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SURPLUS LABOR IN GREEK AGRICULTURE 1953-1960

By
ADAM A. PEPELASIS and PAN A. YOTOPOULOS

ATHENS–GREECE

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ADAM A. PEPELASIS
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THE CENTER OF ECONOMIC RESEARCH

The Center of Economic Research in Greece was established in 1961 in the expectation that it would fulfill three functions: (1) Basic research on the structure and behavior of the Greek economy, (2) scientific programming of resource allocation for economic development, and (3) technical-economic training of personnel for key positions in government and industry. Its financial resources have been contributed by the Ford and Rockefeller Foundations, the Greek Government and the United States Mission in Greece. The University of California at Berkeley participates in the process of selection of scholars who join the Center's staff on an annual basis. It also participates in a fellowship program which supports research in Greece by American graduate students, as well as studies by Greek students for advanced work in economics in American Universities.

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are published in Research Monograph Series.

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Finally, one should emphasize that this is one more example of Greek-American co-operation, a pooling of human talent, funds and efforts, designed to promote the training of economists and help in meeting Greece's needs in the field of economic development.

The ultimate aim is eminently practical : to help in creating a better life for the Greek people.

C O N T E N T S

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P R E F A C E

In this study Professors Adam A. Pepelasis and Pan A. Yotopoulos undertake to measure chronic and intermittent labor surplus in Greek Agriculture for the period 1953—1960, and to derive the implication of their empirical findings for development policy in Greece.

Anyone who has worked with this type of problem is aware of the difficulties involved in unearthing reliable data. The professional economist is invited, therefore, to read with care Part II of the study in which the authors detail the manner in which they succeeded in extracting meaningful information from relatively scanty data. The non-professional reader, however, may find it sufficient to limit his reading to Part I which includes a statement of the problem, the basic findings of the empirical investigation, and the policy recommendations of the authors.

The authors carefully distinguish between chronic (or removable) labor surplus and seasonal labor surplus. Both are measured as a difference of two quantities, namely labor required and labor available in Greek agriculture for each of the years 1953 through 1960. Thus the study is basically h i s t o r i c a l in character. Information on labor availability is far more reliable than information on labor requirements. The data used in estimating labor available are primarily demographic, while the data employed in estimating labor requirements are technical-economic. The labor coefficients used for esti-

mating labor requirements are based on a study by Professor Chrysos Evelpides and refer to 1955. They have been adjusted year-by-year to reflect changing crop structure, variations in output and mechanization. In all instances, they are supposed to reflect the state of the arts as practiced.

While the main body of the study refers to the Greek economy as a whole, four regions were selected for individual attention. The regional findings are reported in Part III. The authors are well aware of the fact that labor surplus estimates based on aggregate (non-regional) requirements and availabilities may hide significant and pressing regional problems (i.e., surpluses or shortages). This consideration motivated the extension of their project to include the investigation of the problem in four particular regions.

Their conclusions merit the attention of professional economists and policy makers. It hems out that over the period considered peak-season labor shortages are becoming apparent, while slack-season surpluses continue to pose a serious economic and social problem. Looking some ten years ahead, the authors conclude that a drastic reorganization of Greek agriculture may well be in order, if the overall labor requirements of a rapidly growing Greek economy are to be met.

ANDREAS G. PAPANDREOU

PART I

THE PROBLEM

Introduction

The size of population became early a central theme in the literature of economics and many eloquent pieces were written by economists elaborating the manifold aspects of this human problem(1). Recently, interest in population and the possibilities of alternative ways of utilizing man-power has been rekindled in the context of the discussion on economic development.

Poverty and « overpopulation » are usually assumed to be the two inevitable fixtures of underdeveloped economies. Semantic trappings are often uninteresting. Whether a country would have a higher per capita income if it had a smaller population is a question that calls for an academic answer. Population in the short run is an insensitive variable — and least amenable to policy manipulations. In a more meaningful context it may be asked «what is the possibility of raising the per capita income through an alternative utilization of man-power ?» This is a problem with important development policy implications.

The purpose of this study is to appraise the size of the agricultural population of Greece in relation to the employment opportunities afforded by the resource-mix of the primary sector. This study is to be consider-

1. The most recent review of the population question from a global point of view is presented in one of professor Carlo M. Cipolla's brilliant little books: *The Economic History of World Population*, Penguin books, 1962.

ed only as an initial and partial attempt to investigate the man-power problem of this developing low-income economy. It must be supplemented by studies of regional agricultural unemployment, industrial and urban unemployment, studies on labor productivity, and in general by a detailed inquiry into the human resources of Greece and the possibility of their improvement. A measure of the volume of unemployment in the Greek countryside is indeed highly important, but it is equally important, in appraising the economic and social significance of rural unemployment, to know something about the mobility of rural labor, the level and kind of its education, its particular skills, the feasibility of alternative employment and so on.

Although, the scope of the present study is limited our findings on the degree of rural unemployment in Greece can still be useful guidelines to policy makers. Three recent developments lend more weight to our results and enhance their significance from the point of view of shaping economic policy. First, the association of Greece with the European *Common Market* may be expected to make labor movements freer between regions of wide wage differentials and of low and high employment opportunities. Second, Greek *emigration* has reached an all time high level and is likely to continue at the same pace(2). And third, official econ-

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2. Quite apart from emigration the birth rate has been on a downward trend which is likely to continue. In 1939 the birth rate was estimated to be about 2.65 % while in 1959 it had fallen to about 1.94 %. The death rate, on the other hand, has reached a low level below which it cannot fall readily (0.74 %). The gross reproduction rate has been computed by professor Valaoras to be 1.2 in 1955 as against 2.1 in 1935. See V. Valao-

omic policy has emphasized the necessity for a more rapid growth of the *industrial sector*. Industrial development, however, will depend partly upon the present and future availability of labor surpluses and their transferability from one sector to another.

In a more general vein, the findings of our investigation may intimately relate to a strategy of economic development that has become popular with textbook writers. It is the « up by the bootstraps » strategy for economic change which typically runs as follows: Population in many underdeveloped areas is larger than the «optimum» size — the size that would maximize per capita output, given the inputs and the state of technology (3). Given a low level of capital in agriculture, a point is reached beyond which further employment of labor reduces its marginal productivity to nil. Surplus labor can, therefore, be withdrawn from agriculture into more productive activities without a fall in output. Thus, the new output outside agriculture will not be obtained at the expense of agricultural output. In this sense surplus labor represents a reserve of unutilized savings(4).

Our study focuses upon two main questions: a) Is there any *removable surplus* labor in Greek agriculture? and b) what is the extent of *seasonal surplus* which

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ras, « A Reconstruction of the Demographic History of Modern Greece », *The Milbank Memorial Fund Quatrterly*, XXXVIII No 2, 1960, pp. 134-135.

3. Gerald M. Meier and Robert E. Baldwin, *Economic Development: Theory, History, Policy*, New York, John Wiley and Son Inc., 1957, p. 281 n. 8.

4. K. Mandelbaum, *The Industrialization of Backward Areas* (Institute of Statistics, Monograph No. 2), New York, Kelley and Millman, Inc., 1945 (second edition 1955), p. XV.

may not necessarily be removable but is equally wasteful both from an economic and a social standpoint? (5)

Within the strictures of our frame of reference and given the limitations of the available data we have found that the *volume of removable labor has declined*, and that Greek agriculture is reaching a stage of permanent labor « shortage » during peak seasons. During the early years of the period under investigation (1953 - 1960), the volume of removable labor was relatively high and part of it had removed itself voluntarily through a continuous outflow of population from the provinces to Athens. In the middle years of the period, the outflow of active agricultural population was just about equal to the size of the labor shortages. In other words, if it were not for emigration, Greek agriculture would have approximated a state of equilibrium in terms of the peak-season demand for and supply of agricultural labor. Since 1957 (and up to 1961, on which we have tentative conclusions) peak-season labor shortages have persisted. Our findings on removable labor may sound unorthodox in view of the quite opposite conclusions that previous studies and estimates have reached(6).

With regard to *seasonal surplus we have found that this continues to remain relatively high* thus presenting a serious economic problem with deep social implications. Winter surpluses for agriculture as a whole have consistently moved to around 25 percent of the winter labor supply, concealing much larger seasonal unemployment in some regions. In Drama, to mention only one such region, we found that about 50

5. Removable labor defined as *chronic surplus labor*, and *seasonal surplus labor*, are discussed below Chapter 6.

6. See Chapter 2.

percent of the agricultural labor force is in surplus during the low employment season. This waste in human resources is too high a cost for an economy to pay to meet labor requirements in the peak season.

In Part I of this study we attempt to set up the proper questions, to clarify some problems of terminology and conceptualization, to outline the conclusions reached by our investigations, and, finally, to formulate policy recommendations suggested by our inquiry. In Part II we develop a method for measuring labor surplus and apply it to Greek agriculture. Part III elaborates on the empirical test of Part II by extending it to a limited regional investigation of the problem.

CHAPTER 1

TERMS AND CONCEPTS

1. Surplus labor

We derive surplus labor in agriculture in three steps. First, we adopt as a norm the labor time that the agricultural population can provide under full employment *(labor available)*. Second, we estimate the labor requirements for performing the agricultural operations, given the cultivated area, the crops, the techniques, the real capital in use and the observed output *(labor required)*. Finally, we assess the difference between labor available and labor required. This we define as surplus labor.

The question that immediately arises is the determination of the time-unit for our measurement. In this respect we will define surplus labor in three ways.

First, the difference between labor available and labor required may be expressed in terms of a whole year. This *average annual surplus labor* is a mere picture of gross changes in the supply of and demand for labor over the years. But it is a measurement deprived of any practical significance for certain kinds of policy questions. The existence of average annual surplus labor does not, for example, warrant the conclusion that part of the labor force can be withdrawn from the farms without any decrease in agricultural output. The inadequacy of the concept in this respect lies in the fact that it overlooks the seasonal nature of agricultural operations by averaging the seasonal employment peaks and troughs. Seasonality is a salient feature of agricultural production which is highly susceptible to the

crop-cycle. Labor requirements, for example, vary with different seasonal operations, and a distinction must be drawn between «preharvest labor» and «harvest labor». This crop-cycle pattern should be recognized and surplus labor should be reckoned in seasonal terms. Early mention must also be made of the need to recognize regional, together with seasonal differences. A study of employment conditions in Western Peloponnesos, for example, would certainly yield different results from a study in the plains of Thessaly.

An alternative is to distribute labor available and labor required over the four seasons of the year. The difference between the two magnitudes leads to the second way of defining surplus labor, the *seasonal surplus labor*. Seasonal surplus labor contributes to the productive operations for only part of the year and can be withdrawn accordingly from the fields only *intermittently*.(7) Policy recommendations outlined in the last section of this part refer primarily to this intermittently withdrawable labor.

The third measurement of surplus labor is better adapted to the problem of permanently withdrawing some labor from the fields. We define *chronic surplus labor* as the difference between the peak-season

7. Agriculture is an industry with a high seasonal component of surplus labor because of the pronounced crop-cycle. However, it should be made clear that from the standpoint of the community's agricultural production as a whole, what determines the degree of seasonal surplus labor is not so much the high or low seasonality of any single crop as the seasonality of the combination of all crops under cultivation. It may be that several crops with highly seasonal labor requirements so dovetail together that the resulting aggregate actual labor employment presents a smooth distribution over the year with a minimum seasonal component of unemployment.

actual employment and the full employment level. Such chronically unemployed labor may be considered as contributing nothing to the productive activities and therefore as directly removable.

An important methodological problem should be clarified. In defining surplus labor the existing cultivated area, crops, techniques, real capital in use and the observed output are assumed to be given. Surplus labor is measured for each year independently, i.e. each year is a unique observation. For our estimates of surplus labor we assess the production function pertaining to each year of the series by applying the computed labor requirement coefficients. These coefficients are expressed in terms of labor per unit of land, capital or output as the case may be for farming, husbandry and forestry. Our basic coefficients are for 1955.([8]) Adjustments for changes in the production function in the other years of the study have been made only by approximation, by changing the labor requirement coefficients appropriately. In other words, for each year of the eight - year period, the labor surplus is measured by taking techniques at their assessed historical levels and not by assuming a state of optimal organization. Thus, the concept of chronic surplus labor refers to a state of affairs where part of the labor force could be removed without a decrease in total agricultural output and without any improvement in methods, (e.g. technology, seeds, irrigation, drainage works, etc.)([9]). We may now define rigorously chronic surplus

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8. The reasons for choosing 1955 as the base year are given in Chapter 6.

9. Recognition should be given to the fact that certain changes in technology from year to year during the period covered

labor: Taking techniques, crop-mix and the quantities of the other factors of production at their historically given levels (with the exception of a routine reorganization of the work force), we estimate the amount of agricultural labor which could have been removed from farms for at least a complete year without any reduction in output.

This definition, is based on the assumption of *ceteris paribus*. This assumption has received a wide range of interpretations. They have varied from the strict static condition to the admission of slight changes in method and organization and even an increase in variable capital. Therefore, it is important that we define exactly what we admit in the province of the « routine reorganization of the work load ».

The withdrawal of some labor from the land is itself a change which must evoke some other changes. It is conceivable that after some people are released from the farms, the remaining workers may have to work harder in order to maintain total output. A reshuffling of workers may occur, and a reshaping of capital may take place. Such changes are assumed to be compatible with the static assumption. Moreover, in our empirical test we will introduce a further aberration from the *ceteris paribus*. We will assume that all labor in excess of peak labor employment can be withdrawn without violating the static conditions, despite the fact that it may have participated in the peak-season agricultural operations. The purpose of this assumption is to make it reasonable to expect the remaining people to do more work after the change — work amounting to a maximum of one season's employment.

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by our study might have shifted the seasonal distribution of unemployment in some crops and in some areas.

For example, assume that the peak-season employment is 94 percent. The chronic surplus labor of 6 percent is then considered withdrawable from the farms without any effect on total output. This, however, does not necessarily mean that 6 percent of the labor force has been idle during the whole year. The peak-season employment is an average figure for three months with component parts higher and lower than 94 percent. If the chronic surplus labor is withdrawn from the farms, output could be maintained only if the remaining workers worked harder for a part of the season. There in lies the importance of our deviation from the *ceteris paribus* condition.

Any more drastic changes are deemed incompatible with the static restrictions. It is assumed that the quantity of capital and natural resources remains fixed. More specificaly, it is assumed that the size of farms does not change; consolidation of the fragmented and scattered small holdings is also ruled out. Finally, the state of techniques in agriculture remains unchanged i.e., no new methods of production are adopted (improved varieties of seeds, new crops, fertilizers, etc.), and no agricultural diversification is introduced to compensate for the seasonal pattern of the crop-cycle.

2. Disguised Unemployment

The term « chronic surplus labor » has often been used in the literature interchangeably with the concept of disguised unemployment. Disguised unemployment refers to the amount of labor force that can be removed for a certain period without any reduction in output. Definitionally, disguised unemployment requires zero marginal productivity *plus* the condition of *ceteris paribus*. The same meaning has been assigned to the concept of disguised unemployment by Nurkse,([10]) Rosenstein-Rodan([11]), Viner([12]), Chiang-Hsieh([13]), Leiben-

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10. Ragnar Nurkse, *Problems of Capital Formation in Underdeveloped Countries,* Oxford, 1955, pp. 32-33. A minor difference between Professor Nurkse's concept and ours lies in the fact that Nurkse includes the consolidation of scattered strips of land in the static conditions while we consider it as violating the *ceteris paribus* assumption.

11. Paul N. Rosenstein-Rodan, « Disguised Unemployment and Underemployment in Agriculture », *Monthly Bulletin of Agricultural Economics and Statistics,* Rome, F.A.O., VI, Nos. 7 and 8 (July 1957), p. 1.

12. Jacob Viner, « Some Reflections on the Concept of Disguised Unemployment », *The Indian Journal of Economics,* XXXVIII, No. 148 (July 1957), p. 17.

13. Chiang-Hsieh, « Underemployment in Asia; I. Nature and Extent », *International Labour Review,* LXV, No. 6 (June 1952), pp. 709-710. In Chiang's nomenclature this concept is referred to as « disguised underemployment » and allows in its static conditions for introduction of « simple labour-saving devices requiring little or no net addition to capital outlay ». Our

stein(14), and the United Nations group of experts(15).

Elucidation of the meaning of disguised unemployment requires that two questions be answered. First, what period is involved in the condition that the marginal productivity of labor be zero? Second, is the existence of zero marginal productivity consonant with rational economic behavior?

It is essential for a correct interpretation of the zero marginal productivity notion in the case of agriculture to define the labor input in terms of man-years. This is an important requirement if we are to differentiate between the *intermittent* and *permanent* withdrawal of labor. Other definitions could easily lead to erroneous measurements. Traditional treatments of disguised unemployment suffer from this defect(16). The result is that the difference between intermittent and permanent withdrawal of labor is obscured and the degree of disguised unemployment is usually exaggerated.

As to the second question a distinction must be made between hired labor and self-employed labor. Disguised unemployment does not apply to the former. Presumably, employers will not employ a worker for wages unless his labor increases the total product(17). Zero mar-

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definition is slightly different since it rules out any increase in capital.

14. Harvey Leibenstein, *Economic Backwardness and Economic Growth*, New York, John Wiley and Sons Inc., 1957, pp. 59-60.

15. United Nations, Department of Economic Affairs, *Measures for the Economic Development of Underdeveloped Countries*, New York, 1951, p. 7.

16. Exception should be made for Rosenstein-Rodan's definition that adopts as unit of measurement the year, which subsequently is modified to ten months; *op. cit.*, p. 12.

17. See Jacob Viner, *op.cit.*, p. 18; Ragnar Nurkse, *op. cit.*, p.33;

ginal productivity is considered compatible only with self-employed labor. In this case, it is argued, farmers are working on their farms but contribute nothing to output. In fact, they apply labor unnecessarily. How can this be explained?

One possibility is to assign such a phenomenon to ignorance. Suppose that in a family farm each member was uninformed of the contributions made by the other members. Consequently, he would have thought his marginal productivity to be positive, while in fact it was not. Such an explanation is hardly acceptable. The family farm operates for consecutive productive periods systematically rather than in a hit and miss way. Ignorance as to the fact that the toil of the family contributes nothing to the output is difficult to envisage as a chronic phenomenon. Besides, an agricultural family does not work during certain periods. This may be admitted as presumptive evidence of the realization that for such periods their marginal product is zero. Then should we not expect them to know if

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Gerald M. Meier and Robert E. Baldwin, *op. cit.*, p. 282; United Nations, Department of Economic Affairs, *op. cit.*, p. 7; United Nations, Economic Commission for Asia and the Far East, *Economic Survey of Asia and the Far East* 1950, New York, 1950, pp. 70 - 74; Paul N. Rosenstein-Rodan, *op, cit.*, p. 3; W. Arthur Lewis, *The Theory of Economic Growth,* Homewood, 111, Richard D. Irwin, 1955, pp. 326 - 327. On the other hand, W. Arthur Lewis in « Economic Development with Unlimited Supplies of Labor », *The Manchester School of Economics and Social Studies*, XXII, No. 2 (May 1954), pp. 141-142, conveys the impression that disguised unemployment appears also in many underdeveloped countries when labor is employed for wages in domestic service. Professor Leibenstein, *op. cit.*, Chapter 6, *passim*, attempts to construct a case for zero marginal productivity of hired labor.

their marginal product were zero for longer periods also?

The other possibility is that a worker works, despite the knowledge that his marginal product is zero, because he has a zero marginal rate of substitution between income and leisure. But in view of the low per capita income of underdeveloped countries and the considerable fatigue associated with agricultural work this supposition cannot generally be accepted.

The hypothesis of disguised unemployment, in the sense of the existence of labor with zero marginal productivity, may be admitted only if we are ready to indict people of low-income economies of a high degree of irrationality. Instead of applying labor that produces nothing, there is always the simple alternative to take more leisure that has a positive marginal utility ([18]).

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18. A review of the literature reveals the existence of at least two other concepts of disguised unemployment that have been used indiscriminately with the one we have described. One refers to the case in which zero marginal productivity would emerge for part of the labor force after a certain compromise of the *ceteris paribus* assumption had been made — by the addition, for example, of some capital in the production function. In this sense, dynamic disguised unemployment either describes no more than the possibility of substitutability between the factors of production, or at best connotes the inefficient utilization of resources. For examples of dynamic disguised unemployment see Harvey Leibenstein, *op. cit.*, p. 60; Chiang-Hsieh, *op. cit.*, pp. 709 and 710; International Labor Office, « The Ninth International Conference of Labour Statisticians », *International Labour Review,* LXXVI, No. 3 (September 1957), p. 278; International Labour Office, « The Measurement of Underemployment », *International Labour Review,* LXXVI, No. 4 (October 1957), p. 353; Alfredo Navarrete, Jr. and Ifigenia M. de Navarrete, « Underemployment in Underdeveloped Economies », reprinted in A.N. Agarwala and S.P. Singh (editors), *The Economics of Underdevelopment,* London, Oxford University Press, 1958, p. 342.

Another meaning that the literature has attached to the con-

Definitional quibbles aside, it still remains true that part of agricultural labor can be withdrawn from the farms without any decrease in output. The preceding discussion has made clear the difference between chronic surplus labor and disguised unemployment. The definition of chronic surplus does not involve the concept

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cept of disguised unemployment entails « low » rather than zero marginal productivity of labor. Such a concept has an evolutionary or developmental ring concerning the efficiency of labor and envisages the possibility of transferring labor to entirely different occupations so that its marginal product is restored to an « appropriate » level. For examples of this version of disguised unemployment see Joan Robinson, « Disguised Unemployment », *The Economic Journal*, LXVI, No. 182 (June 1936), pp. 225 - 237; the same, *Essays in the Theory of Employment*, New York, The Macmillan Company, 1937, pp. 82 - 101; Ragnar Nurkse, *Problems of Capital Formation in Underdeveloped Countries*, Oxford, Basil Blackwell, 1955, p. 50; International Labour Office, « The Ninth International Conference of Labour Statisticians», *loc. cit.* International Labour Office, «The Measurement of Underemployment » *op. cit.*, p. 356; United Nations, Department of Social Affairs, *The Determinants and Consequences of Population Trends*, New York, Population Studies No. 17, p. 249; Alfredo Navarrete, Jr. and Ifigenia M. de Navarrete, *op. cit.*, pp. 342 - 343; W. Arthur Lewis, « Economic Development with Unlimited Supplies of Labour », *The Manchester School of Economic and Social Studies*, XXII, No. 2 (May 1954), pp. 139 - 191; the same, « Unlimited Labour; Further Notes », *ibid*, XXVI, No. 1 (January 1958), pp. 1 - 32; William J. Barber, « Disguised Unemployment in Underdeveloped Economies, » *Oxford Economic Papers*, XIII, No. 1 (February 1961), pp. 103 - 115; Gustav Ranis and John C. H. Fei, « A Theory of Economic Development », *American Economic Review*, LI, No. 4 (September 1961), pp. 533 - 565.

For a theoretical analysis of the different concepts of disguised unemployment and an alternative interpretation see Pan A. Yotopoulos, *Disguised Unemployment and Elastic Supplies of Labor* (Unpublised Ph. D. Dissertation., University of California, Los Angeles Library, July 1962).

of zero marginal productivity, which, however, is definitionally implied by disguised unemployment. This relationship may have been responsible for the interchangeable use of the two concepts in the literature. Nevertheless, both concepts lead to the same policy conclusion: *withdrawal of labor with no decrease in total output.*

CHAPTER 2

THE NEW AND OLD EVIDENCE ON SURPLUS LABOR IN GREEK AGRICULTURE

1. The Findings

At the outset, is should be made clear that our quantitative findings must be received with a grain of salt. The limitations of our measurements, as they are evident throughout Chapters 4 and 5, the variety of assumptions employed in deriving labor available and labor required, and the questionable reliability of some data used make our figures only indicative of the order of magnitudes.

The objective of our test is to measure the volume of removable surplus labor as well as that of seasonal surplus labor. An underlying question of the study relates to the extent to which removable surpluses can contribute to the industrial labor force through the next decade without substantial reorganization of Greek agriculture.

A. *With regard to removable labor:* Our findings suggest that only in the first two years of the period under investigation there was removable labor. In 1953 and 1954 about 3.5 percent and 2.3 percent of agricultural labor respectively, (the equivalent of approximately 90,000 and 60,000 persons of working age), was removable surplus. Since then Greek agriculture has consistently experienced rising labor shortages during both peak periods (spring and fall). The Labor Diagram, Table 5, shows that labor shortage has oscillated from 2.6 percent (of the order of 65,000 workers) to 7.8 percent (195,000 workers). The shift from removable surpluses to labor shortages (during the peak seasons)

is attributable mainly to two factors:

a) A persistent shift of the agricultural population from the countryside into the cities and in particular to Athens,

b) A rising trend in labor requirements.

In the decade of 1950 - 1960 an unparalleled population exodus took place. We estimate that between 1953 - 1960 about 380,000 (or 54,000 annually) left the provinces largely for the capital city. Of these emigrants 360,000 are assumed to be of working age. The annual emigration of the agricultural active population is estimated around 51,000 or, expressed in terms of our labor units, about 8,750,000 Man Productive Days (MPDs), i.e., about 4.1 percent of the annual labor available, for all eight years of the series(1). To underline the significance of emigration, Table 1 below presents the estimates of removable labor and labor removed during each year of the period(2).

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1. Man Productive Days are the work-days of an adult male worker multiplied by the full working days available for agricultural work. See Chapter 4.

2. There are no data on internal emigration for the decade 1950 - 1960. The figures quoted in the text are our own estimates based on a series of assumptions. We assume the physical annual rural population rate of growth to be about 1.4 percent. On the basis of this rate agricultural population should have increased from 3,947,700 in 1953 to about 4,335,000 in 1960. The agricultural population of 1960, however, was estimated to be short of some 380,000 people. This was assumed to be the net outflow from agriculture. Furthermore, we made the assumption that this population outflow was evenly distributed over the years of our study, (i.e., about 54,000 anually). It is likely, however, that in fact, emigration was somewhat higher in the more recent years. Next, by computing the number of emigrants by working age brackets, we derived an estimate of *labor* outflow, the annual size of which was set at about 51,000. Part of our data

The increase in labor requirements is due to a variety of factors the most important of which are: a) increased acreage of land under cultivation. Between 1953 and 1960 cultivated stremmas([3]) increased from 32,5 to 35,7 millions; b) an increase in the share of intensive crops (cotton, fruits and vegetables), and c) increased yields per stremma. The sharp labor shortages in the peak period of 1957 and 1959 were to a large extent connected with high yields. The effect of these three factors upon labor requirements apparently has been greater than the counterbalancing labor-saving effect of increased mechanization and new methods introduced during the period.

In summary aggregate removable surpluses do not seem to characterize Greek agriculture any longer. On the contrary, labor shortages have become more pronounced([4]). But these shortages are not yet alarming because:

1) They can still be offset by an elastic supply of effort. In our study we have not estimated the supply of agricultural labor as a function, say, of a regional pattern of wage rates,but rather we estimated it in terms of the availability of labor as a resource. In the measure of labor available there is inevitably a margin of fluidity which cannot be captured by the techniques used in the study. Thus, during the peak season, agricultural labor

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came from G. Siambos: *Demographiki Exelixis en Helladi* 1950 - 1960. (Population Developments in Greece, 1950 - 1960). Mimeo, Ministry of Coordination, Athens, 1961.

3. One stremma is equal to 0.2471 of an acre.

4. Our regional findings (Part III, Ch. 7) suggest that a region can meet large labor shortages through hired and migratory labor. This, however, cannot be the case for agriculture as a whole.

TABLE 1. Chronic Surplus Labor and Emigration

In thousand Man

		1953	1954
1. Labor Available before Emigration		85,837.1	86,174.3
2. Labor Available after Emigration		83,452.4	83,789.6
3. Labor Required		80,567.9	81,867.1
4. Excess Labor before Emigration		5,269.2	4,307.2
5. Excess Labor after Emigration		2,884.5	1,922.6
6. Rate of Chronic Surplus Labor (before Emigration)	(4/1)	6.1	5.0
7. Rate of Chronic Surplus Labor	(5/2)	3.5	2.3
8. Rate of Labor already Removed	(6—7)	2.6	2.7

Source: Tables 3 and 5.

Note: Computations based on the peak employment season (spring) for all years of the series.

Emigrating labor has a different age distribution from total

from the Agricultural Sector 1953 - 1960

Productive Days (MPDs)

1955	1956	1957	1958	1959	1960
86,454.2	86,601.4	86,715.3	86,857.9	87,009.5	87,077.7
84,069.5	84,216.7	84,330.6	84,473.2	84,624.8	84,693.0
86,565.8	87,414.6	90,887.3	88,236.7	89,271.5	86,914.5
— 111.6	— 813.2	— 4,172.0	— 1,378.8	— 2,262.0	163.2
— 2,496.3	— 3,197.9	— 6,556.7	— 3,763.5	— 4,646.7	— 2,221.5
— 0.1	— 0.9	— 4.8	— 1.6	— 2.6	0.2
— 3.0	— 3.8	— 7.8	— 4.5	— 5.5	— 2.6
2.9	2.9	3.0	2.9	2.9	2.8

agricultural labor. An equal number of MPDs from the emigrating labor group and total agricultural labor group when transformed into equivalent labor units (e.g., persons) give different results.

may be augmented by people working normally outside the sector, and by increased effort on the part of those normally engaged in agricultural pursuits, (e. g. longer and harder hours). It is open to question, however, whether in the future the elasticity of the supply of effort can remain large enough to make up for labor shortages. It stands to reason to expect that when per capita income will have risen from the present neighborhood of $325.00 to, say, $500.00 there will be less pressure for excessive effort during the labor shortage seasons and for young children (e. g., 10 - 14 years old) or old people (elders of over 65 are now the beneficiaries of old age pension) to go to work. To this extent peak labor shortages may then have more of an adverse effect on output.

2) Presently labor shortages are felt enough to lead to a speeding up of mechanization of certain activities. Small size tractors, for example, are being introduced for the ploughing of vineyards in regions (e.g., Corinthia) where labor is scarce and expensive during the peak season.

3) Finally, absence of labor shortages does not necessarily imply an ideal situation. *On the contrary in regions where productivity and incomes are low, removal of labor, even at the expense of labor requirements during the peak season, to more productive employment is a movement in the right direction for the economy as a whole even if regional agricultural output would fall.*

At this point a reminder is in order. Our findings both on the size of removable labor in the early years of the period under investigation and on the peak-season labor shortages since 1957 are based on the restricting condition of changes in techniques which were actually realized and not optimal changes which could have

been introduced. Therefore, one may argue that if agricultural operations were rationally organized and more mechanized a sizeable removable surplus might have emerged.

Indeed, the margins for technological change and, in general, for a more rational farm organization are large in Greek agriculture. Although considerable progress has been accomplished in the decade of the 1950's, productivity is still low by European standards and many innovations remain to be introduced. In discussing the possibilities and the extent of technical changes and labor-saving methods in agriculture the following points should be kept in mind. In the first place public and private investments in agriculture are below the point which would permit rapid and extensive mechanization and reorganization. Secondly, introduction of new techniques takes time as it often requires important changes in farm organization. Such changes have not been forthcoming in Greece at a satisfactory rate. Land consolidation is a good example. If consolidation measures had been more successful labor requiremets would have been considerably less.(5) Thirdly, the margin for introducing certain types of agricultural equipment (e. g., small tools) is still considerable while for others is limited. Tractorization, for example, is restricted in as much as small plots are a predominant feature of Greek agriculture. Given the topography of Greece, the crop pattern, the small size of farms, and their fragmentation, it is estimated that some 30,000 tractors could be used on the 14 million plain land stremmas. Presently there

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5. Kenneth Thompson, *Land Fragmentation in Greece,* Athens, Center of Economic Research, 1962.

are already about 20,000 tractors in use. Finally, introduction of new techniques and advanced methods affect labor requirements both ways. Thus, for example, adoption of insect and disease control, or increased fertilization, requires the application of additional labor. Similarly, irrigation leads to increased demand for labor. It is estimated that, under existing technology, irrigation raises employment up to 100 percent. This increase in the demand for labor is due to increased requirements for a larger output, to increased double cropping, and to a shift from extensive to intensive cultivation. Expansion of such crops as cotton, sugarbeets, fruits and vegetables will take up much of the newly irrigated land. Conservatively, three to four million additional stremmas will have been irrigated by 1970 and to that extent labor requirements will tend to rise on this account.

At this point we might pause and look into the future labor picture of Greece. Presently, in the industrial areas of Athens - Piraeus and Salonica there exists substantial unemployment in industry and the service sector. It is estimated that non - agricultural unemployment is currently over 11 percent, i.e., some 185,000 persons.(6) Therefore, even a continuously sharp increase in the demand for labor can be met readily and rapid industrialization can draw upon this labor pool for some time.

On the assumption, however, that industrial labor productivity maintains the pace observed in the 1950's, it is likely that by 1972 the labor reserve of 185,000

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6. See Andreas G. Papandreou, *A Strategy for Greek Economic Development*, Athens, Center of Economic Research, 1962 p. 26.

unemployed may well have disappeared partly through emigration — assuming its trend of 1957 - 1960 to continue — and partly through a rising demand for labor. More specifically, Professor Papandreou in a discussion of alternative types of programs, notes that surplus labor will persist by 1972 only on the assumption that the emigration rate will be lower than that of 1960 and 1961, and that the net value added per worker will grow in the 1960's faster than it did in the 1950's. If labor productivity in the 1960's falls, labor shortages will develop even if emigration drops below that of 1960 and 1961.(7) The Greek economy which now suffers from heavy unemployment, will then face a *labor problem* — not only in its traditional form of lacking labor skills but also in terms of labor volume. And this at a time when rapid economic development will presumably have caught on.

In the face of these general expectations and the implications of our findings for the future, and in view of the planned changes in the composition of agricultural output *increased programmed capital investments and drastic organizational and technological changes in agriculture will be required in the not too distant future if a transfer of labor from agriculture to industry is to continue without a reduction of agricultural output.* Since most organizational and technological changes require time for their adoption the Greek goverment may well be advised to speed institutional and organizational changes in agriculture and to reconsider its overall investment program in favor of increased capital outlays in agriculture. Within the limits imposed by comparative

7. Andreas G. Papandreou, *A Strategy, op. cit.*, Table 3.6.2 pp. 98-99.

productivity considerations of alternative investments, such outlays ought to be carefully designed in ways which, in part would tend to *alleviate* excessive seasonal labor shortages and, in part, would *release in the future labor for industrial employment.*

The Greek government would also be well advised to review its long-run emigration policy since this is closely connected with the general labor picture (8). The population exodus from Greece in the past ten years has not received sufficient attention. Certainly, it is not easy to compare the social and economic advantages for a low level economy with the losses arising from emigration of surplus labor. But it would appear that while continuing emigration in some ways may ease the process of economic development by restraining total consumption, at the same time it may help to create a number of adverse conditions. In the first place, the rate of Greek population growth is relatively small, i.e., a little above 0.9% including emigration. In the

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8. For the period 1957 - 61 the average annual number of new entrants in the labor force was 37,700. For the same period about 26,200 workers emigrated annually. But during 1960 and 1961 the increase in emigration became alarmingly larger. Thus, gross emigration in 1960 and 1961 jumped from a level of about 29,790 in 1955 to 47,770 and 58,840 respectively. Labor emigration in 1961 reached 37,650. In 1962 it appears that emigration will rise still further. In the first quarter of 1962 gross emigration was estimated to be 50 percent higher than in the corresponding quarter of 1961 and three times as high as in the same quarter of 1960. In 1960 and 1961 emigration during the first quarter of the year was 1/8 and 1/6 respectively of total annual emigration. If something like these two ratios are finally reached in 1962 emigration may well be anywhere between 90,000 and 120,000 persons as against an expected 85,000 increase in population.

second place it is not merely the numbers of emigrants but their quality which is disquieting. Greek workers emigrating to Western Europe and overseas are selected by the receiving country and they are above average in intelligence, receptivity to change, health, education, and skills. About 50 percent of the emigrants of the first quarter of 1962 are classified as handicraft and industrial workers. These workers are not the run of the mill, but young men often characterized by a propensity to self-improvement, an important property for the creation of a changing labor force suitable to face the new tasks of industrialization.

Finally, a government is more likely to face pressing issues, such as unemployment with greater determination by attacking the basic weakness of the economy, when easy and ready-made solutions (such as emigration) are not available. It is feared that alleviation of unemployment through emigration may lull the Greek government into being satisfied with half measures.

B. Equally important is the finding of a *seasonal pattern of heavy unemployment.* Winters and summers are the two seasons that consistently show a considerable degree of seasonal unemployment. (See Chapter 6, table 5.) This is due to the fact that crops with an annual cycle, e.g., cereal food crops, olives, tobacco, etc., dominate farm activity in Greece while more advanced forms of agriculture, such as dairy farming, are of little importance.

Our test has shown that annual seasonal surpluses have fallen from the annual level of 15 percent in 1953-1954 to about 10 percent at which they have persisted for the period 1955 - 1960. Low season unemployment in the first two years of the series was around 16 percent

of the annual labor available. In the last two years of the period this percentage dropped to about 11.5. On an annual basis the waste of human resources because of seasonal unemployment is approximately 40 million man productive days or the equivalent of approximately 275,000 people, or some 90,000 families. Winter unemployment oscillates around the high figure of 25 percent of the winter labor supply — with extreme regional variations. In the region of Drama, for example, about half of the labor force remains unemployed during the slack season. In the summer the percentage drops to around 20.

The extent of social waste is, in fact, larger than these percentages seem to suggest because weather conditions and absence of alternative employment opportunities make the length of the agricultural work-year involuntarily shorter (255 days) than in other activities. On the other hand, it is worth noting that our estimates of the rate of seasonal unemployment may be slightly exaggerated to the extent that changes in the crop-mix have not been considered in the seasonal distribution of labor requirements. That is to say, although changes in the crop-mix have been taken into account as far as aggregate annual labor requirements are concerned, the coefficients of the seasonal distribution — which are determined by the crop-mix — were assumed to remain constant. It is likely, that such changes, on balance, tend to reduce agricultural seasonality.

Assuming that the margins for further rising labor shortages in the peak seasons are limited, the periodical seasonal surpluses can be contracted by removing labor to the extent that some operations in the peak periods can further be mechanized, by further changes in the

crop-mix and the introduction of new activities (e.g., husbandry, industry). As it stands now it may be said that seasonal surpluses express an additional economic and social cost of the increased demand for labor in the peak seasons.

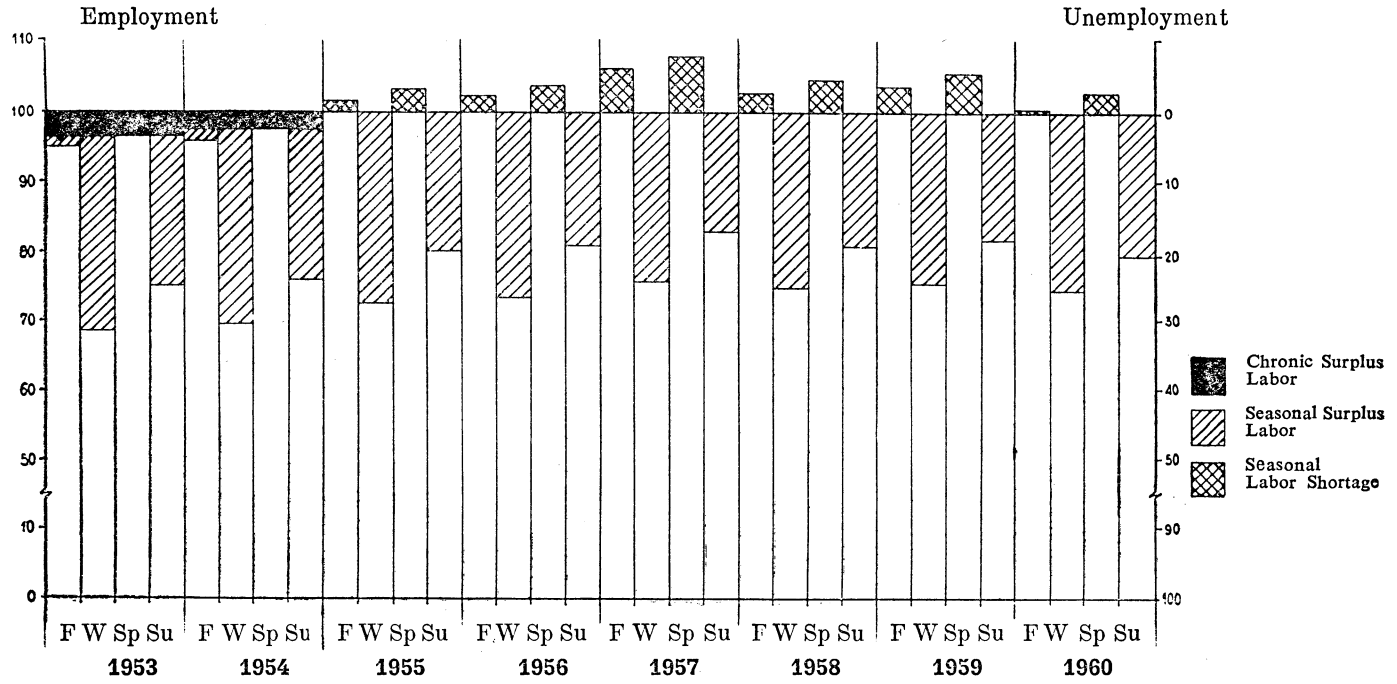
Figure 1 shows the area of seasonal unemployment. This considerable pool of unemployed labor with its regional variations can undoubtedly become a positive condition for the establishment of new non-agricultural activities of relatively higher productivity than marginal agricultural pursuits. As is explained in the last Chapter of this part the utilization of seasonal labor surpluses is one of the criteria that must affect investment allocation for regional development.

Appraisal of the degree of seasonal unemployment opens the way for more efficient man-power utilization in agriculture. Generally, to this end there exist two alternatives. First, seasonal unemployment may be transformed into chronic surplus labor by levelling off the peaks of agricultural employment. Thus, increased mechanization of peak season tasks, and farm reorganization will release labor that can become chronically available for employment elsewhere (9).

The second method calls for providing additional work for the farmer during the slack period. Our test suggests that the production possibility frontier of Greek agriculture would be pushed outwards if more balanced farming could be achieved with supplementary and complementary enterprises (e.g. husbandry, cottage industry or handicrafts) which use more fully the

9. In the case of olives and fruits the peak labor period is during the summer and fall harvest season. These are tasks that cannot satisfactorily be mechanized even when full attention is being directed towards this problem.

FIGURE 1. Employment, Overemployment and Seasonal Unemployment in Greek Agriculture, 1953 - 1960 (In Percentage of total Labor Available)



labor and land resources. The reorganization of the crop-mix by introducing crops whose labor requirements dovetail together would also provide additional employment during the slack seasons([10]).

Both methods of eliminating seasonal unemployment present a serious problem: They call for the use of more capital. This is often the scarce factor of production in underdeveloped countries — which makes the prescription for eliminating the seasonal unemployment an expensive one. Furthermore, the additional capital is bound to remain idle during some part of the year. Under the first method, capital will not be utilized during the period of what before the change used to be the slack employment season. Under the second alternative, capital will remain idle during the peak activity period

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10. The reorganization of the crop-mix for the purpose of alleviating the seasonal unemployment, (within the climatic constraint) may seem a simple measure. However, possibly because of the general surmise of a generous degree of chronic surplus labor, the official agricultural policy in Greece has consistently overlooked seasonal requirements in introducing crop reorganization. An example is provided by the Five-Year Development Program which, in the agricultural sector, placed main emphasis on the further expansion of spring crops, e.g. cotton, rice, maize, pulses, etc. (The production of cotton, for instance, was programmed to increase by 14.5 percent annually for the years 1959 - 1964. Ministry of Coordination, *Five-Year Programme for the Economic Development of Greece*, 1960 - 1964 (Athens, National Printing Office, 1960), p. 20, tables 2 and 2a and p. 31). Such crops are characterized by serious concentration of their labor requirements in the spring (preparation of the soil, ploughing, sowing, fertilizing, etc.) and the fall (late irrigation especially for cotton, and harvesting). *Therefore, emphasis on spring crops would worsen the seasonal distribution of labor employment, unless appropriate technological changes are adopted.*

when labor requirements in the field will cause all cottage industry or handicraft activities to be suspended. It is, therefore, a matter of compromising wisely between the disadvantages of keeping expensive capital or relatively cheap labor employed only during part of the year.

2. The Existing Estimates of Surplus Labor in Greek Agriculture

How do our estimates of labor surplus compare with those of other studies? At the outset, it must be pointed out that since the concepts and the measurement methods used in our test are not strictly comparable with the concepts and methods employed in other studies, comparability of results is to be taken loosely. Thus, often it is not clear whether unemployment figures refer to seasonal conditions or removable surpluses, or are used as annual averages. Yet, a comparison may be useful as it reveals gross differences in the order of magnitude of unemployment estimates.

Impressions about the existence of widespread surplus labor in Greek agriculture have been grounded upon a good deal of casual observation and only occasionally upon a detailed analysis. Below, we cite a few examples of impressionistic estimates of surplus labor.

The «widespread underemployment in Greek agriculture» (11) was invoked by the «National Bank of Greece and Athens» in order to explain why « a considerable proportion of the rural population was moving into urban areas» (12). Similarly, the Bank of Greece quotes «unof-

11. The term « underemployment » as used in many of these studies is analogous to our « surplus labor ».

12. National Bank of Greece and Athens, « Greece Today » *Review of Economic and Business Conditions* No. 32 (January 1957), pp. 58 - 59.

ficial computations » which estimate the excess agricultural labor at 790,000 ([13]). The same source mentions that the Agricultural Bank of Greece estimated for 1955 the average employment per agricultural worker at 170 work-days, « a very low level even when the strongly seasonal nature of the agricultural operation is taken into account » ([14]).

Recently, it was reported in an unpublished memorandum put out by a leading public institution that «the problem (of unemployment) is particularly acute in agriculture. Figures which have been calculated on the basis of data as to man-years required for each type of cultivation under *current conditions as to methods and area of cultivation* with due allowance for seasonal peaks in labor requirements and the influence of factors such as weather conditions on the number of man-days worked, indicate that 750,000 rural workers or 35% of the labor supply currently available in the agricultural sector (2,140,000) could be withdrawn without loss of output or income ». These estimates of labor were made for 1957, a particularly good year with high yields and relatively high labor requirements. If these estimates were to reflect actual employment conditions in 1957, then the percentage of removable labor should be anywhere between 40 and 50 in the period 1950 - 1960 (assuming techniques constant). Indeed, this is an example of exaggerated notions of excess farm labor which careful observations of the conditions in the Greek countryside fail to bear out.

A recent estimate of removable agricultural labor was

13. Bank of Greece (Economic Research Department), *I Economia Tis Hellados Kata ta Eti 1955 ke 1956* (The Greek Economy During the Years 1955 and 1956), Athens, 1957, p. 228.

14. *Idid*, pp. 227 - 228.

given by the Organization for Economic Cooperation and Development. In the 1962 OECD economic survey of Greece it was stated that 25 percent of the agricultural man-power — i.e. 500,000 active persons — could be transferred from agriculture to other sectors without any decrease of agricultural production ([15]).

The FAO Mediterranean Development Project - Country Study on Greece estimated the agricultural labor force and the annual workload in work-days (labor required). The « work per unit of labor force » was computed in days per year and was compared to the number of days per year available for agricultural activities (300 days!). For 1956 the ensuing degree of underemployment was 37 percent.

The most recent estimate of agricultural labor surplus is in the official memorandum of the Greek Government to OECD ([16]). In this document the surplus is estimated at 400,000 persons or at the high figure of 750,000 if surplus estimations are based on a longer agricultural work-year.

The Rockefeller Foundation study of the economy of Crete concluded that « the degree of rural underemployment is significant. Perhaps 60 to 65 percent of the farm labor force working an eight-hour day would be sufficient to maintain current output »([17]). This estimate was revised upwards by Dr. George Coutsoumaris :

« . . .given the fragmentation and geographical dis-

15. Economic Surveys - Greece, April 1962, p. 5.

16. Memorandum sur le programme quinquennaire du developpement économique de la Grèce, Ministère de la Coordination, Athens, Juin 1962.

17. Leland G. Albaugh, *Crete, A Case Study of an Underdeveloped Area*, Princeton University Press, Princeton, New Jersey, 1953, pp. 245 - 246.

persion of plots of land, the production of household goods and the performed marketing services, this figure (Albaugh's) may have to be increased to around 80 percent. The true rate of rural underemployment thus approximates 20 percent of the current farm labor force » ([18]).

Another impression of «disguised unemployment» ([19]) for Greece is included in Professor Colin Clark's study: The Conditions of Economic Progress ([20]). Professor Clark's method, however, is so roundabout that it actually begs the question under consideration. His main concern is to establish a « full employment limit » in the sense of the number of cultivators per square kilometer that may be taken as a maximum satis-

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18. George Coutsoumaris, « Resource Productivity and Development Policy for Greek Agriculture — An Illustrative Study », *Journal of Farm Economics,* XXXVI, No. 2, (May 1954), p. 294. More interesting is another study by the same author that yielded direct estimates of the marginal productivity of labor in Greek agriculture, although it was independent of any test of disguised unemployment. A cross-sectional Cobb - Douglas analysis of data drawn from nine regional agricultural surveys in the 1933 - 38 period estimated the marginal productivity of labor available on the farm at 39 drachmas per man-day (1938 drs., i.e, approximately $0.90). The corresponding average productivity was 30.2 drs., which was from 50 to 70 percent of the rate for hired labor prevailing at that time. If this is admitted as a test for the existence of disguised unemployment, the hypothesis should be rejected since the marginal productivity of labor is positive. See George Coutsoumaris, *Possibilities of Economic Development in Greek Agriculture,* (unpublished Ph. D. Dissertation, The University of Chicago Library, 1953), pp. 97 - 100.

19. The term « disguised unemployment » used often in the studies mentioned here has been discussed in Chapter 1 p. 32.

20. Colin Clark, *The Conditions of Economic Progress,* London, Macmillan and Company, 1957 (First edition, 1940).

factory density([21]). For this purpose he first establishes the actual density of males per square kilometer of cultivated area.

« The next step. . . is to record all the available direct evidence about unemployment of rural labor. Such evidence sometimes takes the form of the average number of days per year worked by a representative sample of rural workers. At other times it may be a round figure stated from general impressions; but such a figure from a really experienced observer, is in many cases, of greater value than a collected sample ». If, for example, we find that a population settled at a density of 50 is only 60 percent occupied, we deduce that 30 percent represents the « full employment » limit ([22]).

For Greece, the estimated « percentage utilization of labor » is taken at 54, or in other words the degree of underemployment is set at 46 percent ([23]). On the basis of this figure and the fact that in Greece we have 33,000 square kilometers of cultivated land and 1.18 million of male population engaged in agriculture (1946) — or 36 males per square kilometer of cultivated area, the «full employment limit» for Greece is estimated at 19 males per square kilometer ([24]).

Similarly, a number of more careful and methodical studies of Greek rural labor surplus reach estimates

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21. *Ibid*, pp. 312 - 325.

22. *Ibid*, p. 318.

23. It is not mentioned whether the degree of labor utilization for Greece is the result of the study of « a representative sample of rural workers » or whether it is « a round figure stated from general impressions ».

24. No other reference is given for the Greek data but to the newspaper *To Vima* Athens, 7th May 1950; Collin Clark, *op. cit.*, p. 319.

that are again more liberal than our results. Professor Evelpides'study may serve as an example. The degree of underemployment he derives from his computations is 40 percent ([25]). Since Evelpides study does not distribute the underemployment in seasonal terms, his estimate is comparable to our average annual surplus labor. A reason for his high estimate is an exaggerated estimate of labor availability (650 million wage days, computed on the basis of an overblown figure of 4,720,000 of agricultural population). On the other hand Professor Evelpides adds together man and supplementary wage days without converting them first into homogeneous Man Productive Units.

Mr. Ferentinos in his valuable study estimated the labor redundancy in Greek agriculture for 1953 (without including forestry and fishing) at 33.4 percent, or 291 Man Productive Days per family out of 436 Man Productive Days available per family ([26]). Again this estimate represents the average annual surplus labor. Ferentinos' study also suffers from an overestimate of labor availability.

The Agricultural Bank of Greece ([27]) compared labor available and labor required for 1955 and deduced the

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25. Chrysos Evelpides, « Anaskopisis tis Georgikis Economias tis Hellados » (Review of the Agricultural Economy of Greece), *Agrotiki Economia*, No. 9 (January - March, 1957) p. 33.

26. K.A. Ferentinos, *I Apodotikotis tis Hellinikis Georgias* (The Productivity of Greek Agriculture), Athens, 1954 pp. 16 - 17.

27. Agricultural Bank of Greece, *I Helliniki Agrotiki Economia Ke I Drasis Tis Agrotikis Trapezis Kata To 1955.* (The Greek Agricultural Economy and the Activities of the Agricultural Bank in 1955), Athens, 1956, pp. 11 - 13.

volume of surplus labor, which seasonally distributed appears as follows :

TABLE 2. Seasonal Labor Distribution

(In million man days)

	Summer	Fall	Winter	Spring	Total
Labor Available	149.8	114.7	79.7	105.8	450.0
Labor Required	82.7	84.4	51.1	81.8	300.0
Underemployment	44.8 %	26.4 %	35.9 %	22.7 %	23.4%

Comparison of these findings for 1955 with our Table 5 below indicates that our main difference lies in the estimate of labor available. Since the method used to derive the Agricultural Bank's estimates is not given, all the sources of the divergence cannot be identified. It is clear, however, that the difference is partly due to different estimates of agricultural population. The Agricultural Bank used for 1955 a figure of 4,768,000 as against our estimate of 3,958,800.

Estimates of «disguised unemployment» have also been included in a study of the economic development of Eastern and Southeastern Europe, undertaken during the Second World War by a group of English economists for the Royal Institute of International Affairs, Chatham House, London([28]). For the entire area of Eastern and Southeastern Europe and on the basis of data for

28. All the information of the group on the subject of disguised unemployment has been summarized in « Agricultural Surplus Population in Eastern and Southeastern Europe », compiled by Paul N. Rosenstein-Rodan as a part of the materials of the 1943 - 45 study of *Economic Development of Eastern and Southeastern Europe*, undertaken by the Royal Institute of International Affairs, Chatham House, 10 St. James' Square, London, S. W. I. As reported by Berdj Kanadjian, *Disguised Unemployment in Underdeveloped Countries* (unpublished Ph. D. Dissertation, Harvard University Library, April 1957), p. 160.

1937, the Chatham House study estimated that 26 percent of the total agricultural population was surplus in the sense that in any given conditions of agricultural production that much could be removed from the land without reducing agricultural output ([29]).

Referring specifically to Greece, the Chatham House study estimated that in 1937 the rural man-power redundance amounted to 1,040,000 people out of 4,350,000 total agricultural population, that is 24.3 percent ([30]). The method used to derive this estimate is only sketchily described. The supply of labor in Greek agriculture was obtained by multiplying the 1937 active agricultural population by 200 (assumed) working days annually. From this number was subtracted « the actual labor used for field work on the basis of the man-days needed for the production of each separate crop grown in the country per unit of agricultural land ([31]) ». This residual was then converted into a number of active workers. The final estimate of 1,040,000 people in «disguised unemployment» was obtained by projecting to Greece the ratio of 5 million active to 8.8 million total agricultural population that was derived in the case of Poland ([32]). This ratio was taken to describe the

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29. United Nation experts have accepted the Chatham House study estimates of disguised unemployment in Eastern and Southeastern Europe. See United Nations, Department of Economic Affairs, *Measures for the Economic Development of the Underdeveloped Countries*, New York, 1951, p. 9.

30. Agricultural Surplus Population in Eastern and Southeastern Europe, *op. cit.*, pp. 7 - 13.

31. *Ibid.* p. 7.

32. J. Poniatowsi, *The Population Surplus in the Village and Agriculture*, Warsaw, 1936 p. 58; mentioned in George Kagan, « Agrarian Regime in Pre-war Poland », *Journal of Central European Affairs*, III, No. 3, (October 1943), pp. 259 - 260.

relationship between economic redundancy of active agricultural population and total agricultural population in «disguised unemployment».

Another estimate given by the Experts on Building Requirements, again of the Royal Institute of International Affairs, Chatham House, London, gauges the Greek active and dependent agricultural population in «disguised unemployment» at 630,000 (33). The Building Experts' method is based on the comparison of « normal» and actual densities of agricultural population. As standard « normal » agricultural density for Greece was chosen 80 per 100 hectares (34).

As appears from the limited sample of studies cited, there exists unanimous agreement that Greece is a country plagued by widespread removable labor ranging from 25 to 45 percent. In the face of such a consensus of opinion, a test that reaches the conclusion that chronic surplus labor is virtually nonexisting while seasonal « shortage » of labor in the peak period is prevalent, appears to be a stark contradiction. But the evidence should be received seriously because of its developmental policy implications.

Admittedly, a certain degree of arbitrariness must have crept into our test. Where discretionary decisions had to be made a consistent effort was put forth to adopt assumptions that would tend to overestimate

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33. « Central European Building with Reference to the Ten-Year Industrial Rebuilding Plan », compiled by Paul. N. Rosenstein - Rodan as part of the material for a study of *Economic Development of Eastern and Southeastern Europe*, undertaken for the Royal Institute of International Affairs, Chatham House, 10 St. James Square, London, S.W. I., during the years 1943 - 45. Reported by Berdj Kanadjian, op. cit., p. 219.

34. *Idid.* p. 2.

rather than underestimate the degree of chronic surplus labor([35]).

It would seem that the main deficiency of a number of the studies cited above is the use of methods which are not entirely appropriate for tackling the problem of removable surplus labor. Specifically, with the exception of the Agricultural Bank's figures, all other estimates of labor redundancy are annual averages that cannot be disaggregated into seasonal or monthly terms. Accordingly, the above cited studies imply a definition of removable surplus labor which refers to labor employed for less than one year. This is a stricter definition than the minimum of employment of one season that we require and, as such, it is comparable with our average annual surplus labor. If part of this surplus labor is removed, agricultural output should be expected to decline inasmuch as this labor contributed to the agricultural operations for a period of more than a season but less than a year.

Finally, the measures of surplus labor that we have cited fail to recognize that aggregative estimates of removable labor do not provide relevant information for policy implementation. These estimates ignore the variability between regions due largely to differences in product-mix and population levels. It is this variability together with the seasonal variability that provide the data for policy formulation e.g. location of investments, etc.

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35. For example, the definition of the active agricultural population in terms of the age bracket 15 - 69; the adoption of the more liberal estimate of 255 work - days available; the adoption of higher conversion coefficients for women and children into Man Productive Days; and finally use of Evelpides' «labor intensity coefficients» rather than the Committee's. See Chapters 4 and 5.

CHAPTER 3

POLICY RECOMMENDATIONS

The overall policy recommendation is that agricultural development be planned in a manner that would allow an increase in real productivity and would assure the necessary flow of labor into industry in the next decade. It is also equally important that plans for regional development be drawn on the basis of careful regional estimates of present and future labor availability.

Measures to reduce regional and seasonal unemployment in agriculture ought to be recommended within the context of a long-run plan for the development of the economy. Such a program, say for the decade up to 1972, must be worked out in a general and flexible form.

Within this long-run program agricultural employment policies will depend upon : a) the employment objectives for the economy as a whole since rural and urban labor surplus is transferable, b) the planned and expected kind of economic change e.g., the rate of growth in the industrial sector, the type of new industries and their anticipated labor requirements, etc., and c) the planned changes in the composition of agricultural output and the projected rate of its growth, e.g., the relative decline of the share of primary production in national output.

Policies for reducing regional surplus labor have two aspects : to facilitate removal of surplus labor into more productive activities, and to increase seasonal employment, agricultural or not, on or near the farm([1]).

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1. It is worth noting that when unemployment is meas-

At the outset, a point should be made explicit : labor mobility within agriculture on a national level is limited. It is estimated that out of all rural emigrants only 10 - 15 percent relocate in rural areas. Our estimates of unemployment, therefore, on the aggregate level may very well conceal wide regional differences. Thus, for example, chronic labor surpluses which certainly exist in parts of Epirus or Sterea Hellas (and which may exceed 10 percent of the local labor force) are concealed underneath the national averages. In part III of this study we conduct a limited regional investigation of unemployment to stress this point. A more detailed analysis of regional demand for and supply of labor, covering the whole country, is necessary for specific policy recommendations.

In general terms, regions with large removable surpluses — say over the range of 8 - 10 percent — ought to be preferred over other regions for public works or the establishment of new industries. In deciding on the location of economic activity it is a matter of wise public policy to strike a balance between the social and economic advantages of reducing heavy regional unemployment and the requirements for increasing real productivity and the competitiveness of the national economy.

At this point a note regarding «regional development» may be appropriate. Since some regions may be endowed with better and more resources than others, the

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ured in man-days (divisible) rather than persons (indivisible), the degree of surplus labor one comes up with, does not quite permit the policy maker to decide with precision on the percent age of the population that can be transferred. Man-days of unemployment may come indiscriminately from men, women, boys and girls, working, say, 10 months a year.

growth potential is not uniform for all regions and consequently there may be a short-run conflict between national and regional social and economic goals. The national interest is to take advantage of economies of scale, standardization, agglomeration, and generally to accomplish an efficient resource allocation for any given level of national product. Given a regional output pattern and the cost determinants, many regional projects may be demonstrated to be inefficient and wasteful from the point of view of the national economy. Economic rationality would suggest that in order to avoid reducing the long-run growth potential of the economy, the development of the poorer regions should come about as a consequence of a more rapid development of the more advanced regions, which will provide the economy with larger savings, higher levels of investments, and consequently more long-run employment opportunities.

A compromise between national growth and regional development, dictated by the fact that in the last analysis the regional distribution of resources is partly a political act, can be proposed in the following manner: first, determine a politically acceptable rate of growth for the economy as a whole and allocate the resources for the attainment of this rate in accordance with rational economic principles. Then resources possibly available over and above the minimum requirements set by the planned rate of growth can be distributed to regional projects([2]).

In removing surplus labor, total output must rise enough to pay the wage of the relocated and fully

2. Professor Louis Lefeber in an unpublished paper entitled *Regional Allocation of Resourses* has discussed lucidly many of the weak points of regional development.

employed worker. It is worth noting, however, that the additional resources needed will be lower than they might appear at first.Thus, the unemployed worker may consume his share of the family product, say $100.00 per annum. When moving into another job the remaining members of the family find themselves with an additional income of $100.00 part of which (say 20 per cent) will be saved. In his new job the relocated and fully employed worker will earn say $400.00 a year out of which he may save about 15 percent. The total amount of accruing savings will thus be about $80.00 a year or 20 percent of the annual income of the newly employed worker. The «opportunity cost» of this worker to the economy will thus be less than his money cost by about 20 percent, the difference being taking the form of increased savings(3).

On the other hand, it may be worth commenting on an aspect of the well-known « up by the bootstraps » theory as developed by W. Arthur Lewis(4) and Ragnar Nurkse(5). The Lewis and Nurkse argument builds upon the premise of the wide existence of unused labor potential in the form of «disguised unemployment». Labor surpluses can be mobilized effectively for development at zero social cost. Objections can be raised against the surmise of zero cost on two grounds:

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3. Paul N.Rosenstein-Rodan, « Disguised Unemployment and Underemployment in Agriculture», *Monthly Bulletin, op. cit.*, p.5.

4. W. Arthur Lewis, «Economic Development with Unlimited Supplies of Labour », *The Manchester School of Economic and Social Studies*, XXII, No. 2 (May 1954), pp. 139 - 191; the same « Unlimited Labour: Further Notes », *Ibid*, XXVI, No. 1 (January 1958), pp. 1 - 32.

5. Ragnar Nurkse, *Problems of Capital Formation in Underdeveloped Countries*, Oxford, Basil Blackwell, 1955, pp. 32 - 56 *passim.*

First, private marginal costs are not considered. Removing an individual from his habitual agricultural way of life into a less congenial industrial environment involves a sacrifice in leisure and possibly in personal freedom, too. Free societies that ascribe a certain value to the leisure or sentimental attachments of their members, unlike their totalitarian counterparts, cannot resort to forced labor. Also, from the point of view of equity considerations, economic development through engagement of «disguised unemployment» may have a repugnant ring, since it is a form of putting the hand on the poor rather than on the rich(6).

Second, it is debatable whether employing productively the unemployed in disguise entails in fact zero social marginal cost. Any increase in effort requires an additional caloric intake — and hence possibly an extra capital outlay which is certainly a social cost(7). Also, arguing that there exists some form of economic activity that requires hardly any capital to speak of is at best an oversimplification. Transferring the unemployed in disguise into industrial projects would at least involve an additional investment for training, housing, etc.(8). In other words ,there is both a private and a social marginal cost connected with an alternative employment

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6. See N. Koestner, « Some Comments on Professor Nurkse's Capital Accumulation in Underdeveloped Countries », *L'Egypte Contemporaine*, XLIV (April 1953), pp. 9 - 10; Benjamin Higgins, *Economic Development, Principles, Problems and Policies*, New York, W.W. Norton and Company, Inc., 1959, pp. 458 - 459.

7. N. Koestner, *ibid, p. 10.*

8. Benjamin Higgins, *op. cit.*, p. 355; Gerald M. Meier and Robert E. Baldwin, *Economic Development, Theory, History, Policy*, New York, John Wiley and Sons, Inc., 1957, p. 342.

of labor — even if we abstract from non-economic considerations like the decrease in freedom or the disrespect of emotional attachment. So the pertinent question is how the marginal cost (private and social) of removing labor from agriculture compares to the marginal benefit. It is not any more a question of development at zero price. It is rather a problem of how much development at a *certain* price.

In attacking seasonal unemployment, primary consideration must be given to the projected volume of rural unemployment in a region for a period long enough to justify the cost of building new enterprises planned to absorb seasonal labor surplus. The choice of industries to be entablished is important. The decision should depend upon: a) the availability of local materials, b) the availability of managerial talents, c) supply of skilled labor, d) regional specialization, e) the desirability of attaining a higher rate of growth in the immediate future or in the later stages, and f) the balance of payments consideration which would determine what import saving and what export industries should be promoted.(9) In the case of new exports in particular, consideration should also be given to the effect which surplus labor-absorbing activities will have upon the cost of locally produced goods and their competitiveness in the world markets. Political favoritism and expediency may otherwise be tempted to hide under the cloak of an employment policy with short-run aims that come into conflict with the long-run objectives of a developing economy able to create by itself new jobs for its work force. For an economy

9. See also International Labor Office, *Employment Objectives in Economic Development*, Geneva, 1961, pp. 76 - 87.

such as the Greek which has become overly non-competitive through daily expedience, unprogrammed protection, and government interference, employment and welfare policies may have to give way to efficiency and cost considerations.

As a general rule it is suggested that productivity and cost considerations ought to outweigh employment objectives. This should be particularly the case with new agricultural exports and export industries. All possibilities for reducing production and distribution costs must be examined independently of their employment effect. Thus, for example, marketing costs in the fruit export market will be decreased by shifting packing operations from the field, where more labor is required, to special packing plants and houses where the labor cost per unit of produce is lower. At the same time quality is preserved and greater uniformity in packing is achieved. In particular, where exports to the competitive Common Market are involved, higher employment ought to be viewed primarily as a social goal and as such its cost ought to be borne by the society as a whole —via welfare or other devices— and not by the export sector. It is worth pointing out that, at least with respect to new agricultural exports such as fruits and vegetables which are expected to play an increasingly important role in the Greek export trade, production will tend to expand at a faster rate than domestic demand. Consequently pressures for increased exports will mount at a time when foreign competition from Italy and to a lesser extent from Holland, France and Spain will be growing sharper. It is likely, therefore, that Greece will be faced with a disposal problem for fruits and vegetables. In view of the potential inbalance between production and con-

sumption of the products of several of the major agronomic and horticultural plants, serious and immediate attention should be given to lowering costs of production and improving domestic and foreign marketing of these products([10]).

It must be stressed in unambiguous terms that employment cannot be the only criterion in determining the composition of output, the techniques of production, and the location of new economic activity. In many instances there may be a real conflict between increased employment and growth objectives. Many factors will tend to influence the decision as to the composition of output and the choice of techniques. Among them, importance should be given to the relative prices of labor and capital (the divergence between their market prices and their true social costs being duly considered), the resource structure, the pattern of domestic and foreign demand, supply conditions, *and the general requirements of the development program.* It is therefore likely that a conflict between employment and growth may arise to the extent that output and techniques will be capital intensive.

Furthermore, the introduction of labor - absorbing techniques which maximize output per unit of investment will inevitably decrease the average and marginal productivity of labor. This beyond a certain point may prove to be a strain on the wage bill and little will be left to increase the rate of capital accumulation. To this extent there appears to be again a conflict

10. For a detailed discusion of the production — concumption balance in Greek fruits and vegetables see C.O. McCorkle, *Fruits and Vegetable Marketing and Economic Development in Greece*, Athens; Center of Economic Research, Chapter 2, 1962.

between the objectives of employment and economic development.(11)

In the light of these general remarks, some seasonal unemployment may be eliminated through the establishment of an agricultural processing industry. Such industrial activity has a high growth potential in Greece. Demand for processed goods will increase because of growing urbanization, the concommitant rise in the outside-the-home employment of housewives, and the expected entry into foreign markets. However, the development of the processing industry will not be accomplished readily in the immediate future. Greek consumers' preferences may require time in shifting towards processed fruits and vegetables and other foods. Costs will have to be reduced and a number of obstacles in producing and marketing must be removed before the market for these goods expands to include the bulk of the urban and semi-urban population. Establishment or construction of modern plants, size of operations, procurement of raw materials, and quality control are typical problems facing the processing industry. Given the organizational shortcomings of the Greek economy, the level of technical and managerial skills, lack of market information, and some adverse economic conditions (e.g., shortage of credit, or own capital), these problems may be long in being solved. Here, as in other industries, development can be accelerated if Greek firms join in common ventures with foreign firms

11. For a careful discussion of the various conflicts between growth, technology, and employment see Andreas G. Papandreou, *Planning Resource Allocation for Economic Development*, Athens, Center of Economic Research, 1962 ; See also I.L.O. *Employment Objectives, op. cit.*, pp. 61-75.

better equipped to handle both the technical problems of production of new commodities and their promotion and distribution in the domestic and foreign markets([12]).

In the regions producing for the export market (e.g., fruits) agricultural supply and packing industries can be established to operate during the low-employment seasons. It is likely that the cost of production of an «employment providing» factory, such as a box plant for example, may be higher in the export fruit region than say near Athens, or Salonica where external economies may be enjoyed (e.g., sharing social overhead facilities, skilled labor pools, service industries, and expert management), and where operations can be near full capacity throughout the year. If such factories are to be established in an export region it may be necessary that they are government owned and operated.

Longer seasonal runs for such processing activities as canneries are also possible measures against seasonal unemployment. Typically, canneries are multi-product firms which can program a long seasonal run in a number of regions for fruits and vegetables. Raw products can be canned in large containers during the peak season and subsequently can be reworked into other products ready for the market. In California, for example, many of the ingredients used in fruit cocktail and canned soups are canned in bulk containers during the late summer and are combined and recanned for sale in the off-season.

Expansion of livestock enterprises will certainly provide increased seasonal employment. Livestock is one of the more backward activities of the primary sector but one with considerable growth and employment

12. See C.O. McCorkle, *op. cit.* Chapter 2.

potential. If the irrigation works of Central and Northern Greece are successfully completed, larger quantities of feeds will become available. These can only be disposed off through livestock use as they are bulky to be transported or as they are crop aftermath which can be best consumed on the spot. However, livestock enterprises require knowledge and managerial skills which the Greek farmer does not posssess at present. Given the level of productive efficiency on farm, seasonal livestock enterprises such as winter cattle feeding may be profitable. It is doubtful, however, if livestock on these farms could be competitive on a four-season basis.

Special consideration ought to be given to possible ways of utilizing the seasonally unemployed labor in connection with promoting education, vocational training, and social services. Lengthening of the school period may have become necessary because of the increasing educational pressures and the need to expand curricula to include more mathematics and science. Seasonal classes in general topics and in special subjects relating to the local economy, vocational training in new skills to be developed for a better exploitation of materials produced locally, kindergarten classes in villages where women work away from home in the fields, all are examples for both expanding the educational horizon and employment and creating activities with a high social component.

Besides lengthening the school period and providing agricultural training programs, public works with seasonal schedules, increased handicraft activites, introduction of new crops, greater emphasis on out-of season vegetables for northern European markets, and use of later maturing varieties, reforestration

(plant bare-root trees in the winter), and soil conservation, all are possibilities which can provide additiolal seasonal employment. But all depend on the needs of the particular region and the strains and requirements of the overall plan for the development of the national economy.

The removal of regional surplus labor or the alleviation of seasonal unemployment, it must be stressed, does not automatically solve all the fundamental problems of Greek agriculture. This sector of the Greek economy has remained inefficient, suffering from many organizational shortcomings, wide, protective rather than promotional, government intervention, and institutional limitations (e.g., small holdings), low productivity of land and labor due to incessant soil erosion, inadequate overhead investment, lack of skills and capital, and poor marketing. Agricultural incomes reflect the performance of this sector. In 1960, for example, the per capita agricultural income was about $192.00 as against $325.00 for the per capita national income. The average annual increase, for 1955 - 1960, in agricultural incomes was 0.76 percent, in constant 1954 drachmas, while the per capita national income rose by about 5 percent annually. In fact agricultural per capita income was lower than $192.00 since part of the agricultural output was apportioned among emigrants or city dwellers who still own land.

In building a low-cost, deversified, and competitive agriculture able to survive and get its share in the Common Market, steps may have to be taken often independent of their short-term employment effect. Further land improvement and consolidation, efficient and wide irrigation, overhead capital accumulation, introduction of new skills and creation of research and exten-

sion centers, consolidation of agricultural cooperatives and revamping of agricultural credit, a low-cost distribution and marketing, expansion of agricultural processing export industries, all are examples of the measures that will have to be adopted to increase efficiency and incomes in agriculture. But not all of these measures (e.g., land consolidation) can be expected to reduce rural unemployment, at least in the short-run.

Seasonal unemployment which in some regions will remain considerable can be reduced through a variety of policy measures. The major objective, however, ought to be increased productivity with reduced unemployment as a secondary goal. And where there is a cost in reducing unemployment this ought to be borne by the economy as a whole and not by the sensitive agricultural export sector.

Finally, the problem of rural man-power utilization is directly connected with urban and industrial unemployment. This seems to have remained at socially unacceptable high levels. The growth of the Greek economy during the 1950's could not have eliminated industrial unemployment. The searching question, however, is whether the developments of the 1950's have inspired the intellectuals, the bureaucrats, and the mass of Greek people into enthusiasm for and dedication to social change and economic progress; and also whether the growth of the past decade was based on the kind of investments and structural changes which would justify high optimistic expectations for the performance of the Greek economy—and in particular the Greek industry— in the coming decade : a performance which would produce not only higher per capita incomes but also a more equitable society in which more people would have an opportunity for a decent living.

PART II

AN EMPIRICAL TEST

Introduction

In this section we shall attempt to measure the volume of surplus labor in Greek agriculture. The measurement is based on a comparison of labor available and labor required for a given volume of output.

Estimates of labor availability and labor requirements can be derived in two ways : (a) directly, through a sample questionnaire on the composition of the labor force, labor time available at each farm household and the way labor is utilized in agricultural operations. This method, based on farm enterprise survey data, makes possible a detailed analysis of excess labor, and can be measured on the household, regional or national level by aggregating the data accordingly. (b) Indirectly, through the use of general statistical data. Specifically, labor available is deduced from the total size of the agricultural population as measured by the Census. Labor required is derived by applying «labor-intensity coefficients» to the size of each crop, and/or output, and by aggregating labor requirements for all agricultural activities. Coefficients can be established by sample surveys of the amount of time farmers spend in performing each agricultural operation. In the present study we have employed the indirect method. The advantage of the indirect method is that it lends itself to application more readily through partly utilizing general census data. But it can be used only for macroeconomic analysis.

Chronic surplus labor was defined as the amount of

labor which can be removed for at least one year, without any change in the quantities of other factors of production (save for routine reorganization of the work load), and without leading to any reduction in output.

Such a definition may, however, appear too demanding for operational purposes. It is conceivable that the entire labor force will be fully utilized for brief periods of time, say one day or one or two weeks. Withdrawal of labor that is found excessive on the basis of a whole year, would inevitably lead to a reduction in output. Accordingly we have introduced the assumption that the minimum peak load of work required to qualify the labor force as indispensable is a whole season.

Our investigation covers the period 1953 - 1960. Both labor availability and labor requirements are estimated separately for each of the eight years. A note is in order in connection with labor requirements. As a basis for our «labor intensity coefficients» we used a modified version of those derived by Professor Evelpides for the year 1955. These coefficients were corrected and adjusted in our study for every year of the series. As is explained below, adjustments were necessary in order to reflect changes in agricultural yields and major changes in mechanization in agriculture (i.e., increase in the number of tractors and combines). Thus, the analysis incorporates year-by-year changes that occurred in agriculture during the period under examination. However, it should be pointed out that the reliability of our test would have been enhanced if labor requirements for 1953 - 1960 had been determined directly by fresh annual surveys. These surveys would have measured certain changes which

our test has not been able to estimate. Indicatively, we mention three such cases: a) possible changes in the size of farmlots, b) changes in the ratio of plain to mountain stremmas under cultivation, and c) changes in multi-crop patterns. Labor requirements per stremma would automatically decline if the size of farms increase or if, for certain crops, more land on the plains and less on the mountains were cultivated, even if there were no changes in the composition of output. Furthermore, there may be an upward bias in our estimates to the extent that joint labor requirements for multi-crop cultivation are not likely to be additive. Changes in labor requirements due to changes from year to year in the pattern of multi-crop cultivations have not been assessed.

Nevertheless, there is some presumptive evidence supporting the reliability of our coefficients. The Agricultural Bank of Greece derived for 1960 a set of labor coefficients for farming, which match our corresponding set closely.

CHAPTER 4

LABOR AVAILABLE IN AGRICULTURE

The Procedure

There are several factors which determine the size of labor available in agriculture. These are the size of the agricultural population pyramid, the proportion of the labor force not available for employment because of illness, absence etc., the relative work efficiency of the two sexes, the potential number of working days annually per worker, and the potential length of the working day. To permit a comparison with labor requirements all these variables which determine labor availability should then be converted to a comparable basis. Table 3 shows this process of conversion. In the following section we present steps taken, as well as assumptions employed, in estimating the volume of labor available.

The size of the agricultural population for 1953-1960 was derived indirectly from the Census of 1951 and the Pilot Census of 1960. On the basis of the 1951 Census the total agricultural population of 1951 was estimated at 50.5 percent of the total population of Greece. This percentage, however, was corrected to reflect a small leakage in the Census of 1951 due to abnormal conditions in certain regions affected by the civil war of the late 1940's. We took, therefore, the agricultural population of 1951 to be 51.3 percent of the total population. If there is an error in this arbitrary increase of the percentage, it must be on the side of overestimation as the tentative results of the 1961 Census seem to confirm the reliability of the 1951 Census.

The agricultural population of 1960 was derived from the Pilot Census of 1960, which estimated that 54 percent of the active population of the country is engaged in agriculture. By estimating the number of persons corresponding to each person actively engaged in agriculture the size of total agricultural population was derived. This in 1960 was estimated to be 47.5 percent of the total population of Greece.

Next, assuming that the physical annual rate of growth of the agricultural population was the same during 1951 - 1960 and that the population outflow from agriculture was the same from year to year (1953-1960), we derived the appropriate percentages of agricultural to total population for each year of the period 1953 - 1960 (50.5 percent in 1953, 47.5 percent in 1960).

Table 3, columns 1 and 2, show the distribution of population into total and agricultural by sex and in totals.

Active agricultural population is defined to include all persons from *15 to 69* years of age (working age population). Similar studies usually exclude from the labor force persons over 65([1]). In practice, however, at least the upper limit is higher. In fact, the 1951 Census estimated that about 86 percent of males in the age bracket 65 - 69, and 32 percent of females in the same age bracket work in the fields. (The 1960 Pilot Census gave

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1. See K.A. Ferentinos, *I Apodotikotis tis Hellinikis Georgias* (The Productivity of Greek Agriculture), Athens, 1954, p. 16, and P.N. Rosenstein - Rodan, « Chômage et sous - emploi déguisés dans l'agriculture », *Bulletin Mensuel d'Economie et Statistique Agricoles*, FAO, Nos. 7,8, 1957, Rome, pp. 1 - 7, where the age bracket 14 to 65 is taken. The Organization of Agricultural Social Security (OGA) has adopted the 65th birthday beyond which pensions are paid to the farmer.

slightly lower percentages i.e., 80 percent and 25 percent for the respective two age groups). Despite the common practice of excluding these elderly persons from the active population we considered it to be more accurate to take account of their numbers. Children under 15, however, are excluded. The error introduced here is likely to be quite small as the majority of persons of this age group go to school full time and, during the summer, share work in the household rather than in the field(2). The active agricultural population was separated by sex and grouped into three age brackets (15 - 19; 20 - 64; 65 - 69). Data on the agricultural population pyramid and the three groups were checked against a projection of the Ministry of Coordination which differentiates males and females, urban, semi-urban and rural population, and age groups. The proportion of each of the three age groups to the total rural population was computed for 1953 and 1960 and the ensuing changes in the distribution were considered to be the same throughout the seven years of the series. Agricultural population of working age appears in Table 3, column 3.

Estimates of the agricultural labor potential are derived from data on the active agricultural population (Table 3, column 4)(3). Lack of official data

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2. Under the assumptions that, a) 10 percent of the boys and girls 10 - 14 years of age work full time in the fields for 255 days, (Pilot Census 1960, p. 6), and b) a youngster of that age has a potential of 0.30 of that of a male worker, it is estimated that the contribution of this age group to labor availlable is no more than 2.8 million Man Productive Days.

3. To estimate Labor Potential in agriculture labor units available for full time work were considered (i.e., 9 hours a day). The concept of Active Agricultural Population used in the Pilot

TABLE 3. Labor Force and Labor

	(1)		(2)		
	Total Population	Percent Coefficient	Total Agricultural Population	Age Bracket	Percent Coefficient
1953				15 - 19	10.0
Male	3,815,473	50.5	1,926,814	20 - 64	49.1
				65 - 69	2.6
				15 - 19	10.0
Female	4,001,622	50.5	2,020,819	20 - 64	51.8
				65 - 69	3.0
Total	7,817,095		3,447,633		
1954				15 - 19	9.9
Male	3,853,804	50.1	1,930,756	20 - 64	49.3
				65 - 69	2.6
				15 - 19	9.8
Female	4,039,608	50.1	2,023,844	20 - 64	52.0
				65 - 69	3.0
Total	7,893,412		3,954,600		
1955				15 - 19	9.8
Male	3,888,541	49.7	1,932,605	20 - 64	49.4
				65 - 69	2.7
				15 - 19	9.6
Female	4,076,997	49.7	2,026,268	20 - 64	52.3
				65 - 69	3.1
Total	7,965,538		3,958,873		
1956				15 - 19	9.7
Male	3,918,964	49.3	1,932,049	20 - 64	49.6
				65 - 69	2.7
				15 - 19	9.3
Female	4,112,049	49.3	2,027,240	20 - 64	52.5
				65 - 69	3.1
Total	8,031,013		3,959,289		

Source: Population Census 1951
Pilot Census 1960

Potential in Agriculture (1953 - 1960)

(3) Active Agricultural Population		(4) Labor Potential in Agriculture		(5) Conversion into Man Productive Units (MPU)		(6) Conversion into Man Productive Days (MPDs) (thousand)
	Percent Coeffi-cient		Percent Coeffi-cient		Coeffi-cient	
192,681	75	144,511	70	101,158	255	25,795.3
946,066	92	870,381	100	870,381	255	221,947.2
50,097	80	40,078	70	28,055	255	7,154.0
202,082	35	70,729	60	42,437	255	10,821.4
1,046,784	45	471,053	70	329,737	255	84,082.9
60,625	25	15,156	60	9,094	255	2,319.0
2,498,335		1,611,908		1,380,862		352,119.8
191,145	75	143,359	70	100,351	255	25,589.5
951,863	92	875,714	100	875,714	255	223,307.1
50,200	80	40,160	70	28,112	255	7,168.6
198,337	35	69,418	60	41,651	255	10,621.0
1,052,399	46	473,580	70	331,506	255	84,534.0
60,715	25	15,179	60	9,107	255	2,322.3
2,504,659		1,617,410		1,386,441		353,542.5
189,395	75	142,046	70	99,432	255	25,355.2
954,707	92	878,330	100	878,330	255	223,974.1
52,180	80	41,744	70	29,221	255	7,451.4
194,522	35	68,083	60	40,850	255	10,416.8
1,059,738	45	476,882	70	333,817	255	85,123,3
62,814	25	15,704	60	9,422	255	2,402.6
2,513,356		1,622,789		1,391,072		354,723.4
187,409	75	140,557	70	98,390	255	25,089.4
958,296	92	881,632	100	881,632	255	224,816.2
52,165	80	41,732	70	29,212	255	7,449.1
188,533	35	65,987	60	39,592	255	10,096.0
1,064,301	45	478,935	70	335,255	255	85,490.0
62,844	25	15,711	60	9,427	255	2,403.8
2,513,548		1,624,554		1,393,508		355,344.5

TABLE 3. Labor Force and Labor

	(1)		(2)		
	Total Population	Percent Coefficient	Total Agricultural Population	Age Bracket	Percent Coefficient
1957				15 - 19	9.6
Male	3,949,773	48.9	1,931,439	20 - 64	49.7
				65 - 69	2.7
				15 - 19	9.1
Female	4,146,445	48.9	2,027,612	20 - 64	52.8
				65 - 69	3.2
Total	8,096,218		3,959,051		
1958				15 - 19	9.5
Male	3,988,787	48.4	1,930,573	20 - 64	49.9
				65 - 69	2.7
				15 - 19	8.9
Female	4,184,342	48.4	2,025,222	20 - 64	53.0
				65 - 69	3.3
Total	8,173,129		3,955,795		
1959				15 - 19	9.3
Male	4,032,749	47.9	1,931,687	20 - 64	50.1
				65 - 69	2.7
				15 - 19	8.6
Female	4,225,413	47.9	2,023,973	20 - 64	53.3
				65 - 69	3.3
Total	8,258,162		3,955,660		
1960				15 - 19	9.2
Male	4,064,589	47.5	1,930,680	20 - 64	50.2
				65 - 69	2.7
				15 - 19	8.4
Female	4,262,816	47.5	2,024,838	20 - 64	53.5
				65 - 69	3.4
Total	8,327,405		3,955,518		

Potential in Agriculture (1953 - 1960) *(cont.)*

(3) Active Agricultural Population	Percent Coefficient	(4) Labor Potential in Agriculture	Percent Coefficient	(5) Conversion into Man Productive Units (MPU)	Coefficient	(6) Conversion into Man Productive Days (MPDs) (thousand)
185,418	75	139,064	70	97,345	255	24,823.0
959,925	92	883,131	100	883,131	255	225,198.4
52,149	80	41,719	70	29,203	255	7,446.8
184,513	35	64,580	60	38,748	255	9,880.7
1,070,579	45	481,761	70	337,233	255	85,994.4
64,884	25	16,221	60	9,733	255	2,481.9
2,517,468		1,626,476		1,395,393		355,825.2
183,404	75	137,553	70	96,287	255	24,553.2
963,356	92	886,288	100	886,288	255	226,003.4
52,125	80	41,700	70	29,190	255	7,443.4
180,245	35	63,086	60	37,852	255	9,652.3
1,073,368	45	483,016	70	338,111	255	86,218.3
66,832	25	16,708	60	10,025	255	2,556.4
2,519,330		1,628,351		1,397,753		356,427.0
179,647	75	134,735	70	94,315	255	24,050.3
967,775	92	890,353	100	890,353	255	227,040.0
52,156	80	41,725	70	29,208	255	7,448.1
174,062	35	60,922	60	36,553	255	9,321.0
1,078,778	45	485,450	70	339,815	255	86,652.8
66,791	25	16,698	60	10,019	255	2,554.8
2,519,209		1,629,883		1,400,263		357,067.0
177,623	75	133,217	70	93,252	255	23,779.2
969,201	92	891,665	100	891,665	255	227,374.6
52,128	80	41,702	70	29,191	255	7,443.7
170,086	35	59,530	60	35,718	255	9,108.1
1,083,288	45	487,480	70	341,236	255	87,015.2
68,844	25	17,211	60	10,327	255	2,633.4
2,521,170		1,630,805		1,401,389		357,354.2

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makes this operation a complicated one which has to be handled in approximation only. The procedure used is the following: the active agricultural population is first reduced across the board by the number of persons who are disabled, confined in prisons or mental institutions, in retirement, or otherwise unavailable. We have estimated that these cases comprise about 3 percent of the active agricultural population. In the male age bracket 20 - 64 we have allowed 5 percent for persons included in the working age population but not presently available for work, e.g., men serving in the armed forces, and full time students at universities and vocational schools([4]). Adding up the two deductions we can see that only 92 percent of the working age male agricultural population of the age bracket 20 - 64 is available for agricultural work.

In the case of boys in the age bracket 15 - 19 the 3 percent standard deduction is increased by 19 percent to allow for rural male students attending secondary or technical schools([5]). Three percent is added for boys not available for agricultural labor because they are apprentices in workshops (e.g., tailoring

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Census 1960 and the 1961 Population Census refers to persons working both part time and full time or looking for work. It follows that our Labor Potential figure is higher than the Active Population figure of the Census.

4. In 1960 there were about 100,000 men with the Greek Armed Forces out of a total adult male population of about 2,332,000. In the period 1953 - 1959 the number changed only slightly, so that the 5 percent overall estimate may be considered quite accurate.

5. Our estimates are based on computations made from educational data in the *Statistiki Epetiris tis Hellados* (Statistical Yearbook of Greece) 1959, Athens, 1960, pp. 14, 30, 158.

shops) or helpers in various service establishments (e.g., barbershops, cafés etc.). This estimate seems to be a conservative one. Adding up all the deductions cited above we arrive at a labor potential coefficient of 75 percent of the active agricultural population in the 15 - 19 year group.

In the case of elders the Pilot Census of 1960 estimated that about 80 percent of the males of 65 - 69 years of age work in the fields the year around. This percentage is used in the study.

We have estimated the female agricultural labor potential in the age bracket 20 - 64 to be approximately 45 percent of the working age population of the same group. This gross reduction of 55 percent includes the standard 3 percent plus an allowance for women performing household duties and engaged in cottage industry and handicrafts. Once again official data are lacking. Our estimates are guided by Rosenstein-Rodan's Italian study(6).

Professor Rosenstein-Rodan assumed that in a family of up to four members one woman is fully occupied in household activities. For families of 5 to 10 members two women, and for families of more than 10 members three women must be occupied with everyday household activities. If we assume that the agricultural family in Greece is composed of four members, of which two are adult women, the female labor available for work in the field would be 50 percent of the total female labor of the family. But in fact, the average agricultural family in Greece has 4.7 members. This makes the distribution on the right side of the four member family more

6. *Op. cit.* p. 3.

skewed than on the left([7]). That is to say it increases the number of women necessary for household duties more than it increases the number of the members of the family. If we assume one woman and one girl per family of 4.7 then the female labor available for agriculture would correspond to something less than one full woman unit([8]). The bias introduced by this assumption would suggest that a labor potential coefficient of 50 percent for women is an overestimate. We selected, therefore, a liberal female labor potential coefficient of 45 percent of the active agricultural female labor in the age bracket 20 - 64.

For girls in the age bracket 15 - 19 a labor potential coefficient of 35 percent was derived. There are at least two additional factors to be considered in the case of female labor at this early age. It is estimated that about 11 percent of all girls in the agricultural regions of Greece go to public schools full time for 9 months of the year([9]). Also a number of females in this age bracket is employed in cottage activities, domestic employment and such activities as dowry making. We have, therefore, deducted a flat 10 percent from the 45 percent and adopted the 35 percent coefficient for the

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7. Ch. Evelpides, «Anaskopisis tis Georgikis Economias tis Hellados» (Review of the Agricultural Economy of Greece) *Agrotiki Economia*, No. 9 (January - March 1957), p. 33 n.1.

8. This will be clarified immediately below when labor units are converted into homogeneous Man Productive Units. Our computations here are confirmed by Ferentinos' estimates (op. cit., p. 17 n. 1) that yielded 1.71 Man Productive Units per family as the average labor potential in Greek agriculture.

9. Computations from the *Statistiki Epetiris tis Hellados* (Statistical Yearbook of Greece), 1959, Athens 1960 pp. 14, 30, 158.

population of girls aged 15-19 working in agriculture([10]).

Finally it was estimated that about 25 percent of women of 65 - 69 years of age are available for work in the field([11]).

The next step was to convert the four categories of potential agricultural labor into homogeneous units (Table 3, column 5). The work-day of an adult male worker — the Man Productive Unit (MPU) — was chosen as a standard. G. Medici and G. Orlando in a detailed Italian study used a conversion coefficient that varied from 0.50 to 0.85 of a Man Productive Unit according to the type of cultivation([12]). Rosenstein - Rodan and dell' Angelo([13])—for Italy again— used the coefficients of Ser-

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10. The Pilot Census of 1960 (p. 6a) estimates that about 50-60 percent of the total agricultural female population work in the fields. From a diagram on the proportion of females employed by hours of work in agriculture (p. 48a), however, it appears that only 78 to 80 percent of this female labor work full time (i.e., 48 hours a week), or approximately 43 percent of the total agricultural female population.

11. Pilot Census 1960, and Population Census 1951.

12. In extensive monoculture and simple pluricultural cultivation the working day of women from 18 to 65 years of age is converted into 0.50 MPU, while that of children below 17 and adults over 65 is converted into 0.55 MPU; in pluricultural orchard cultivation and intensive monoculture with prevalence of olive, fig, and nut trees, the coefficients are 0.85 and 0.70; and in intensive monoculture with prevalence of vine and citrus trees or truck cultivation the coefficients are 0.85 and 0.65 for women and children respectively. The study does not distinguish between boys and girls. See G. Medici and G. Orlando, «Agricultura e disoccupazione », I, *I brassianti della bassa pianura padana* (Zenichelli, Bologna, 1952), pp. 128 - 129.

13. Gian Giacomo dell'Angelo, « Note sulla sotoccupazione nelle aziende contadine », (Guiffre Editore, Roma, 1960) as deduced from Table 16, p. 75.

pieri(14) and converted the labor of a child from 14 to 18 years of age into 0.50 MPU and that of a woman into 0.60 MPU.

Our conversion coefficients are somewhat higher than the ones used in the case of Italy. We assume that the working day of an adult woman or a boy corresponds to 0.70 of a Man Productive Unit, while the ratio is 0.60 for girls. These coefficients are considered realistic in Greece and they have often been used(15).

Next, the Man Productive Units are converted into Man Productive Days by multiplying the former by the number of full working days available for agricultural activities. From the 365 days of the year we subtract 52 Sundays and 13 official national holidays in Greece. It is difficult to be equally precise in the number of days lost to agricultural work because of inclement weather. We have assumed, however, that

14. A. Serpieri « Instituzioni di economia agraria », Edizioni agricole Bologna, 1950.

15. Under the assumption that the wage rates represent the marginal productivity of labor, the ideal method to derive conversion coefficients in a perfect market would be to take the ratio of women's and children's agricultural wages to men's wages. Such an attempt that was made in Greece on the basis of a small sample of different enterprises yielded a conversion coefficient of woman's labor into man's from 0.62 to 0.81. (See George Kitsopanides, *Sygritika Economica Apotelesmata Erevnis Georgikon Ekmetalefseon*, (Comparative Farm Survey Results), Thessaloniki, 1958, p. 61. A 1951 Committee of the Ministry of Agriculture, Ministry of Coordination and the Agricultural Bank of Greece used coefficients of 0.70 for women and 0.50 for children. On the other hand, the coefficient 0.66 for women has been suggested by Efthymios Papageorgiou, « The Problem of Full Employment in the Greek Agricultural Family », *Agrotiki Epitheorisis*, XXXVIII, (1950), p. 13. The coefficients we adopt have been used before by K.A. Ferentinos, *op. cit.*, p. 16.

rainfall of at least one millimeter or rainfall that accumulates to less than one millimeter but lasts for more than three hours, usually causes the loss of a full day's work in the muddy fields. When rainfall exceeds 10 millimeters then one-half of the next day is similarly assumed to be lost on account of soil and road conditions(16).

For the 30 year period, 1929 - 1959, we have calculated that on the average 90 days a year are lost to agriculture because of rainfall. However, to avoid double counting we subtract from the year only 81 days the difference of nine being the estimated number of rain Sundays and holidays(17).

The total number of days lost because of Sundays, holidays, and inclement weather (81) adds up to 146 and the potential number of working days for agricultural activities would appear to be reduced to 219. To the extent, however, that some agricultural activities (e.g., animal raising or preparatory farm work) are carried out under cover or inside the house, not all inclement weather days represent loss of work. We have adopted, therefore, a more liberal estimate of 255 work-days(18).

16. Personal communications with the Meteorological Institute of the University of Thessaloniki.

17. Computations from the *Statistiki Epetiris* 1959 - 1960, (Statistical Yearbook 1959 - 1960), Athens, pp. 9 - 11.

18. 219 work days is the lowest estimate that appears in studies of Greek agriculture and official documents. The Ministry of Coordination, Five Year Plan (1960) p. 23, takes 220 days as the possible maximum employment level for Greek agriculture. Other estimates place the possible number at 250 (Evelpides, *op. cit.* p. 33), at 255 (Ferentinos, *op. cit.* p. 16) or at 270 for Southern Italy (Rosenstein - Rodan, *op. cit.* p. 3)

The last column of Table 3 presents the estimated labor availability for 1953 - 1960, derived as explained above. To summarize these steps, first there was an estimate of the agricultural population from 15 to 69 years of age which was then turned into Labor Potential. This estimate was transformed into homogeneous Man Productive Units (MPU) on the basis of conversion coefficients measuring the work-day potential of women, boys and girls as compared to the work-day of an adult male farm worker. Finally, the MPUs were converted into Man Productive Days available during the year. For the first year of the series we have reached an estimate of 352.1 million MPDs which has increased to 357.4 million MPDs for 1960. These estimates are not directly comparable with the results of other studies of Greek agricultural unemployment which have considerably relied on guess-work. Our estimates of the volume of agricultural labor avilaable appear to be on the conservative side[19].

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19. Compare, for example, Evelpides (*op. cit.* p. 33). He takes, for 1955, an agricultural population of 4,720,000. By assuming the labor potential to be 55 percent of the agricultural population and by using 250 work-days in the year, he estimates the available agricultural labor for 1955 at 650 million days. Our difference is due to the fact that he accepted a higher estimate for the total agricultural population and he did not distinguish between man-days, women-days, and children-days but he added them all together with a coefficient of one. Furthermore, his estimate of the labor potential at 55 percent of the agricultural population seems high. Ferentinos (*op. cit.* p. 16) estimates, for 1953, the labor potential at 2,190,000 and the Man Productive Days available at 445,821,600. The difference between our estimates is primarily due to his including the total population of boys and girls from 15 to 19 years of age rather than only the agricultural children.

CHAPTER 5

LABOR REQUIREMENTS IN AGRICULTURE

The Procedure

Annual agricultural labor requirements have been estimated seperately for *farming*, *husbandry*, *forestry*, *fishing and agricultural transport*. Given each year's agricultural activities annual labor requirements by product have been derived by applying a «labor-intensity coefficient» i.e., labor/land and/or capital and output ratio. For Greek agriculture there are two sets of such coefficients, one for 1951 and the other for 1955. The 1951 coefficients were used in a study of Greek agriculture in 1951 conducted by a Joint Committee of the Ministry of Agriculture, the Ministry of Coordination, and the Agricultural Bank of Greece. Professor Evelpides computed his coefficients for 1955 by using the results of a sample farm survey of the labor time spent in performing each agricultural operation(1). The survey covered farms in several regions of the country producing different crop varieties and under different cultivation patterns. Evelpides' coefficients were derived with greater care and in greater detail than those derived by the Committee(2). They also appear to be more conservative than the 1951 set and consequently lead to lower estimates of labor requirements . The authors decided to adopt Evelpides' estimated coefficients as the basis for deriving their own estimates.

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1. *Loc. cit.*

2. The difference between the Joint Committee's and Evelpides' coefficients is shown in the following table:

Their choice is justified because of the relative completeness of the Evelpides coefficients, their apparent greater consistency and because of the authors inclination to adopt throughout this study, in case of doubt and choice, estimates that would generally tend to lead to higher rather than lower estimates of labor surpluses.

The labor coefficients (Tables A - 1 to A - 7, column 1) are expressed in terms of man and supplementary (women elders and children) *nine hour* work-days estimated to be used per stremma or animal or unit of output to produce the given volume of agricultural output of the year. *The length of the working day for the farmer is set at 10.5 hours on the average.* The nine hour work-day is net, excluding the average time needed for commuting from the village to the farm(3).

Labor Coefficients

	Committee (1951)		Evelpides (1955)	
	Men	Supplementary	Men	Supplementary
Wheat	1.97	0.67	2.0	0.6
Barley	1.97	0.67	1.8	0.2
Corn	3.40	3.36	1.7	3.3
Rice	5.58	3.50	3.3	7.5
Potatoes	9.75	12.50	2.3	5.3
Vegetables	12.42	10.31	3.5	10.5
Olives, and	—	—	7.0	3.0
Olive Oil	2.66	3.75	2.2	2.7
Horses and	—	—	15.0	10.0
Mules	22.50	11.00	10.0	10.0
Donkeys	4.50	4.50	2.4	2.4
			Milk	
Cows	15.50	15.50	Cows 10.0	18.0
			Beef	
			Cattle 10.0	15.0

3. The Rockefeller Foundation Study of Crete found that

In estimating the labor/land and/or capital and output ratios, which would give us the labor requirements for the period 1953 - 1960 we took the Evelpides coefficients for 1955 as our starting point. We applied them after *inclusion of labor requirements for fishing and agricultural transports.* In the case of farming a labor/land ratio observed in one year (e.g., 1955) cannot be extended to apply to preceding and following years (e.g., 1953 - 1960) before adjusting for those factors which tend to affect it. Thus this ratio may become smaller with, for example, the introduction of better techniques, more equipment and improved drainage. It may tend to increase with the use of better seeds or more irrigation which would lead to higher output and increased harvesting needs. Since the period under investigation extends to only eight years we assume that the labor/land ratio is relatively insensitive to changes in methods except in so far as a) *they affect yields per stremma*, b) and *they are connected with farm mechanization.* At first sight it might appear that much is omitted and consequently our labor coefficients will not reflect many labor affecting changes. However, it should be pointed out that many changes in the methods of cultivation, or in the capital/labor ratio (capital other than tractors and combines by which we measure the extent of mechanization in the context of our study), or in seeds and crop varieties, or finally in the institutional agricultural set up (e.g., land consolidation) af-

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on the average 1.5 hours per working day are lost in transportation. This seems to be rather typical for other regions of the country. See also K. Thompson *op. cit.*, Chapter 6.

fect yields directly and therefore these changes are taken into account indirectly. The error therefore may be rather small. Worth noting is, on balance, the one-sided direction of the error. One example is how improved disease control affects labor requirements both ways. On the one hand it increases them in that it leads to higher yields (and this we take into account) and on the other, it may reduce them as pesticides may be administered more efficiently and by machines rather than by hand (and this we cannot assess). The net result may lead to an overestimate of labor requirements.

In Table 4, below, a comparison is made between our

TABLE 4. Comparison of Labor Coefficients in Farming

Year 1960	Our Coefficients (1)	Agricultural Bank Coefficients (2)	Corrected Coefficients for 10% bias (3)
Wheat	2.15	2.18	2.40
Maize	3.68	4.22	4.64
Rice	8.00	7.00	7.70
Tobacco	25.50	22.67	24.94
Cotton	7.95	7.51	8.26
Wine Grapes	8.90	7.01	7.71
Currants	12.10	10.19	11.21
Vegetables	10.00	12.05	13.26

1. Supplementary work-days were turned into man work-days on the basis of the coefficient 0.6 to be consistent with the Agricultural Bank's methodology. Evelpides' 1955 constant coefficients were corrected for any changes due to mechanization and yields per stremma.

2. The set of coefficients shows a downward bias of around 10 percent due to the sampling method which excluded regions showing less than 3,000 stremmas cultivated with one crop.

3. The coefficients are corrected for the 10 percent downward bias.

labor-intensity coefficients for 1960 and those computed by the Agricultural Bank of Greece. The comparison although restricted to a few crops shows that on the average there is no significant divergence(4). This may be a presumptive evidence of the relative reliability of both the 1955 coefficients used in this study and the method of their extension to cover the other years of our study.

Changes in yields for each crop for the period 1953 - 1960 can be assessed with considerable accuracy. It is estimated that harvesting requirements add up to about 20 percent of total agricultural labor employment. Thus, an increase in yields of 10 percent, for example, would raise the agricultural «labor intensity coefficients» by 2 percent(5).

On the basis of this assumption we adjusted the 1955 constant coefficients for yield changes in each crop for the period 1953 - 1960. Table A - 1 gives the percentages used for this adjustment. In some instances adjustments have been considerable. In the case of olive groves, for example, the standard coefficients

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4. The Agricultural Bank coefficients for sultanina and potatoes are considerably different from ours. The Committee on Research and Organization of Economic Planning (Basic commitee on Primary Production) estimates sultanina and potatoes coefficients as 17 and 10 respectively, both nearer to the bank's. Practically, however, the difference is not of significance, because the acreage covered by sultaninas and potatoes is relatively small.

5. The case of olive groves calls for special treatment. The « labor-intensity coefficients » for men is a function of the total area covered with olive trees. The supplementary « labor-intensity coefficient », however, is a function of the annual harvest of olives since this is primarily a woman's and child's job. The annual harvest of olives is subject to the highly cyclical variation

were raised by 70 percent for 1953 and reduced by 20 percent for 1960.

While increased yields raise the «labor-intensity coefficients», increased mechanization works the opposite way. Farm mechanization in Greece has almost exclusively taken the form of introducing more tractors and combines for the cultivation of cereal crops. Accordingly, only the coefficients for cereal need be adjusted for changes in mechanization. The error committed by restricting the adjustment to cereal coefficients is very small. On the basis of consultations with agricultural experts we have estimated that substitution of tractors for draught animals for plowing, sowing and harvesting saves on the average 1,481 - man and 391 - supplementary wage days for every 1,000 stremmas(6). A 40 H.P. tractor can cover on the average 400 stremmas annually in Greece(7). Consequently, the labor substituted by a tractor amounts to about 592.4 - male and 156.4 - female wage days per 1,000 stremmas. A combine saves 232 - man and 47 - supplementary wage days per year for every 1,000 stremmas. Since a combine can cover in Greece some 2,000 stremmas per year, the actual labor substituted annually amounts to 464- man and 94-supplementary wage days per machine. In Table A - 1, note 1, the percentage annual

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in yields of olive trees. Accordingly, this had to be taken into consideration in computing the supplementary work-days per stremma devoted to olive groves for each of the years 1953 to 1954 and 1956 to 1960.

6. Ch. Evelpides, «Anaskopisis tis Georgikis Economias tis Hellados» (Review of the Agricultural Economy in Greece), *Agrotiki Economia*, No. 9, (Jan.-March 1957), pp. 36-37.

7. L. Soulis, « Oi en Helladi Georgikoi helkistires » (Tractors in Greece) *Agrotiki Economia*, No. 16, (Oct. - Dec. 1958), p. 322.

change in the «labor-intensity coefficients» refers to the number of tractors and combines operating in Greece in the years 1953 - 1960(8).

To calculate the total labor required in Greek farming for each year in the period 1953 - 1960 the appropriate «labor-intensity coefficients» are applied on the area devoted to each crop (Table A - 2)(9). The findings of this operation are shown in Table A - 3. There is an upward trend in total labor requirements, characterised by fluctuations. The upward trend tells the story of expanding cultivated areas and/or shifts from extensive to intensive cultivations outrunning increases in mechanization. Annual fluctuations are due mainly to weather conditions. (In 1957 weather conditions were ideal for farming operations, hence a peak in employment; 1960 was a bad year). It is also interesting to note that total supplementary labor, except for 1960, exceeds total male labor, as it appears in the table.

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8. Changes in the Number of Tractors and Combines for 1953 - 1960, over 1955.

	1955	1953	1954	1955	1956
Tractors	8450	- 2567	- 698	-0-	+ 2198
Combines	700	- 200	- 130	-0-	+ 87

	1957	1958	1959	1960
Tractors	+ 4930	+ 8504	+ 9504	+ 11004
Combines	+ 506	+ 506	+ 940	+ 1160

9. Official data (of the Bank of Greece, the Ministry of Agriculture, the Agricultural Bank of Greece, and Ministry of Coordination) on cultivated areas by crops for 1953 - 1960 have many gaps. We have supplemented them with our own estimates and findings of other private studies. We estimate that the error we may have committed does not exceed 1.5 percent.

In forestry and husbandry, changes in yields and in mechanization seem to be relatively unimportant. Consequently, the 1955 coefficients are used for all years between 1953 - 1960 without adjustment. (Tables A - 4. I and II). The coefficients are expressed in terms of man and supplementary wage days required per head of livestock for husbandry and per weight unit for forestry. When these coefficients are applied to the total livestock population and the total forestry output for the years 1953 - 1960 (Tables A - 5. I and II) show the total labor required in these two agricultural industries for each year of the series (Tables A - 6. I and II).

In husbandry there is a consistent upward trend in total labor requirements. (With weather conditions playing a minor part). In 1953 total labor requirements amount to 93,812.4 thousand work-days; in 1960 they increase to 105,297.9. Total supplementary labor again exceeds total male labor by a wider margin than in farming.

In forestry there is an increase in employment up to 1957. After 1957 a decline is noticed. This is due to limited forestry activities. Supplementary labor is slight due to the nature of the activities.

The 1955 coefficients worked out by Evelpides which we took as a starting point did not refer to fishing and, therefore, fishing coefficients had to be derived for the first time. Employment in fishing was estimated for 1955 and then by assuming a linear homogeneous production function of the first degree, we estimated the labor required for 1953, 1954 and 1956 - 1960 using the proportion of employment to output pertaining in the year 1955. (Tables A - 4, A - 5, and A - 6). The error that we might have committed due to our assumption of linearity and homogenuity in the produc-

tion function should be rather negligible in the overall picture, given the small volume of labor employed in the fishing industry as compared to total agricultural employment.

Finally, we derived labor requirements for agricultural transport. Here, reference is not made to the transportation of labor to and from the field. National income accounting conventionally excludes such transportation from production costs. But in estimating the amount of labor required in agriculture to produce a given volume of output during a given period, not only the time required for the production of the produce in the narrow sense but also the time spent in moving it from one stage of process to the next or time spent in activities related to the agricultural operations, ought to be measured. For example, account should be taken of the farmer's time spent in bringing in the produce or in transporting it to be processed; or of the transportation of fertilizers and livestock feed; or of the farmer's time in going back and forth to the bank or cooperative to apply for a loan, or for an advance on his output, or for insurance or market information, etc. In counting labor requirements all such activities are grouped under agricultural transport.

In our estimates of agricultural transport labor requirements are broken down as follows : for transport in farming we adopt a coefficient of 15 percent of the total labor required; for husbandry and forestry we use coefficients of 10 and 30 percent respectively. These estimates are very conservative as compared to those adopted by Evelpides([10]). Thus for 1955 our estimates

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10. He estimated that on the average agricultural transport represent 15 - 25 percent of the total agricultural expenses and

yield 37.1 million wage days absorbed in agricultural transport, while Evelpides' estimate was 54.5 million (see Table A-7).

The sum of the labor requirements in *farming*, *husbandry*, *forestry*, *fishing* and *agricultural transport*, represents the total labor required in agricultural production (Table 5).

At first, the impression might be created that there are some items missing from the sum of labor requirements. In particular, the labor devoted to handicrafts and the cottage industry does not appear to have been included in the labor requirements. This is because it had already been accounted for in the estimates of labor available. After having allowed for household activities the labor potential for women and girls was taken to be 45 and 35 percent of their active popu-

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occupy a proportional number of wage days of the farmers and the draught animals. « ... When husbandry is concerned, the agricultural transports decrease substantially because they mainly represent the transportation of hay and other livestock feeds. As for forestry products, their transport (to the nearest road where the truck will load) represents 30-40 percent of the wage days required for felling, collecting etc. » see Chrysos Evelpides, *op. cit.* pp. 39 - 40. Even if we assume that Evelpides' estimate adequately describes the conditions prevailing in 1955 these conditions have since changed considerably to render extrapolation dangerous. On the one hand, since the volume of output has increased, the wage days required for agricultural transport should also have increased. On the other hand, a set of factors works the opposite way. Agricultural transport wage days should decrease as the condition of the roads improves, as mechanical means of transportation are introduced, as credit becomes easier, as the advanced monetization of the economy extends the role of the middleman who takes over tasks previously perfomed by the farmer etc. The second set of factors, it might be argued, tends to counterbalance the first.

lation respectively. When it comes to household item repairs and various kinds of improvements some difficulties are encountered. The tasks that can be performed inside the house were presumably allowed in our estimate of 255 working days in a year. When inclement weather prevents the farmer from working in the field some work related to his agricultural operations is supposedly being done at home under cover. In the case of land improvement or construction, however, the same cannot be done. In the first place, such activities are often highly elusive and cannot be measured. Secondly, conceptually it is not easy to draw the line. Is building a barn, for example, an agricultural activity, or is it part of the building industry? Or, when a farmer uses his free time to build his neighbor's fence for wages, does this mean that his agricultural occupation keeps him fully employed? This is to suggest that our estimates of excess labor, albeit biased on the conservative side, should not be construed as representing *idle* time for the farmer. They only show the extent to which agricultural labor is not employed, in strictly agricultural work. And this is a far cry from indolence!

The Labor Diagram of Table 5 presents in a concise form the results of our investigation so far conducted within a framework of assumptions which we introduced along the way in order to supplement inadequate data or substitute for unreliable information on relevant agricultural operations and on the behavior of agricultural households. Total labor required depicts the sum of requirements in farming, husbandry, forestry, fishing and transport. An upward trend in both total labor required and its components is observed up to 1957. The relative slackening off after 1957 is partly asso-

ciated with weather conditions affecting mainly farming([11]). The relative shares of the components of total labor requirements appear to have changed during the period 1953 - 1960. In 1953, a relatively normal weather year, farming made up 53.49 percent, hus-

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11. This increase in labor required (labor input) in Greek agriculture since 1953 appears to be an atypical case considering the trends in other European countries. The following table gives a comparative picture of the developments in agricultural labor required.

AGRICULTURAL LABOR INPUT - 1953= 100

Countries	1950	1956	1959	Percentage Changes $\frac{1959}{1950}$
Greece	...	110	106	6
Austria	102	97	94	—8
Belgium	112	90	81	—28
Denmark	108	91	84	—22
Finland	110	93	90	—18
France	105	95	91	—14
W. Germany	112	85	75	—33
Holland	105	95	90	—15
Sweden	118	86	78	—34
Switzerland	105	95	91	—14
United Kingdom	105	94	87	—17
Italy	103	96	92	—11
Western Europe	109	92	86	—21

Source: F.A.O./E.C.C. *Towards a Capital Intensive Agriculture — Fourth Report on Output, Expenses and Income of Agriculture in European Countries*, p. 38.

There are at least two main reasons for this special trend in Greek agricultural Labor input vis-a-vis other European countries

a) Farming makes up a high percentage of the agriculture, while many European countries have favored husbandry. Since 1950 Greek farming production increased requiring a higher labor input (special pattern). In most European countries hus-

bandry 31.79 percent, forestry 1.73 percent and fishing 1.27 percent of total labor required. In 1959—a relatively normal weather year—the respective percentages were 52.64, 32.04, 1.64, and 2.09. (Transport is ignored as it is taken to be directly proportional to farming, husbandry and forestry).

A comparison of our estimates of labor requirements with those reached by similar studies illustrates two points :

a) Our estimates tend to be on the conservative side.

b) In our measurements we have proceeded in detail and step by step and have avoided gross simplifications that usually lead to an overevaluation of labor requirements([12]).

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bandry production went up compared to farming. Husbandry, however, is capital intensive.

b) Agricultural investment in Western Europe went to a large extent for the purchase of machinery. In Greece, on the other hand a large proportion of agricultural investments were for riparian works, which do not necessarily result in lower labor inputs.

12. Ferentinos' estimates for 1953 (*op. cit.*, p. 13) apparently were made in a rough and ready way with a method that is only sketchily described (*ibid*, p. 15). For both farming and husbandry our figures differ from his significantly. For 1953 we found that farming required 90.5 million man and 96.2 million supplementary wage days as compared to his 123.8 and 94.0 million respectively; for husbandry our estimates in millions are 49.3 and 63.6 as compared to his 85.3 and 31.8 for man and supplementary wage days respectively. Ferentinos did not include in his study forestry and fishing. See Tables A - 4 and A - 7. That Ferentinos overestimated the 1953 labor requirements is evidenced by a more recent appraisal by the same writer which yields figures closer to ours. See *Helleniki Agrotiki Economia* Agrotiki Trapeza, 1956, p. 13.

Evelpides' 1955 total labor requirements for farming, husbandry, forestry, cottage industry, improvement and repairs and

transports amount to 395.5 million wage days (*op. cit.*, p. 33) as compared to our 316.9 million total for farming, husbandry, forestry, fishing and transports (Table 5). The divergence, besides a slight difference of the items included in our totals, is due to the fact that Evelpides adds together man and supplementary wage days with no attempt to convert them first to a common basis. If the man and supplementary wage days subtotals are considered separately, then our estimates fall closer together.

CHAPTER 6

AGRICULTURAL SURPLUS LABOR

1. Seasonal Distribution

Our treatment so far has neglected the seasonal aspects of employment in agriculture. Labor available and labor required have been expressed in terms of Man Productive Days per year. Agricultural activities, however, follow a seasonal pattern more than other kinds of economic activity. In defining chronic surplus labor, we assumed that the minimum peak load of work required to qualify the labor force as indispensable is a whole season. Consequently, chronic surplus labor must be delineated in seasonal terms. To this end both annual labor available and annual labor required must be distributed over the four seasons.

On the side of labor availability, a seasonal distribution of the days lost for agricultural tasks due to rainfall, Sundays and holidays, is in order. Table A - 8 shows the seasonal distribution of an average of 90 days of rain. The data are thirty year averages of observations at four meteorological stations : Athens, Argostolion, Heraklion, and Thessaloniki. Because of lack of additional data we assume that this distribution is typical for the country as a whole. After computing the probabilities that some rainy days during which agricultural work cannot be done fall on Sundays and holidays, the number of inclement weather workdays is reduced from 90 to 73.7. These are distributed over the four seasons as in Table A - 8. As it has already been pointed out the number of work-days lost because of rainfall is a function of the quantity of rain and its

duration. Rainfall of at least one millimeter or less but lasting for more than three hours is supposed to cause the loss of a full work-day. If rainfall during a day accumulates more than 10 m.m. one half of the next day is also supposed to be lost. The number of work-days thus lost was estimated at 81.1. Table A - 8 shows their seasonal distribution (1). Furthermore, 65 Sundays and holidays are added and then distributed as per Table A - 8. The difference between the number of work-days in each season and the number of days lost gives the seasonal distribution of the days available for agricultural work. At first, the days available for the whole year were estimated at 218.9 and their distribution was found at 25.1, 20.0, 23.7 and 31.2 percent for the fall, winter, spring, and summer respectively. The same distribution was retained after adding 36.1 days to reach the more liberal estimate of 255 available work-days, that is adopted throughout this study. The agricultural labor has been assumed constant throughout the year.

The seasonal distribution of labor requirements was derived from a study made by the Agrotiki Trapeza. The study calculated seasonal requirements per crop per stremma for farming, and corrected the data for the cultivated area of each crop. The same procedure was followed in husbandry per animal head, while in forestry and fishing it was assumed that annual labor requirements are distributed proportionally among the four seasons (except for a winter drop in fishing). These computations appearing in Table A - 9 were

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1. When more than one day was lost the probability that the next day would be a Sunday or holiday was culculated and the distribution was accordingly corrected.

made by the Agrotiki Trapeza for the year 1956 and were based on the pattern of farming and husbandry for that year. Since these patterns have changed only shightly in the last decade, the percentage seasonal distribution of labor requirements for 1956 has been assumed to hold true for the whole period of 1953-1960. Table A - 9. II presents this percentage seasonal distribution, which has been applied to the annual labor requirements computed on the basis of Evelpides' «labor intensity coefficients» as they were adjusted for changes in mechanization and yields.

For agricultural transport a linear homogeneous production function of the first degree was assumed to exist both annually and seasonally. The seasonal distribution of the total wage days required for transport was taken to be proportional to the seasonal employment in agriculture. The coefficients of 15, 10, and 30, assumed to express transport labor requirements in farming, husbandry, and forestry respectively, were taken to apply both to annual total and seasonal subtotal labor requirement. Thus, the labor required for farming transport in the fall is estimated at 15 percent of the 31.2 percent of the annual total labor required in farming; the labor required for husbandry transport was estimated at 10 percent of the 23.8 percent of the annual total labor required in husbandry, and so on for forestry and for the other seasons of the year.

The Labor Diagram, in Table 5, presents in detail a picture of the annual and seasonal labor available and labor required in Greek agriculture for the years 1953 - 1960. The difference between the two magnitudes is a measure of the «surplus» agricultural labor in Greece.

2. Surplus Labor: Seasonal and Chronic

The annual difference between total labor available and labor required varies in the eight year period from a low of 6.5 percent (1957) to a high of 16.2 percent (1953), as Table 5 shows. These average percentages, however, have little practical significance because they include a high degree of aggregation. Specifically, the annual averages of surplus labor level off what may be significant peaks and troughs of seasonal employment. Agriculture is an industry with its seasonality dependent on the productive cycle. By averaging out this seasonality we distort productive activity in agriculture beyond any allowance made for averaging. The seasonal pattern of agriculture should be maintained if the analysis is to suggest meaningful policy recommendations.

Table 5 reveals, as it might have been expected, a highly seasonal pattern. Winter is the season with the highest degree of surplus labor for all eight years of the series. It ranges from a high of 31.5 percent (1953) to a low of 24.2 percent (1957). On the other hand, spring is the season with the lowest degree of surplus labor—indeed «shortage» of labor for most years of the period. It ranges from a labor surplus of 3.5 percent (1953) to a « shortage » of 7.8 percent (1957). Fall is the second busiest season in our series marked by « shortage » of labor (e.g., 1955 - 1960), while is summer the second slack season, consistently presenting excessive labor supply.

The seasonal distribution of excess labor is linked with two important factors partly connected with the nature of agricultural activity. First, it is the biological and technical factors which, given the type of cultivation, make crops require varying amounts of labor inputs over the different seasons regardless of the supply of labor. Second, some institutional (holidays) and climatic (inclement weather) factors reduce the number of available days during each season. Labor surplus, as distributed seasonally, has two components: the seasonal surplus of the productive cycle and the chronic surplus. Clear demarkation between the two is necessary when policy recommendations are formulated.

Seasonal surplus, for a year, is defined as the difference between the actual employment in every season and the employment available. The chronic surplus is described by the difference between the labor available and labor required for the peak season.

A distinction between the two concepts is essential. The term chronic surplus labor has a normative connotation. It suggests that labor chronically unemployed could be removed from agriculture without disturbance in the production function since its involvement with agricultural activities is restricted to less than one season's work. On the contrary, seasonal surplus labor is indispensable(2).

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2. The case for the indispensability of the labor force that is seasonally unemployed may be overstated. Is it possible that the seasonal unemployment during a productive cycle has been overestimated because we assume that even a mere one-week or a one-month peak load of work is enough in order to consider part of labor non-removable? Possibly, but not necessarily. The fact, for example, that the summer peak for 1953

TABLE 5. Labor Diagram,

1953	Fall MPD	Fall %	Winter MPD	Winter %
1. Labor Available	88,382.0	25.1	70,424.0	20.0
2. Labor Required	83,904.2		48,271.0	
a. Farming.....	49,251.3	31.2	15,785.7	10.0
(Transport)	(7,387.7)		(2,367.8)	
b. Husbandry	22,327.4	23.8	25,329.3	27.0
(Transport)	(2,232.7)		(2,532.9)	
c. Forestry	1,273.3	25.0	1,273.4	25.0
(Transport)	(382.0)		(382.0)	
d. Fishing	1,049.8	28.0	599.9	16.0
e. Agricultural Transport	10,002.4		5,282.7	
3. Surplus Labor.....	4,477.8		22,153.0	
4. Rate of Surplus Labor	5.1%		31.5%	
5. Rate of Chronic Surplus labor				
1954				
1. Labor Available	88,739.2	25.1	70,708.5	20.0
2. Labor Required	85,208.8		49,139.3	
a. Farming.....	49,820.3	31.2	15,968.1	10.0
(Transport)	(7,473.1)		(2,395.2)	
b. Husbandry	22,815.0	23.8	25,882.6	27.0
(Transport)	(2,281.5)		(2,588.2)	
c. Forestry	1,246.2	25.0	1,246.2	25.0
(Transport)	(373.8)		(373.9)	
d. Fishing	1,198.9	28.0	685.1	16.0
e. Agricultural Transport	10,128.4		5,357.3	
3. Surplus Labor.....	3,530.4		21,569.2	
4. Rate of Surplus Labor	4.0%		30.5%	
5. Rate of Chronic Surplus Labor				

1953 - 1960.

In thousand Man Productive Days (MPDs)

Spring		Summer		Total	
MPD	%	MPD	%	MPD	%
83,452.4	23.7	109,861.4	31.2	352,119.8	100.0
80,567.9		82,356.5		295,099.6	
43,568.4	27.6	49,251.3	31.2	157,856.7	100.0
(6,535.3)		(7,387.7)		(23,678.5)	
25,235.5	26.9	20,920.2	22.3	93,812.4	100.0
(2,523.6)		(2,092.0)		(9,381.2)	
1,273.3	25.0	1,273.4	25.0	5,093.4	100.0
(382.0)		(382.0)		(1,528.0)	
1,049.8	28.0	1,049.9	28.0	3,749.4	100.0
9,440.9		9,861.7		34,587.7	
2,884.5		27,504.9		57,020.2	
3.5%		25%		16.2%	
				3.5%	

83,789.6	23.7	110,305.2	31.2	353,542.5	100.0
81,867.1		83,627.2		299,842.4	
44,071.8	27.6	49,820.3	31.2	159,680.5	100.0
(6,610.8)		(7,473.0)		(23,952.1)	
25,786.7	26.9	21,377.1	22.3	95,861.4	100.0
(2,578.7)		(2,137.7)		(9,586.1)	
1,246.2	25.0	1,246.3	25.0	4,984.9	100.0
(373.9)		(373.9)		(1,495.5)	
1,199.0	28.0	1,198.9	28.0	4,281.9	100.0
9,563.4		9,984.6		35,033.7	
1,922.6		26,678.0		53,700.1	
2.3%		24.2%		15.2%	
				2.3%	

TABLE 5. Labor Diagram,

1955	Fall MPD	Fall %	Winter MDP	Winter %
1. Labor Available	89,035.6	25.1	70,944.7	20.0
2. Labor Required	90,254.2		51,525.2	
a. Farming.....	53,258.2	31.2	17,069.9	10.0
(Transport)	(7,988.7)		(2,560.5)	
b. Husbandry	23,580.1	23.8	26,750.5	27.0
(Transport)	(2,358.0)		(2,675.1)	
c. Forestry	1,284.0	25.0	1,284.0	25.0
(Transport)	(385.2)		(385.2)	
d. Fishing	1,400.0	28.0	800.0	16.0
e. Agricultural Transport	10,731.9		5,630.8	
3. Surplus Labor.....	—1,218.6		19,419.5	
4. Rate of Surplus Labor	—1.4%		27.4%	
5. Rate of Chronic Surplus Labor				
1956				
1. Labor Available	89,191.5	25.1	71,068.9	20.0
2. Labor Required	91,100.1		52,143.6	
a. Farming.....	53,538.8	31.2	17,159.9	10.0
(Transport)	(8,030.8)		(2,574.0)	
b. Husbandry	23,860.9	23.8	27,069.1	27.0
(Transport)	(2,386.1)		(2,706.9)	
c. Forestry	1,359.3	25.0	1,359.4	25.0
(Transport)	(407.8)		(407.8)	
d. Fishing	1,516.4	28.0	866.5	16.0
e. Agricultural Transport	10,824.7		5,688.7	
3. Surplus Labor.....	—1,908.6		18,925.3	
4. Rate of Surplus Labor	—2.1%		26.6%	
5. Rate of Chronic Surplus Labor				

1953 - 1960 *(cont.)*

In thousand Man Productive Days (MPDs)

Spring		Summer		Total	
MPD	%	MPD	%	MPD	%
84,069.4	23.7	110,673.7	31.2	354,723.4	100
86,565.8		88,619.5		316,964.7	
47,113.1	27.6	53,258.2	31.2	170,699.4	100
(7,067.0)		(7,988.7)		(25,604.9)	
26,651.4	26.9	22,094.0	22.3	99,076.0	100
(2,665.1)		(2,209.4)		(9,907.6)	
1,284.0	25.0	1,284.0	25.0	5,136.0	100
(385.2)		(385.2)		(1,540.8)	
1,400.0	28.0	1,400.0	28.0	5,000.0	100
10,117.3		10,583.3		37,053.3	
—2,496.4		22,054.2		37,758.7	
—3.0%		19.9%		10.6%	
				—3.0%	

84,216.6	23.7	110,867.5	31.2	355,344.5	100
87,414.6		89,446.1		320,104.4	
47,361.2	27.6	53,538.8	31.2	171,598.7	100
(7,104.2)		(8,030.8)		(25,739.8)	
26,968.8	26.9	22,357.1	22.3	100,255.9	100
(2,696.9)		(2,235.7)		(10,025.6)	
1,359.3	25.0	1,359.4	25.0	5,437.4	100
(407.8)		(407.8)		(1,631.2)	
1,516.4	28.0	1,516.5	28.0	5,415.8	100
10,208.9		10,674.3		37,396.6	
—3,198.0		21,421.4		35,240.1	
—3.8%		19.3%		9.9%	
				—3.8%	

TABLE 5. Labor Diagram

1957	Fall MPD	Fall %	Winter MPD	Winter %
1. Labor Available	89,312.1	25.1	71,165.0	20.0
2. Labor Required	94,830.2		53,912.5	
a. Farming.....	56,082.0	31.2	17,975.2	10.0
(Transport)	(8,412.3)		(2,696.3)	
b. Husbandry	24,418.3	23.8	27,701.5	27.0
(Transport)	(2,441.8)		(2,770.1)	
c. Forestry	1,405.8	25.0	1,405.8	25.0
(Transport)	(421.8)		(421.7)	
d. Fishing	1,648.2	28.0	941.9	16.0
e. Agricultural Transport	11,275.9		5,888.1	
3. Surplus Labor.....	—5,518.1		17,252.5	
4. Rate of Surplus Labor	—6.2%		24.2%	
5. Rate of Chronic Surplus Labor				
1958				
1. Labor Available	89,463.2	25.1	71,285.4	20.0
2. Labor Required	91,727.0		53,185.9	
a. Farming.....	52,968.6	31.2	16,977.1	10.0
(Transport)	(7,945.3)		(12,546.6)	
b. Husbandry	24,694.6	23.8	28,014.8	27.0
(Transport)	(2,469.5)		(2,801.5)	
c. Forestry	1,365.2	25.0	1,365.3	25.0
(Transport)	(409.5)		(409.6)	
d. Fishing	1,874.3	28.0	1,071.0	16.0
e. Agricultural Transport	10,824.3		5,757.7	
3. Surplus Labor.....	—2,263.8		18,099.5	
4. Rate of Surplus Labor	—2.5%		25.4%	
5. Rate of Chronic Surplus Labor				

1953 - 1960 *(cont.)*

In thousand Man Productive Days (MPDs)

Spring		Summer		Total	
MPD	%	MPD	%	MPD	%
84,330.6	23.7	111,017.5	31.2	355,825.2	100
90,887.3		93,137.4		332,767.4	
49,611.0	27.6	56,082.0	31.2	179,750.2	100
(7,441.6)		(8,412.3)		(26,962.5)	
27,598.9	26.9	22,879.4	22.3	102,598.1	100
(2,759.9)		(2,288.0)		(10,259.8)	
1,405.8	25.0	1,405.8	25.0	5,623.2	100
(421.8)		(421.7)		(1,687.0)	
1,648.3	28.0	1,648.2	28.0	5,886.6	100
10,623.3		11,122.0		38,909.3	
— 6,556.7		17,880.1		23,057.8	
— 7.8%		16.1%		6.5%	
				— 7.8%	
84,473.2	23.7	111,205.2	31.2	356,427.0	100
88,236.7		90,015.2		323,164.8	
46,856.9	27.6	52,968.7	31.2	169,771.3	100
(7,028.5)		(7,945.3)		(25,465.7)	
27,911.1	26.9	23,138.2	22.3	103,758.8	100
(2,791.1)		(2,313.8)		(10,375.9)	
1,365.2	25.0	1,365.3	25.0	5,461.0	100
(409.6)		(409.6)		(1,638.3)	
1,874.3	28.0	1,874.3	28.0	6,693.9	100
10,229.2		10,668.7		37,479.9	
— 3,763.5		21,190.0		33,262.2	
— 4.5%		19.1%		9.3%	
				— 4.5%	

TABLE 5. Labor Diagram,

1959	Fall MPD	Fall %	Winter MPD	Winter %
1. Labor Available	89,623.8	25.1	71,413.4	20.0
2. Labor Required	92,824.5		53,735.5	
a. Farming	53,693.0	31.2	17,209.3	10.0
(Transport)	(8,053.9)		(2,581.4)	
b. Husbandry	24,927.1	23.8	28,278.7	27.0
(Transport)	(2,492.7)		(2,827.9)	
c. Forestry	1,342.2	25.0	1,342.3	25.0
(Transport)	(402.6)		(402.7)	
d. Fishing	1,913.0	28.0	1,093.2	16.0
e. Agricultural Transport	10,949.2		5,812.0	
3. Surplus Labor.....	—3,200.7		17,677.9	
4. Rate of Surplus Labor	—3.6%		24.8%	
5. Rate of Chronic Surplus Labor				
1960				
1. Labor Available	89,695.9	25.1	71,470.8	20.0
2. Labor Required	90,103.9		53,022.8	
a. Farming.....	51,095.6	31.2	16,376.8	10.0
(Transport)	(7,664.3)		(2,456.5)	
b. Husbandry	25,060.9	23.8	28,430.4	27.0
(Transport)	(2,506.1)		(2,843.1)	
c. Forestry	1,360.2	25.0	1,360.2	25.0
(Transport)	(408.1)		(408.0)	
d. Fishing	2,008.7	28.0	1,147.8	16.0
e. Agricultural Transport	10,578.5		5,707.6	
3. Surplus Labor.....	—408.0		18,448.0	
4. Rate of Surplus Labor	—0.5%		25.8%	
5. Rate of Chronic Surplus Labor				

Source: Computed from Table 2 and Tables A-3, A-6, A-8, A-9

1953 - 1960 *(cont.)*

In thousand Man Productive Days (MPDs)

Spring		Summer		Total	
MPD	%	MPD	%	MPD	%
84,624.9	23.7	111,404.9	31.2	357,067.0	100
89,271.5		91,096.7		326,928.2	
47,497.7	27.6	53,693.0	31.2	172,093.0	100
(7,124.7)		(8,054.0)		(25,814.0)	
28,173.9	26.9	23,356.1	22.3	104,735.8	100
(2,817.4)		(2,335.6)		(10,473.6)	
1,342.2	25.0	1,342.3	25.	5,369.0	100
(402.7)		(402.6)		(1,610.6)	
1,913.0	28.0	1,913.0	28.0	6,832.2	100
10,344.7		10,792.3		37,898.2	
— 4,646.6		20,308.2		30,138.8	
— 5.5%		18.2%		8.4%	
				— 5.5%	
84,693.0	23.7	111,494.5	31.2	357,354.2	100
86,914.5		88,366.4		318,407.6	
45,199.9	27.6	51,095.5	31.2	163,767.8	100
(6,780.0)		(7,664.3)		(24,565.1)	
28,352.2	26.9	23,481.4	22.3	105,297.9	100
(2,825.5)		(2,348.1)		(10,529.8)	
1,360.2	25.0	1,360.3	25.0	5,440.9	100
(408.1)		(408.1)		(1,632.3)	
2,008.6	28.0	2,008.7	28.0	7,173.8	100
10,020.6		10,420.5		36,727.2	
— 2,221.5		23,128.1		38,946.6	
— 2.6%		20.7%		10.9%	
				— 2.6%	

Policies designed to increase employment and utilize labor more rationally should, among other things, aim at supplementing the off season workload by creating part time work in handicrafts, local public works, community development, etc.

Table 5 describes the seasonal surplus labor for the period 1953-1960. Winter is consistently the season of highest surplus. Fall presents the lowest degree of seasonal surplus labor: 5.1 and 4.0 percent for 1953 and 1954 respectively.

Chronic surplus labor was defined as the labor employed for less than one season which can be removed from agriculture for a complete year with only some routine reorganization of the work force, and without leading to any reduction in output. *In this sense*, Table 5 and Figure 1 show that chronic surplus labor in Greek agriculture is virtually non - existent. From the eight years of our series it existed only in 1953 and 1954 to a degree of 3.5 and 2.3 respectively. The other years of the period are marked by a seasonal shortage of labor.

The shortage of labor is concentrated in the fall and the spring. The degree of spring labor shortage

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is at 96.5 percent of employment (i.e., 3.5 percent underemployment) does not imply that only 96.5 percent of the labor force was employed throughout that season. This is only a three month average. Most likely more than 96.5 percent of the labor force was employed part of the time, averaging out with the rest of the time. By drawing our seasonal unemployment of the productive cycle line at the highest seasonal employment peak we do not adhere to rigid, static assumptions. On the contrary, we have already incorporated the possibility of using for some peak load work labor that lies above the seasonal unemployment line, e.g., part of the surplus labor or even hired labor.

ranges from a low of 2.6 percent (1960) to a high of 7.8 percent (1957), while the degree of fall labor shortage ranges from 0.5 (1960) to 6.2 percent (1957). This finding of a labor shortage, odd as it may seem in face of the general assumption of widespread chronic surplus labor in Greece is in no way an impossibility. The gap is likely filled by increasing the supply of labor in ways that are unrecorded in our labor available of Table 5. Possibly, during a part of the fall and the spring seasons the farmers work more than nine hours, which we chose as the standard agricultural work-day. In fact, experience with Greek agriculture suggests that during the seasons of peak activity the work-day begins and ends with the beginning and the end of daylight (3). A second possibility is that the supply of labor is increased during the peak seasons from without. Because of pluricultural cultivation it may well be that the peak activity does not fall in the same season for all regions of the country, or all villages of an area or even all families of a village. In this case it is customary that the farmers whose crops happen to be on the off season hire their labor to the ones who face their seasonal employment peak. The nature of the aggregative method we employed did not provide for explicit consideration of this factor.

A methodological question has still to be resolved before a conclusion is reached about the actual

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3. Paul N. Rosenstein - Rodan adjusted in his Italian study the length of the work-day according to month of the year. He thus used 10, 11, and 12 hours for the spring months of March, April, and May and 10, 9 and 8 hours for the fall months of September, October, and November.

possibility of removing the chronically unemployed. It is connected with the fact that labor is nondivisible for both physical and institutional reasons. Part of the labor force that is chronically unemployed may not be composed of whole human units and hence it may be non-removable. If in one village of 100 working agricultural population the surplus labor is 2 percent, this does not imply that we can remove for a whole year two workers without decreasing the total output of the village. It might be that this 2 percent consists of the sum of fractions of one worker that are excessive in a number of families. Obviously, if we remove two people, the families that lost them will be faced with a shortage of labor and will have reduced output. In the same manner, due to institutional reasons not all chronic surplus labor is removable even if it includes only whole human units. Suppose that in a family of four working members (father, mother, one boy and one girl) chronic surplus labor amounts to a whole man productive year. Is it safe to assume that the father can then be removed with no repercussion on the productive activity and output? Even if we set aside the human element, can we hypothesize perfect substitutability between the labor of a man, a woman, a boy, and a girl?

The conclusion is that we cannot exactly determine how much chronic surplus labor it is *feasible* to remove. For all practical purposes it is less than the chronic surplus labor revealed by a comparison between the peak seasonal labor available and labor required. The minuend of this formal magnitude is the non-removable fractional surplus. Its size can only be determined through a *disaggregative microeconomic investigation based on the direct method of studying a sample of farm households.*

PART III

A REGIONAL TEST

CHAPTER 7

LABOR SURPLUS IN PELOPONNESOS, LARISSA, EDESSA-VEROIA, AND DRAMA –1959

1. The Sample

Agricultural underemployment figures treating the whole country as a single unit should be interpreted with caution. National policy recommendations should be based on figures for each region, because any region may have quite a different incidence and distribution of seasonal surplus and chronic surplus labor from the overall national pattern. It is likely that some regions will display little surplus labor while others will suffer from unemployment exceeding considerably the national average. On the aggregate level, for example, the winter months are characterized by the most severe labor surpluses; a particular region, however, growing olives and citrus fruit, may have high levels of employment during this period. Similarly, there may be sharp differences, both annually and seasonally, between the various regions of the country. Argo-Nauplia may experience full employment throughout the year while Larissa - Farsala may be facing heavy surpluses; or the Messara region in Crete may use its man-power fully during the winter months while Drama is experiencing surpluses. And this, is likely to be reversed in spring, when tobacco growing in Drama increases the demand for labor there, while Messara goes through a slack period.

Ideally, our aggregative study of surplus labor ought to have been accompanied by a detailed regional investigation of the same problem. (Regions, here, can be defined in terms of labor mobility and patterns of

cultivation, keeping in mind existing institutional divisions such as the administrative boundaries or the area covered, for example, by the Agricultural Bank's Branches, etc.). Our objectives, however, are limited and we investigate only a selected group of regions.

Four regions are selected for investigation: a) Peloponnesos, b) Larissa, c) Edessa-Veroia, and d) Drama. The choice of these regions, was dictated by a number of reasons, one of which was the advisability for some representation of different patterns of agricultural activity. Thus, Peloponnesos was selected to represent a relatively large area with limited labor mobility in and out of the unit, a relative decline in population, and diversified cultivation which keeps the population busy throughout the four seasons, (grapes, fruit, olives, vegetables, cereals). Larissa is a reasonably good example of monoculture with extensively cultivated cereals and intensive use of machinery. Edessa-Veroia is of special importance as a case of arboriculture and the main producer of some types of fresh fruit for the domestic and the export markets. Finally, Drama is a tobacco raising region employing little machinery and depending heavily on tobacco exports.

The scope of each of the four regions was determined by the availability of data necessary to compute the volume of surplus labor. The administrative structure and the distribution of the branch offices of the Agricultural Bank of Greece set the limits for the precise area of each region. This bank has about 160 non-overlapping branch offices throughout Greece, which is thus divided into 160 distinct departments. Peloponnesos consists of 37 such departments, Larissa and Drama are of one each, and Edessa-Veroia is a two-department district.

Our regional investigation covers only one year, 1959. Lack of data made it difficult to extend our examination over the whole period of 1953 - 1960. It is therefore intended to provide only a partial check for the results of the aggregate surplus labor test and a partial supplement to it.

The estimation of labor available for any one region presented serious difficulties. The crucial step was to compute the agricultural population of each region. Since the regions we chose, except for Peloponnesos, do not form official administrative units, their population data are not given directly by the Census.

The bureau of the Agricultural Bank in charge of coordinating the activities of the branch offices keeps a roster of the names of towns and villages under the jurisdiction of each branch office. The total population of each of the three regions (Peloponnesos excepted) was thus derived by aggregating the 1961 Census population data for all communities of a region. The agricultural population of a region was deduced as a proportion of the urban, semi-urban, and rural population. These proportions were based upon the percentages given by the 1951 Census for each administrative unit (nomos), a geographical part of which our three regions happen to be. The assumption was made that the share of agriculture in the occupational structure in urban,semi-urban, and rural areas is identical throughout the «nomos» and has changed slightly since 1951.

From the derived 1961 agricultural population we estimated the 1959 agricultural population of each region. For this operation we computed the annual percentage net increase of the rural population of the respective administrative units (nomos) for the period between the two censuses. This percentage was then

used to decrease the agricultural population of 1961 and arrive at the 1959 population figure.

In the case of Peloponnesos, which coincides with a larger administrative unit, the agricultural population was directly derived for the years 1951 and 1961 from data of the respective censuses. It was found that the agricultural population showed a net decrease in the ten-year period. The annual rate of this decline was computed and, then, the 1961 figure was increased appropriately to arrive at the 1959 figure for agricultural population. See Table 6.

The active agricultural population, labor-potential, and Man Productive Units in agriculture were computed from the total agricultural population of each region by using coefficients similar to those used for our national computations.

Next the MPUs were converted into Man Productive Days (MPD). Since there are no regional rainfall data we assumed that the four regions are subject to the same climatic conditions and so we adopted the same coefficient of 255 agricultural work-days a year. The seasonal distribution appearing in Table A - 9 was assumed to be the same for the four regions as for the country.

Labor required has been computed on the basis of the labor-intensity coefficients which were applied on the area cultivated with each crop, or alternatively on the livestock population, and the forestry and fishing output. Aggregate labor-intensity coefficients per stremma for each crop are given in the form of weighted averages for the whole country. However, labor intensity coefficients may differ significantly for each crop from region to region. Consequently, regional labor coefficients had to be derived in order to estimate

the labor requirements. (Per stremma requirements for wheat, for example, are higher in Peloponnesos than in Thessaly where there is greater application of machinery). Similarly, the size of cultivated areas, livestock population, forestry and fishing output had to be measured on a regional basis.

The sources for our computations are the unpublished reports submitted to the Agricultural Bank in Athens by each of its 160 branch offices, and particularly the reports of the bank offices in the four regions under consideration. These reports, among other things, contain information on annual crop cultivation (stremmas cultivated with each crop), on livestock,and forestry and fishing output of each bank district(1). These reports give also annual labor cost in drachmas per stremma of each crop and, in some cases, per animal head. The cost is given seperately for « family labor » and « hired labor ». « Family labor » cost is calculated by each bank branch office on the basis of a man, woman, and child standard for all branch offices, at a wage figure given by the Agricultural Bank. « Hired labor » cost is calculated on the basis of the standard man-wage set by the Agricultural Bank as a basis for the estimation of family-labor costs per crop per land-unit etc.

It is thus possible to compute the wage-days required annually per stremma of each crop, or per animal-head, by dividing the total annual family and hired labor cost by the standard man-wage. This leads to the determining of labor-intensity coefficients in man-days for different crops and livestock in each bank branch office.

Labor intensity coefficients are derived directly for the regions of Drama and Larissa, which are under

1. See Tables A—12 and A—13.

TABLE 6. Regional Labor Force

	Total Agricultural Population	Age Bracket	Percentage Coefficient	Agricultural Population	Percentage Coefficient
I. Peloponnesos					
		15—19	9.32	31,873	75
Male	341,987	20—64	50.04	171,130	92
		65—69	2.69	9,199	80
		15—19	8.63	30,924	35
Female .	358,332	20—64	53.25	190,812	45
		65—69	3.31	11,861	25
Total .	700,319			445,799	
II. Edessa-Veroia					
		15—19	9.32	3,649	75
Male	39,154	20—64	50.04	19,593	92
		65—69	2.69	1,053	80
		15—19	8.63	3,540	35
Female .	41,025	20—64	53.25	21,846	45
		65—69	3.31	1,358	25
Total .	80,179			51,039	
III. Drama					
		15—19	9.32	2,700	75
Male	28,970	20—64	50.04	14,496	92
		65—69	2.69	779	80
		15—19	8.63	2,620	35
Female.	30,355	20—64	53.25	16,164	45
		65—69	3.31	1,005	25
Total .	59,325			37,764	
IV. Larissa					
		15—19	9.32	2,397	75
Male	25,718	20—64	50.04	12,869	92
		65—69	2.69	692	80
		15—19	8.63	2,326	35
Female .	26,947	20—64	53.25	14,349	45
		65—69	3.31	892	25
Total .	52,665			33,525	

and Labor Potential, 1959

Labor Potential in Agriculture	Percentage Coefficient	Conversion into Man-Productive Units	Coefficient	Conversion into Man-Productive Days
23,905	70	16,734	255	4,267,170
157,440	100	157,440	255	40,147,200
7,359	70	5,151	255	1,313,505
10,823	60	6,494	255	1,655,970
85,865	70	60,106	255	15,327,030
2,965	60	1,779	255	453,645
288,357		247,704		63,164,520
2,737	70	1,916	255	488,580
18,026	100	18,026	255	4,596,630
842	70	589	255	150,195
1,239	60	743	255	189,465
9,831	70	6,882	255	1,754,910
339	60	203	255	51,765
33,014		28,359		7,231,545
2,025	70	1,418	255	361,590
13,336	100	13,336	255	3,400,680
623	70	436	255	111,180
917	60	550	255	140,250
7,274	70	5,092	255	1,298,460
251	60	151	255	38,505
24,426		20,983		5,350,665
1,798	70	1,259	255	321,045
11,839	100	11,839	255	3,018,945
554	70	388	255	98,940
814	60	488	255	124,440
6,457	70	4,520	255	1,152,600
223	60	134	255	34,170
21,685		18,628		4,750,140

the jurisdiction of one bank branch office each. For Edessa-Veroia and Peloponnesos, which are broken into 2 and 37 bank department districts respectively, we computed a weighted average. Unfortunately, the bank office reports give labor-cost information only for crops cultivated on an area exceeding 3,000 stremmas and only for livestock in large numbers. Forestry and fishing labor costs are not given. Consequently, for crops cultivated on less than 3,000 stremmas, for livestock in small numbers and for fishing and forestry where labor costs are not reported we applied the labor intensity coefficients used for the country as a whole. The possible error incurred by doing this cannot be so significant as to alter our results in farming because only a small portion of the cultivated crops is involved; with respect to husbandry, forestry, and fishing, labor-intensity coefficients are likely to be practically identical for the various regions. We cannot estimate the degree of the error incurred in estimating regional transport requirements by the transport coefficients used in the aggregate analysis.

For the distribution of seasonal labor required in farming, new coefficients were computed. Seasonal labor distribution in farming in each region is a function of the crop-mix. If, for example, wheat cultivation occupies a high percentage of the cultivated land in a region, we should expect the labor requirements to be much higher in summer than in other seasons. If maize or dry legumes are the main crops, employment would most likely be higher in spring. It is clear, therefore, that the seasonal distribution over the country as a whole may not be appropriate for a regional analysis, as the crop composition of a region may differ significantly from the crop composition of the whole country.

From data of the Ministry of Agriculture regarding seasonal requirements per stremma for important crops, a weighted average was computed for each region. The resulting seasonal distribution of labor required in farming for 1959 is given in the following table.

TABLE 7. Farming: Seasonal Distribution of Labor Required, 1959.

Regions	Fall percent	Winter percent	Spring percent	Summer percent	Total percent
Greece	31.2	10.0	27.6	31.2	100
Peloponnesos	25.1	20.7	25.6	28.6	100
Larissa	31.9	12.9	28.8	26.4	100
Edessa - Veroia ..	26.9	9.6	30.2	33.1	100
Drama	19.4	4.2	33.0	43.4	100

Source: Computed from data by the Agricultural Bank of Greece and Ministry of Agriculture.

The seasonal distribution of labor required in husbandry, forestry and fishing employed in the aggregate analysis has been assumed to hold true for the four regions as well.

The Labor Diagrams in Tables 8 I, II, III and IV present a picture of the annual and seasonal labor available, labor required, and surplus labor (or labor shortage) in the regions of Peloponnesos, Edessa - Veroia, Drama and Larissa for the year 1959.

TABLE 8. Regional Labor

	Fall		Winter	
	M P D	%	M P D	%
I. Peloponnesos				
1. Labor Available	15,854,294.5	25.1	12,632,904.0	20.0
2. Labor Required	14,886,048.3		13,542,059.2	
a. Farming.....	9,283,210.9	25.1	7,655,875.2	20.7
(Transport)	(1,392,481.6)		(1,148,381.3)	
b. Husbandry	3,609,817.6	23.8	4,095,171.3	27.0
(Transport)	(360,981.8)		(409,517.1)	
c. Forestry	172,711.4	25.0	172,711.4	25.0
(Transport)	(51,813.4)		(51,813.4)	
d. Fishing	15,031.6	28.0	8,589.5	16.0
e. Agricultural Transport	1,805,276.8		1,609,711.8	
3. Surplus Labor.....	968,246.2		- 909,155.2	
4. Rate of Surplus Labor	6.1 %		- 7.2 %	
5. Rate of Chronic Surplus Labor				

Source: Computed from Table 6 and Tables, A - 8, A - 10.

II. Edessa - Veroia				
1. Labor Available	1,815,117.8	25.1	1,446,309.0	20.0
2. Labor Required	1,665,702.9		934,986.6	
a. Farming.....	1,075,442.5	26.9	391,796.9	9.8
(Transport)	(161,316.4)		(58,769.5)	
b. Husbandry	375,094.7	23.8	425,527.6	27.0
(Transport)	(37,509.5)		(42,552.8)	
c. Forestry	12,569.1	25.0	12,569.1	25.0
(Transport)	(3,770.7)		(3,770.7)	
d. Fishing	—	28.0	—	16.0
e. Agricultural Transports	202,596.6		105,093.0	
3. Surplus Labor.....	149,414.9		511,322.4	
4. Rate of Surplus Labor	8.2%		35.3 %	
5. Rate of Chronic Surplus Labor				

Source: Computed from Table 6 and A - 8, A - 11.

Diagram, 1959

In Man Productive Days (MPDs)

Spring		Summer		Total	
M P D	%	M P D	%	M P D	%
14,969,991.3	23.7	19,707,330.2	31.2	63,164,520.0	100
15,615,916.6		16,124,430.3		60,168,454.4	
9,468,135.4	25.6	10,577,682.6	28.6	36,984,904.1	100
(1,420,220.3)		(1,586,652.4)		(5,547,735.6)	
4,080,004.0	26.9	3,382,308.1	22.3	15,167,301.0	100
(408,000.4)		(338,230.8)		(1,516,730.1)	
172,711.4	25.0	172,711.4	25.0	690,845.6	100
(51,813.4)		(51,813.4)		(207,253.6)	
15,031.7	28.0	15,031.6	28.0	53,684.4	100
1,880,034.1		1,976,696.6		7,271,719.3	
— 645,925.3		3,582,899.9		2,996,065.6	
— 4.3 %		18.2 %		4.7 %	
				— 7.2 %	
1,713,876.2	23.7	2,256,242.0	31.2	7,231,545.0	100
1,871,166.6		1,924,750.7		6,396,606.8	
1,207,374,1	30.2	1,323,313.9	33.1	3,997,927.4	100
(181,106.1)		(198,497.1)		(599,689.1)	
423,951.5	26.9	351,454.3	22.3	1,576,028.1	100
(42,395.1)		(35,145.4)		(157,602.8)	
12,569.1	25.0	12,569.2	25.0	50,276.5	100
(3,770.7)		(3,770.8)		(15,082.9)	
—	28.0	—	28.0	—	100
227,271.9		237,413.3		772,374.8	
— 157,290.4		331,491.3		834,938.2	
— 9.2 %		14.7 %		11.5 %	
				— 9.2 %	

TABLE 8. Regional Labor

	Fall		Winter	
	MPD	%	MPD	%
III. Drama				
1. Labor Available	1,343,016.9	25.1	1,070,133.0	20.0
2. Labor Required	954,660.7		488,442.8	
a. Farming.....	562,522.4	19.4	121,783.2	4.2
(Transport)	(84,378.4)		(18,267.5)	
b. Husbandry	274,728.8	23.8	311,667.1	27.0
(Transport)	(27,472.9)		(31,166.7)	
c. Forestry	4,275.6	25.0	4,275.6	25.0
(Transport)	(1,282.6)		(1,282.7)	
d. Fishing		28.0		16.0
e. Agricultural Transport	113,133.9		50,716.9	
3. Surplus Labor.....	388,356.2		581,690.2	
4. Rate of Surplus Labor	28.9 %		54.4 %	
5. Rate of Chronic Surplus Labor				

Source: Computed from Table 6 and Tables A - 8, A - 12.

IV. Larissa				
1. Labor Available	1,192,285.1	25.1	950,028.0	20.0
2. Labor Required	1,066,249.9		708,498.7	
a. Farming.....	595,414.8	31.9	240,779.1	12.9
(Transport)	(89,312.2)		(36,116.9)	
b. Husbandry	339,214.7)	23.8	384,823.4	27.0
(Transport)	(33,921.5)		(38,482.3)	
c. Forestry	6,290.4	25.0	6,290.4	25.0
(Transport)	(1,887.1)		(1,887.1)	
d. Fishing	209.2	28.0	119.5	16.0
e. Agricultural Transport	125,120.8		76,486.3	
3. Surplus Labor.....	126,035.2		241,529.3	
4. Rate of Surplus Labor	10.6 %		25.4 %	
5. Rate of Chronic Surplus Labor				

Source: Computed from Table 6 and Tables A - 8, A - 13.

Diagram, 1959 *(cont.)*

In Man Productive Days (MPDs)

Spring		Summer		Total	
MPD	%	MPD	%	MPD	%
1,268,107.6	23.7	1,669,407.5	31.2	5,350,665.0	100
1,447,520.6		1,735,904.1		4,626,528.2	
956,868.1	33.0	1,258,426.5	43.4	2,899,600.2	100
(143,530.1)		(188,764.0)		(434,940.0)	
310,512.8	26.9	257,413.9	22.3	1,154,322.6	100
(31,051.3)		(25,741.4)		(115,432.3)	
4,275.6	25.0	4,275.6	25.0	17,102.4	100
(1,282.7)		(1,282.7)		(5,130.7)	
—	28.0	—	28.0	—	100
175,864.1		215,788.1		555,503.0	
— 179,413.0		— 66,496.6		724,136.8	
— 14.1%		— 4.0%		13.5%	
				— 14.1%	

1,125,783,2	23.7	1,482,043.7	31.2	4,750,140.0	100
1,048,310.9		924,676.4		3,747,735.9	
537,553.2	28.8	492,757.1	26.4	1,866,504.2	100
(80,633.0)		(73,913.5)		(279,975.6)	
383,398.2	26.9	317,855.7	22.3	1,425,272.0	100
(38,339.8)		(31,783.6)		(142,527.2)	
6,290.4	25.0	6,290.3	25.0	25,161.5	100
(1,887.1)		(1,887.1)		(7,548.4)	
209.2	28.0	209.1	28.0	747.0	100
120,859.9		107,584.2		430,051.2	
77,472.3		557,367.3		1,002,404.1	
7.0 %		37.6 %		21.1%	
				7.0%	

2. Conclusions

In our regional sample annual surplus labor varies from 4.7 percent (Peloponnesos) to 21.1 percent (Larissa). These average percentages are an indication of the general employment conditions existing in each of the four regions and vis-a-vis the country as a whole. Considering that aggregate national surplus labor for 1959 is 8.4 percent, Peloponnesos and Larissa (4.7 percent and 21.1 percent respectively) occupy the two extremes of the distribution, while Edessa-Veroia and Drama show a degree of surplus labor somewhat higher than the national average. Before proceeding to comments, however, both labor available and labor required in each region and the country as a whole must be given in a comparable form. This can be done for farming by computing average man-days available and man-days required per cultivated stremma in each region separately.

Requirements per cultivated stremma appear to be higher for Drama (7.79 man-days per stremma). Edessa-Veroia is second (7.12), Peloponnesos follows (5.79) and Larissa remains last (1.82). These coefficients reflect generally the crop composition of each region. Drama is a region where intensively cultivated tobacco is grown (27.5 man-days per tobacco stremma). Edessa - Veroia shows a well diversified pattern of cultivation of cereals, cotton, vegetables and especially fresh fruit, and this diversification creates higher employment per stremma. Peloponnesos is also well

diversified - mainly because of its large area vis-a-vis the other three regions-where grapes, vegetables, citrus, and olives are the main products. Finally, Larissa is the opposite of Drama: Little diversification and dependence on cereals (85 percent of cultivated area) which require little employment per stremma. In fact, demand for labor has been declining because of increasing mechanization.

Man-days available per stremma are needed, however, if a ratio expressing surplus labor (in farming) is to be determined. Man-days available per stremma are 13.9 in Drama, 12.5 in Edessa-Veroia, 9.6 in Peloponnesos and 4.5 in Larissa(2). Computing the ratios of labor required to labor available per stremma in each region we get 0.60 for Peloponnessos, 0.57 for Edessa—Veroia, 0.56 for Drama and 0.40 for Larissa. These ratios give an indication of per stremma employment (and unemployment) in each region as far as farming is concerned. When husbandry, forestry and fishing enter into the picture the above ratios increase as labor required increases (with a simultaneous decrease in the degree of surplus labor). Yet, regional employment in husbandry, forestry and fishing do not seem to change the order of these ratios; Peloponnesos keeps the lead, with the lowest annual degree of unemployment, and Larissa remains last.

Seasonal surplus labor as defined in the first part of the study, gives an interesting picture of the annual employment cycle on the regional level. In Pe-

2. The ratio of labor-required coefficients to labor-available coefficients suggests that, in small holding agriculture, intensive cultivation and relatively high yields (e.g. Drama) go hand in hand with relatively high population density. Thus Larissa with extensive cereal cultivation shows a ratio of 1.82/4.7 while Drama's ratio is 7.8/13.9.

loponnesos summer shows the highest degree of surplus labor of 18.2 percent as compared to fall's 6.1 percent. Winter and spring are the seasons of labor shortage with 7,2 percent and 4.3 percent respectively. Compared with the other regions and the aggregate data Peloponnesos is a unique area of labor shortage in winter. Citrus and olives requirements coupled with low labor available in winter time — which has been estimated at 20 percent of the annual labor available — explain this shortage. Chronic surplus labor does not seem to exist, under the present organizational conditions.

In Edessa-Veroia the peak of surplus labor is winter, as in the country as a whole (35.3 percent), and the peak of labor shortage is spring (9.2 percent). Fresh fruit cultivation explains this distribution.

Drama is an interesting case showing a high degree of surplus labor in winter and fall (54.4 percent and 28.9 percent respectively) and labor shortage in spring and summer (14.1 percent and 4.0 percent respectively)(3). The intensity of tobacco cultivation in spring and summer is the main cause of this employment distribution. It should be noted, however, that the volume of employment for Drama as shown in Table 7 III is somewhat underestimated. The tobacco labor-intensity coefficient has been confined to employment in the tobacco field only. But the early stages of tobacco processing require a good deal of work at

3. Mild labor shortages are usually met with longer and harder work-days and an increased supply of labor from within the region. (Younger and older people work in the fields). When shortages run too high, however, migratory labor comes into the picture. In the region of Drama, during the spring season when requirements are large leading to higher wages, labor comes in from as far as the island of Lesbos.

home (e.g., leaf processing by members of the family during summer, fall, and winter months). This form of activity is not included in our coefficients; thus there is an overestimate of the volume of winter and fall unemployment, and an underestimate of summer labor shortage.

Larissa shows a year-round labor surplus, summer being the peak season (37.6 percent). Extensively cultivated cereals and intensive use of machinery in summer explain the pattern of seasonal unemployment. In the case of Larissa seasonal surplus amount to 37.6 percent for summer, 25.4 percent for winter, and 10.6 percent for fall. Spring shows a chronic labor surplus of 7.0 percent. The fact that in the four regions studied only Larissa depicted some chronic surplus labor does not necessarily suggest absence of pockets of removable surplus labor reflecting local conditions in some areas of the other regions too. Yet, given our definition of a region in terms of some labor mobility, regional chronic surplus labor may very well be zero.

A last comment is worth making. For economic policy much more detailed employment information is needed on many more regions of the country. But a thorough regional investigation of labor shortages and surpluses requires much time and great deal of collective effort. At present, what is urgently needed is for the regional development plans to be supplemented by inquires into the volume of labor surplus or seasonal shortage and the cost of investments necessary to alter the flow of labor. As it stands now, it is feared that regional planning is largely based on speculative estimates rather than on careful measurements of labor availability.

APPENDIX

APPENDIX

TABLES

TABLE A—1. Employment Coefficients
Constant Coefficients 1955; Percentage Correction of

Products	Work-Days per Stremma		1953		1954	
	Male	Supplementary	Male	Suppl.	Male	Suppl.
Wheat	2.0	0.6	+ 0.8		— 1.8	
Maize	1.7	3.3	— 1.6		— 4.0	
Rice	3.3	7.5	+ 1.6		+ 3.2	
Other Cereals	1.8	0.2	+ 1.8		+ 0.4	
Tobacco	17.1	15.7	— 2.4		— 4.8	
Cotton	2.8	9.0	— 3.6		+ 0.9	
Hemp - Flax	3.0	1.3				
Sesame	1.0	3.0				
Ground Nuts-Sun Flower Seed	2.0	4.0				
Sorgum	1.7	5.0				
Anise - Peper	2.0	7.0				
Dry Legumes	2.1	6.0				
Beans		5.0				
Hay	1.7	0.8				
Clover	5.0	1.8				
Pastures	0.5	0.8				
Straw Bundling	4.7					
Melons - Water Melons	3.4	6.7	— 1.0		+ 0.1	
Potatoes	2.3	5.3	+ 2.2		+ 1.6	
Vegetables	3.5	10.5	+ 4.0		+ 1.2	
Olive Groves	1.1	2.4	+ 70.0		+ 15.0	
Table Grapes	7.0	3.0				
Wine Grapes	6.0	1.5	+ 3.0		+ 3.0	
Currants	8.5	6.0				
Raisin Soultanina	12.0	19.0				
Citrus Fruits	14.0	2.0	— 1.0		— 1.0	
Dry Fruits	2.3	1.5				
Carob Beans — Chestnut Trees	1.0	2.0				
Mastic	9.0	9.0				
Figs — Plums	1.1	11.0				
Fresh Fruits	6.7	6.5				
Cattle Feed Legumes	2.55	2.0				

Notes:

1) In addition to the above corrections of constant coefficients, 195 due to changes in per stremma output, increasing mechanization for the tim period 1953 - 1960 resulted in the following percentage changes in the con stant employment coefficients for cereals.

1953		1954		1955		1956	
male	supple-mentary	male	supple-mentary	male	supple-mentary	male	supple-mentary
+ 2.5	+ 4.9	+ 0.6	+ 1.4	0	0	— 1.9	— 4.3

for Agriculture, 1953 — 1960

Constant Coefficients to allow for Changes in per Stremma Output.

1956	1957	1958	1959	1960
Male Suppl.	Male Suppl.	Male Suppl.	Male Suppl.	Male Suppl.
— 1.8	+ 4.8	+ 5.0	+ 4.0	+ 2.8
— 3.4	— 0.4	— 3.0	+ 0.4	+ 2.0
+ 1.8	+ 4.2	+ 2.6	+ 3.2	+ 2.8
— 3.0	+ 3.6	+ 4.6	+ 3.8	+ 3.5
— 2.4	+ 5.1	— 0.3	+ 0.6	— 3.6
— 4.5	+ 0.9	—	+ 4.8	— 3.0
— 1.4	+ 4.0	+ 1.6	— 1.5	— 0.1
+ 1.6	+ 3.6	+ 3.2	+ 2.4	+ 1.8
— 0.4	+ 0.4	+ 1.4	+ 1.6	+ 1.6
+ 56.0	+ 62.0	+ 4.0	+ 66.0	— 20.0
+ 8.2	+ 5.6	+ 4.0	+ 4.0	+ 1.0
+ 3.0	+ 4.0	+ 6.0	+ 5.0	+ 6.4

2) For some products there has been no annual correction in the constant coefficients due to the nature of the product and/or lack of data; it should be noted, however, that possible corrections along with their impact on total employment in agriculture do not seem to be of importance.

1957		1958		1959		1960	
male	supplementary	male	supplementary	male	supplementary	male	supplementary
— 4.3	— 9.6	— 7.8	— 17.8	— 8.8	— 21.0	— 10.6	— 26.1

TABLE A – 2.

Products	1953	1954	1955
Wheat	10,447.0	10,445.0	10,400.0
Maize	2,689.0	2,526.0	2,306.0
Rice	175.2	213.0	182.0
Other Cereals	4,300.0	4,466.0	4,508.0
Tobacco	879.4	1,065.0	1,290.0
Cotton	889.0	1,092.0	1,670.0
Hemp - Flax	29.0	29.0	29.2
Sesame	340.0	293.0	298.0
Grounds Nuts - Sun Flower Seed	49.0	49.0	49.0
Sorgum	35.0	33.0	33.2
Anise - Pepper	14.0	14.0	14.1
Dry Legumes	1,000.0	1,001.0	1,047.8
Beans	310.0	385.0	362.7
Hay	780.0	780.0	987.6
Clover	400.0	400.0	403.0
Pastures	400.0	400.0	360.0
Melons - Water Melons	309.9	307.0	295.4
Potatoes	389.5	398.0	402.8
Vegetable	676.8	716.0	718.0
Olive Groves	4,500.0	4,500.0	4,550.0
Table Grapes	135.0	140.0	142.0
Wine Grapes	1,450.0	1,500.0	1,505.0
Currants	444.0	390.0	393.0
Raisin Soultanina	107.0	155.0	160.0
Citrus Fruits	170.0	180.0	200.0
Dry Fruits	170.0	170.0	170.0
Carob Beans - Chestnut Trees	218.0	218.0	218.0
Mastic	25.0	25.0	25.0
Figs - Plums	365.0	365.0	365.0
Fresh Fruits	400.0	400.0	410.0
Cattle Feed Legumes	460.0	460.0	470.0
Total	32,556.8	33,115.0	33,964.8

Source: Computed from data supplied by the Ministry of Agriculture.

Cultivated Area by Product

In thousand stremmas

1956	1957	1958	1959	1960
10,619.0	10,888.0	11,117.0	11,634.0	11,426.0
2,278.0	2,167.0	2,044.0	2,065.0	2,104.0
114.0	143.0	168.0	180.0	139.0
4,393.0	4,268.0	4,135.0	3,664.0	3,600.0
1,176.0	1,220.0	1,124.0	1,022.0	938.0
1,600.5	1,560.0	1,627.0	1,315.0	1,681.0
28.5	25.0	19.0	14.0	10.0
288.0	283.0	275.0	322.0	324.0
56.0	51.0	48.0	56.0	45.0
31.4	30.0	32.0	33.0	26.0
15.2	11.0	11.0	12.0	9.0
954.0	991.0	926.0	699.0	1,002.0
362.0	334.0	382.0	380.0	397.0
900.0	1,099.0	1,158.0	1,272.0	1,600.0
443.0	510.0	558.0	603.0	686.0
319.0	361.0	339.0	430.0	344.0
308.0	305.0	293.0	321.0	289.0
402.5	420.0	394.0	426.0	375.0
761.0	891.0	886.0	908.0	845.0
4,805.0	4,650.0	4,870.0	5,327.0	5,327,0
150.0	160.0	171.0	180.0	180.0
1,520.0	1,523.0	1,500.0	1,500.0	1,600.0
396.0	407.0	414.0	415.0	416.0
165.0	170.0	175.0	180.0	185.0
210.0	210.0	230.0	240.0	250.0
170.0	170.0	185.0	195.0	195.0
218.0	218.0	218.0	218.0	218.0
25.0	25.0	25.0	25.0	25.0
365.0	365.0	365.0	365.0	365.0
450.0	464.0	470.0	480.0	500.0
460.0	465.0	471.0	514.0	582.0
33,983.1	34,384.0	34,630.0	34,995.0	35,683.0

TABLE A — 3. Labor Requirements,

Products	1953 Male	1953 Supplementary	1953 Total in Male	1954 Male	1954 Supplementary
Wheat	21,061.2	6,318.3	25,484.0	20,514.0	6,154.2
Maize	4,498.2	8,731.7	10,610.4	4,122.4	8,002.4
Rice	587.5	1,335.0	1,522.0	725.4	1,648.6
Other Cereals	7,879.3	875.5	8,492.2	8,071.0	896.8
Changes due to Mechanization	850.6	845.7	1,442.5	200.6	233.8
All Cereals	34,876.8	18,106.2	47,551.1	33,633.4	16,935.8
Tobacco	14,676.8	13,475.2	24,109.5	17,337.3	15,917.9
Cotton	2,399.6	7,713.0	7,798.7	3,085.1	9,916.5
Hemp - Flax	87.0	37.7	113.4	87.0	37.7
Sesame	380.0	1,020.0	1,094.0	293.0	879.0
Ground Nuts - Sun Flower Seed	98.0	196,0	235.2	98.0	196.0
Sorgum	59.5	175.0	182.0	56.1	165.0
Anise - Pepper	28.0	98.0	96.6	28.0	98.0
Dry Legumes	2,100.0	6,000.0	6,300.0	2,102.1	6,006.0
Beans	—	1,550.0	1,085.0	—	1,925.0
Hay	1,326.0	624.0	1,762.8	1,326.0	624.0
Clover	2,000.0	720.0	2,504.0	2,000.0	720.0
Pastures	200.0	320.0	424.0	200.0	320.0
Straw Bundling	300.0	—	300.0	300.0	—
Melons - Water Melons	1,043.2	2,055.5	2,482.1	1,044.8	2,059.0
Potatoes	915.6	2,109.8	2,392.5	930.0	2,143.2
Vegetables	2,463.6	7,390.7	7,637.1	2,536.1	7,608.2
Olive Groves	4,950.0	18,360.0	17,802.0	4,950.0	12,420.0
Table Grapes	973.3	417.2	1,265.3	1,009.4	432.6
Wine Grapes	8,961.0	2,240.3	10,529.2	9,270.0	2,317.5
Currants	3,887.2	2,743.9	5,807.9	3,414.5	2,410.2
Raisin Soultanina	1,322.5	2,094.0	2,788.3	1,915.8	3,033.3
Citrus Fruits	2,356.2	336.6	2,591.8	2,494.8	356.4
Dry Fruits	391.0	255.0	569.5	391.0	255.0
Carob Beans — Chestnut Trees	218.0	436.0	523.2	218.0	436.0
Mastic	225.0	225.0	382.5	225.0	225.0
Figs - Plums	401.5	4,015.0	3,212.0	401.5	4,015.0
Fresh Fruits	2,680.0	2,600.0	4,500.0	2,680.0	2,600.0
Cattle Feed Legumes	1,173.0	920.0	1,817.0	1,173.0	920.0
Total	90,492.8	96,234.1	157,856.7	93,199.9	94,972.3

Farming, 1953 - 1960 — In thousand work-days

1955			1956			
Total in Male	Male	Supplementary	Total in Male	Male	Supplementary	Total in Male
24,821.9	20,800.9	6,240.0	25,168.0	20,855.7	6,256.7	25,235.4
9,724.1	3,920.2	7,609.8	9,247.1	3,740.9	7,261.8	8,824.2
1,879.4	600.6	1,365.0	1,556.1	383.0	870.4	992.3
8,698.8	8,114.4	901.6	8,745.5	7,670.2	852.2	8,266.7
364.2	—	—	—	- 620.4	- 655.4	- 1,079.2
45,488.4	33,435.2	16,076.4	44,688.7	32,029.4	14,585.7	42,239.4
28,479.8	22,059.0	20,253.0	36,236.1	19,627.0	18,020.1	32,241.1
10,026.7	4,676.0	15,030.0	15,197.0	4,279.7	13,756.3	13,909.1
113.4	87.6	38.0	114.2	85.5	37.7	111.9
908.3	298.0	894.0	923.8	288.0	864.0	892.8
235.2	98.0	196.0	235.2	112.0	224.0	268.8
171.6	56.4	166.0	172.6	53.4	157.0	163.3
96.6	28.2	98.7	97.3	30.4	106.4	104.9
6,306.3	2,200.4	6,286.8	6,601.2	2,003.4	5,724.0	6,010.2
1,347.5	—	1,813.5	1,269.4	—	1,810.0	1,267.0
1,762.8	1,678.9	790.0	2,231.9	1,530.0	720.0	2,034.0
2,504.0	2,015.0	725.4	2,522.8	2,215.0	797.4	2,773.2
424.0	180.0	288.0	381.6	159.5	255.2	338.1
300.0	300.0	—	300.0	300.0	—	300.0
2,486.1	1,004.4	1,979.2	2,389.8	1,033.0	2,034.7	2,457.3
2,430.3	926.4	2,134.8	2,420.8	940.5	2,167.4	2,457.7
7,861.8	2,513.0	7,539.0	7,790.3	2,652.8	7,958.5	8,223.7
13,644.0	5,005.0	10,920.0	12,649.0	5,285.5	17,989.9	17,878.4
1,312.2	994.0	426.0	1,292.2	1,136.1	486.9	1,476.9
10,892.3	9,030.0	2,257.5	10,610.2	9,867.8	2,467.0	11,594.7
5,101.6	3,340.5	2,358.0	4,991.1	3,642.0	2,570.8	5,441.6
4,039.1	1,920.0	3,040.0	4,048.0	2,142.4	3,392.1	4,516.9
2,744.3	2,800.0	400.0	3,080.0	3,028.2	432.6	3,331.0
569.5	391.0	255.0	569.5	391.0	255.0	569.5
523.2	218.0	436.0	523.2	218.0	436.0	523.2
382.5	225.0	225.0	382.5	225.0	225.0	382.5
3,212.0	401.5	4,015.0	3,212.0	401.5	4,015.0	3,212.0
4,500.0	2,747.0	2,665.0	4,612.5	3,015.0	2,925.0	5,062.5
1,817.0	1,198.5	940.0	1,856.5	1,173.0	920.0	1,817.0
159,680.5	99,827.0	102,246.3	171,699.4	97,865.1	105,333.7	171,598.7

TABLE A – 3. Labor Requirements,

Products	1957 Male	1957 Supplementary	1957 Total in Male	1958 Male	1958 Supplementary
Wheat	22,821.2	6,846.4	27,613.7	23,345.7	7,003.5
Maize	3,669.2	7,122.5	8,655.0	3,370.6	6,542.8
Rice	491.7	1,117.5	1,273.9	568.8	1,292.8
Other Cereals	7,959.0	884.3	8,578.0	7,785.4	865.0
Changes due to Mechanization	- 1,502.5	- 1,533.2	- 2,575.7	- 2,735.5	- 2,795.3
All Cereals	33,438.6	14,437.5	43,544.9	32,335.0	12,908 8
Tobacco	21,926.0	20,130.9	36,017.6	19,162.7	17,593.9
Cotton	4,407.3	14,166.4	14,323.8	4,555.6	14,643.0
Hemp - Flax	75.0	32.5	97.7	57.0	24.7
Sesame	283.0	849.0	877.3	275.0	825.0
Ground Nuts - Sun Flower Seed	102.0	204.0	244.8	96.0	192.0
Sorgum	51.0	150.0	156.0	54.4	160.0
Anise - Pepper	22.0	77.0	75.9	22.0	77.0
Dry Legumes	2,081.1	5,946.0	6,243.3	1,944.6	5,556.0
Beans	—	1,670.0	1,169.0	—	1,910.0
Hay	1,868.3	879.0	2,483.6	1,968.6	926.4
Clover	2,550.0	918.0	3,192.6	2,790.0	1.004.4
Pastures	180.5	288.8	382.7	169.5	271.2
Straw Bundling	300.0	—	300.0	300.0	—
Melons - Water Melons	1,078.5	2,125.2	2,566.1	1,012.1	1,994.5
Potatoes	1,000.8	2,306.1	2,615.1	935.2	2,155.0
Vegetables	3,131.0	9,392.9	9,706.0	3,144.4	9,433.2
Olive Groves	5,115.0	18,079.2	17,770.4	5,357.0	12,155.5
Table Grapes	1,182.7	506.9	1,537.5	1,244.9	533.5
Wine Grapes	9,649.7	2,412.4	11,338.4	9,360.0	2,314.0
Currants	3,653.2	2,578.8	5,458.4	3,659.8	2,583.4
Raisin Soultanina	2,154.2	3,410.9	4,541.8	2,184.0	3,458.0
Citrus Fruits	3,057.6	436.8	3,363.4	3,413.2	487.6
Dry Fruits	391.0	255.0	569.5	425.5	277.5
Carob Beans — Chestnut Trees	218.0	436.0	523.2	218.0	436.0
Mastic	225.0	225.0	382.5	225.0	225.0
Figs - Plums	401.5	4,015.0	3,212.0	401.5	4,015.0
Fresh Fruits	3,108.8	3,016.0	5,220.0	3,149.0	3,055.0
Cattle Feed Legumes	1,185.7	930.0	1,836.7	1,201.0	942.0
Total	102,837.5	109,875.3	179,750.2	99,661.0	100,157.6

Source: Computed from Tables A – 1. and A – 2.

Farming, 1953 - 1960 *(cont.)* In thousand work-days

1959				1960		
Total in Male	Male	Supple-mentary	Total in Male	Male	Supple-mentary	Total in Male
28,248.1	24,198.7	7,259.6	29,280.4	23,491.9	7,047.6	28,425.2
7,950.6	3,524.5	6,841.8	8,313.8	3.648.3	7,082.1	8,605.8
1,473.8	613.0	1,393.2	1,588.2	471.5	1,071.7	1,221.7
8,390.9	6,845.8	760.6	7,378.2	6,706.8	745.2	1,228.4
4,692.2	3,096.0	3.413.6	5,485.5	3,637.8	4,162.1	6,551.3
41,371.2	32,086.0	12,841.6	41,075.1	30,680.7	11,784.5	38,929.8
31,478.4	17,581.1	16,141.7	28,880.3	15,462.4	14,196.4	25,399.9
14,805.7	3,858.4	12,403.1	12,540.6	4,565.6	14,675.1	14,838.2
74.3	42.0	18.2	54.7	30.0	13.0	39.1
852.5	322.0	966.0	998.2	324.0	972.0	1,004.4
230.4	112.0	224.0	268.8	90.0	180.0	216.0
166.4	56.1	165.0	171.6	44.2	130.0	135.2
75.9	24.0	84.0	82.8	18.0	63.0	62.1
5,833.8	1.467.9	4,194.0	4,403.7	2,104.2	6,012.0	6,312.6
1,337.0	—	1,900.0	1,330.0	—	1,985.0	1,389.5
2,617.1	2.162.4	1,017.6	2,874.7	2,720.0	1,280.0	3,616.0
3,493.1	3,015.0	1,085.4	3,774.8	3,430.0	1,234.8	4,294.4
359.3	215.0	344.0	455.8	172.0	275.2	364.6
300.0	300.0	—	300.0	300.0	—	300.0
2,408.2	1,075.0	2,118.4	2,557.9	981.6	1,934.4	2,335.7
2,443·7	1,003.3	2,312.0	2,621.7	878.0	2,023.3	2,294.3
9,747.6	3,228.8	9,686.5	10,009.4	3,004.8	9,014.5	9,314.9
13,865.8	5,859.7	21,222.8	20,715.7	5,859.7	10,227.8	13,019.2
1,618.4	1,310.4	561.6	1,703.5	1,272.6	545.4	1,654.4
10,979.8	9,360.0	2,314.0	10,979.8	9,696.0	2,424.0	11,392.8
5,468.2	3,668.6	2,589.6	5,481.3	3,571.4	2,521.0	5,336.1
4,604.6	2,246.4	3,556.8	4,736.2	2,242.2	3,550.2	4,727.3
3,754.5	3,528.0	504.0	3,880.8	3,724.0	532.0	4,096.4
619.8	448.5	292.5	653.2	448.5	292.5	653.3
523.2	218.0	436.0	523.2	218.0	436.0	523.2
382.5	225.0	225.0	382.5	225.0	225.0	382.5
3,212.0	401.5	4,015.0	3,212.0	401.5	4,015.0	3,212.0
5,287.5	3,216.0	3,120.0	5,400.0	3,500.0	3,250.0	5,625.0
1,860.4	1,310.7	1,020.0	2,024.7	1,484.1	1,164.0	2,298 9
169,771.3	98,341.8	105,358.8	172,093.0	97,298.5	94,956.1	163,767.8

TABLE A - 4. Employment Coefficients in Husbandry, Forestry and Fishing.

Per head or ton.

I. Husbandry

Animals	Male	Supplementary
Horses	13.0	9.0
Mules	10.0	10.0
Donkeys	5.0	8.0
Cattle	8.6	13.7
Water Buffaloes	10.0	15.0
Sheep	2.4	2.4
Goats	1.8	1.8
Swine	1.0	4.0
Poultry	0.2	0.8
Rabbits	—	1.5
Apiary	0.6	—
Silk Production (Kg)	0.36	0.47

II. Forestry

Products	Male	Supplementary
Timber (m^3)	1.5	—
Charcoal	3.9	3.9
Fire Wood	0.78	—
Resin	31.0	—
Acorns, Pine Tree bark, etc.	150,000 man days annually	
Fire - Wood (for own consumption)	1,500,000 »	» »

III. Fishing

Output	Male
Fishing	5,000,000 man days in 1955

Source: Computed from data in *Agrotiki Economia*, No 9 (Jan - March 1957), pp. 20 - 45, and data supplied by the Agricultural Bank of Greece»,

Note: In the case of fishing, to assess annual labor requirements a constant ratio of employment to output for 1955 is used for 1953 - 1960.

TABLE A – 5.

Livestock, Forestry and Fishing Output

	1953	1954	1955	1956	1957	1958	1959	1960
Animals			**I. Husbandry**					In thousand heads
Horses	315.3	317.2	325.9	328.0	333.1	330.1	330.0	329.0
Mules	200.1	203.1	207.7	210.0	219.6	219.3	221.0	223.0
Donkeys.....	492.5	500.9	507.8	510.0	514.2	515.1	517.0	518.0
Cattle	904.3	917.4	956.5	980.0	1,005.1	1,027.7	1,048.0	1,060.0
Water Buffaloes ..	71.7	73.0	75.6	76.0	75.5	75.3	75.3	75.3
Sheep	8,523.6	8,737.9	9,070.0	9,100.0	9,195.2	9,255.2	9,333.9	9,350.0
Goats	4,510.1	4,643.1	4,795.0	4,800.0	1,005.1	5,010.0	5,066.1	5,070.0
Swine	603.4	603.4	621.2	640.0	639.7	630.7	635.0	640.0
Poultry.....	11,613.5	12,056.0	12,748.0	13,300.0	14,127.0	14,617.8	15,000.0	15,300.1
Rabbits	310.3	315.5	323.9	330.0	372.1	411.3	420.0	430.0
Apiary	550.0	535.0	540.0	540.0	550.0	550.0	550.0	550.0
Silk Production (Kg.)	1,210.0	1,200.0	773.0	782.0	925.0	874.0	514.0	490.0
			II. Forestry					In thousand tons
Products								
Timber (m3)	221.0	220.4	303.0	310.0	258.5	275.9	256.5	261.6
Charcoal.....	42.5	40.8	33.8	46.0	29.1	27.0	25.8	26.3
Fire Wood	2,500.0	2,476.0	2,518.8	2,780.0	3,145.6	3,132.7	3,110.0	3,172.2
Resin	25.0	22.5	23.7	24.0	26.9	21.6	20.4	20.8
Acorns, Pine Tree bark, etc.	—	—	—	—	—	—	—	—
Fire-Wood (for own consumption).	—	—	—	—	—	—	—	—
			III. Fishing					In thousand tons
Output								
Fishing	45,000.0	51,392.0	60,010.0	65,000.0	70,651.0	80,340.0	82,000.0	86,100.0

Source: Computed from data supplied by the Ministry of Agriculture.

TABLE A – 6. Labor Required in Husbandry

	1953			1954		
	Male	Supplementary	Total in Male	Male	Supplementary	Total in Male
Animals		I. **Husbandry**				
Horses.....	4,098.9	2,837.7	6.085.3	4,123.6	2,854.8	6,122.0
Mules	2,001.0	2,001.0	3,401.7	2,031.0	2,031.0	3,452.7
Donkeys	2,462.5	3,940.0	5,220.5	2,504.5	4,007.2	5,309.5
Cattle	7,777.0	12,388.9	16,449.2	7,889.6	12,568.4	16,687.5
Water Buffaloes ..	717.0	1,075.5	1,469.9	730.0	1,095.0	1,496.5
Sheep	20,456.6	20,456.6	34,776.2	20,971.0	20,971.0	35,650.7
Goats	8,118.2	8,118.2	13,800.9	8,357.6	8,357.6	14,207.9
Swine	603.4	2,413.6	2,292.9	603.4	2,413,6	2,292.9
Poultry	2,322.7	9,290.8	8,826.3	2,411.2	9,644.8	9,162.6
Rabbits		465.5	325.8		473.3	331.3
Apiary	330.0		330.0	321.0		321.0
Silk Production (Kg.)	435.6	568.7	833.7	432.0	564.0	826.8
Total.....	49,322.9	63,556.5	93,812.4	50,374.9	64.980.7	95.861.4
Products		II. **Forestry**				
Timber (m^3) ..	331.5		331.5	330.6		330.6
Charcoal	165.8	165.8	281.9	159.1	159.1	270.5
Fire Wood	1,950.0		1,950.0	1,931.3		1,931.3
Resin	775.0		775.0	697.5		697.5
Acorns, Pine Tree bark, etc. ...	150.0	150.0	255.0	150.0	150.0	255.0
Fire-Wood (for own consumption) ..	1,500.0		1,500.0	1,500.0		1,500.0
Total.....	4,872.3	315.8	5.093.4	4,768.5	309.1	4,984.9
Output		III. **Fishing**				
Fishing	3,749.4		3,749.4	4,281.9		4,281.9
Total.....	3,749.4		3,749.4	4,281.9		4,281.9

Forestry and Fishing, 1953-1960

In thousand work-days

1955			1956		
Male	Supplementary	Total in Male	Male	Supplementary	Total in Male
4,236.7	2,933.1	6,289.9	4,264.0	2,952.0	6,330.4
2,077.0	2,077.0	3,530.9	2,100.0	2,100.0	3,570.0
25,39.0	4,062.4	5,382.7	2,550.0	4,080.0	5,406.0
8,225.9	13,104.0	17,398.7	8,428.0	13,426.0	17,826.2
756.0	1,134.0	1,549.8	760.0	1,140.0	1,558.0
21,768.0	21,768.0	37,005.6	21,840.0	21,840.0	37,128.0
8.631.0	8,631.0	14,672.7	8,640.0	8,640.0	14,688.0
621.2	2,484.8	2,360.5	640.0	2,560.0	2,432.0
2,549.6	10,198.4	9,688.5	2,660.0	10,640.0	10,108.0
	485.9	340.1		495.0	346.5
324.0		324.0	324.0		324.0
278.3	363.3	532.6	281.5	367.5	538.8
52,006.7	67,241.9	99,076.0	52,487.5	68,240.5	100,255.9
454.5		454.5	465.0		465.0
131.8	131.8	224.1	179.4	179.4	305.0
1,964.7		1,964.7	2,168.4		2,168.4
734.7		734.7	744.0		744.0
150.0	150.0	255.0	150.0	150.0	255.0
1,500.0		1,500.0	1,500.0		1,500.0
4,938.7	281.8	5,136.0	5,206.8	329.4	5,437.4
5,000.0		5,000.0	5,415.8		5,415.8
5,000.0		5,000.0	5,415.8		5,415.8

TABLE A – 6. Labor Required in Husbandry,

	1957			1958		
	Male	Supple-mentary	Total in Male	Male	Supple-mentary	Total in Male
Animals		I: **Husbandry**				
Horses.....	4,330.3	2,997.9	6,428.8	4,291.3	2,970.9	6,370.9
Mules	2,196.0	2,196.0	3,733.2	2,193.0	2,193.0	3,728.1
Donkeys	2,571.0	4,113.6	5,450.5	2,575.5	4,120.8	5,460.1
Cattle	8,643.9	13,769.9	18,282.8	8,838.2	14,079.5	18,693.9
Water Buffaloes .	755.0	1,132.5	1,547.8	733.0	1,129.5	1,543.7
Sheep	22,068.5	22,068.5	37,516.5	22,212.5	22,212.5	37,761.1
Goats	8,390.0	8,890.0	15,113.0	9,018.0	9,018.0	15,330.6
Swine	639.7	2,558.8	2,430.9	630.7	2,522.8	2,396.7
Poultry	2,825.4	11,301.6	10,736.5	2,923.6	11,694.2	11,109.5
Rabbits		558.2	390.7		617.0	431.9
Apiary	330.0		330.0	330.0		330.0
Silk Production (Kg)	333.0	434.8	637.4	314.6	410.8	602.2
Total.....	53,582.8	70,021.8	102,598.1	54,080.4	70,969.0	103,758.7
Products		II: **Forestry**				
Timber (m3) ...	387.7		387.7	413.9		413.9
Charcoal	113.5	113.5	193.0	105.3	105.3	179.0
Fire Wood	2,453.6		2,453.6	2,443.5		2,443.5
Resin	833.9		833.9	669,6		669.6
Acorns, Pine Tree bark etc.	150.0	150.0	255.0	150.0	150.0	255.0
Fire-Wood (for own consumption) .	1,500.0		1,500.0	1,500.0		1,500.0
Total.....	5,438.7	263.5	5,623.2	5,282.3	255.3	5,461.0
Output		III: **Fishing**				
Fishing	5,886.6		5,886.6	6,693.9		6,693.9
Total.....	5,886.6		5,886.6	6,693.9		6,693.9

Source: Computed from data in Tables A — 4. and A — 5.

orestry and Fishing, 1953 - 1960 *(cont.)*

In thousand work-days

1959			1960		
Male	Supple-mentary	Total in Male	Male	Supple-mentary	Total in Male
4,290.0	2,970.0	6,369.0	4,277.0	2,961.0	6,349.7
2,210.0	2,210.0	3,757.0	2,230.0	2,230.0	3,791.0
2,585.0	4,136.0	5,480.2	2,590.0	4,144.0	5,490.8
9,012.8	14,357.6	19,063.1	9,116.0	14,522.0	19,281.4
753.0	1,129.5	1,543.7	753.0	1,129.5	1,543.7
22,401.4	22,401.4	38,082.4	22,440.0	22,440.0	38,148.0
9,119.0	9,119.0	15,502.3	9,126.0	9,126.0	15,514.2
635.0	2,540.0	2,413.0	640.0	2,560.0	2,432.0
3,000.0	12,000.0	11,400.0	3,060.0	12,240.0	11,628.0
	630.0	441,0		645.0	451.5
330.0		330.0	330.0		330.0
185.0	241.6	354.1	176.4	230.3	337.6
54,521.2	71,735.1	104,735.8	54,738.4	72,227.8	105,297.9
384.8		384.8	392.4		392,4
100.6	100.6	171.0	102.6	102.6	174.4
2.425.8		2,425.8	2,474.3		2,474.3
632.4		632.4	644.8		644.8
150.0	150.0	255.0	150.0	150.0	255.0
1,500.0		1,500.0	1,500.0		1,500.0
5,193.6	250.6	5,369.0	5,264.1	252.6	5,440.9
6,832.2		6,832.2	7,173.8		7,173.8
6,832.2		6,832.2	7,173.8		7,173.8

TABLE A – 7. Agricultural Transport Labor Requirements, 1953 - 1960

In thousand work - days

	1953	1954	1955	1956	1957	1958	1959	1960
Farming	23,678.5	23,952.1	25,604.9	25,739.8	26,962.5	25,465.7	25,814.0	24,565.2
Husbandry	9,381.2	9,586.1	9,907.6	10,025.6	10,259.8	10,375.9	10,473.5	10,529.7
Forestry	1,528.0	1,495.5	1,540.8	1,631.2	1,687.0	1,638.3	1,610.7	1,632.3
Total	34,587.7	35,033.7	37,053.3	37,396.6	38,909.3	37,479.9	37,898.2	36,727.2

Source: Table 5.

TABLE A — 8. Seasonal Distribution of days Available for Agricultural Work

	Fall	Winter	Spring	Summer	Total
1. Rainfall days (30 year average)	21.6	36.0	24.4	8.0	90.0
2. Rainfall days coinciding with Sundays or holidays (probability distribution) ..	3.6	6.8	4.5	1.4	16.3
3. Rainfall work-days (1 minus 2)	18.0	29.2	19.9	6.6	73.7
4. Loss of work-days because of rainfall ...	21.0	29.2	23.2	7.7	81.1
5. Loss of work-days because of Sundays ..	13.0	13.0	13.0	13.0	52.0
6. Loss of work-days because of official holidays	2.0	4.0	4.0	3.0	13.0
7. Total loss of work-days (4 plus 5 plus 6)	36.0	46.2	40.2	23.7	146.1
8. Total number of days.....	91.0	90.0	92.0	92.0	365.0
9. Days available for agricultural work (8 minus 7)	55.0	43.8	51.8	68.3	218.9
10. Percentage distribution	25.1%	20.0%	23.7%	31.2%	100.0%

Source: Statistical Yearbook of Greece, 1959, 1960, pp. 8 - 11; and Meteorological Institute of Thessaloniki University (Mr. Livadas).

TABLE A – 9. I. Seasonal Distribution of Wage Days Required in Agriculture

Employment in million man-wage days

Agricultural Activities	Fall	Winter	Spring	Summer	Total
Farming	53.8	58.3	18.7	51.6	186.9
Husbandry	26.6	28.4	32.2	32.2	119.4
Forestry	2.5	2.5	2.5	2.5	10.0
Fishing	1.4	1.4	0.8	1.4	5.0
Total	88.8	90.6	54.2	87.7	321.3

TABLE A – 9.II. Seasonal percentage Distribution of Wage Days Required in Agriculture

Agricultural Activities	Fall Percent	Winter Percent	Spring Percent	Summer Percent	Total Percent
Farming	31.2	10.0	27.6	31.2	100
Husbandry	23.8	27.0	26.9	22.3	100
Forestry	25.0	25.0	25.0	25.0	100
Fishing	28.0	16.0	28.0	28.0	100

Source: Computed from data by the Agricultural Bank and *The Greek Agricultural Economy and the Activity of the Agricultural Bank*, 1956, Athens 1957.

TABLE A—10.

PELOPONNESOS, 1959

I. **Farming**

Products	Cultivated Area in stremmas	Man-Wage Days per stremma	Total Man-Wage Days
Wheat	2,235,015.6	2,712	6,061,362.3
Maize	281,100.0	4,213	1,184,274.3
Rice	19,435.0	11,012	214,018.2
Other Cereals	739,414,0	1,530	1,131,303.4
Tobacco	4,725.0	14,000	66,150.0
Cotton	34,775.0	4,760	165,529.0
Hemp - Flax	5,750.0	3,780	21,735.0
Sesame	3,482.0	2,800	9,749.6
Ground Nuts-Sun Flower Seed	18,854.0	4,400	82,957.6
Sorgum	13,230.0	4,700	62,181.0
Dry Legumes	140,667.0	5,700	801,801.9
Hay	168,551.0	2,180	367,441.2
Clover	60,337.0	6,100	368,055.7
Pastures	27,230.0	0,980	26,685.4
Straw Bundling			53,222.5
Melons, Water-Melon	42,125.0	7,310	307,933.8
Potatoes	111,135,0	9,861	1,095,902.2
Tomatoes	96,878.0	13,021	1,261,448.4
Vegetables	157,837.0	9,548	1,507,027.7
Olive Groves (in trees)	24,067,440.0	0,384	9,241,897.0
Table Grapes	26,096.0	8,800	229,644.8
Wine Grapes	366,435.0	7,106	2,603,887.1
Currants	412,683.0	11,235	4,636,493.5
Raisin Sultanina	60,246.0	12,119	730,121.3
Citrus Fruits (in trees)	4,481,458.0	0,274	1,227,919.5
Fresh Fruits (in trees)	5,754,609.0	0,327	1,881,757.1
Strawberries	101.0	12,600	1,272.6
Nurseries	233.0	56,500	13,164.5
Cattle Feed Legumes	434,658.0	3,750	1,629,967.5
Total (arboriculture not included)	5,460,992.6		36,984,964.1

Source: Computed from data supplied by the Agricultural Bank of Greece.

II. Husbandry

Animals	Animal Heads	Man-Wage Days per animal head	Total Man-Wage Days
Horses	75,878	21.0	1.593,438.0
Mules	61,112	16.0	977,792.0
Donkeys	80,269	9.8	786,636.2
Beof Cattle	36,914	19.0	701,366.0
Milk Cows	8,180	20.8	170,144.0
Calfs	9,804	9.8	96,079.2
Sheep	1,660,488	3.2	5,313,561.6
Goats	946,800	2.9	2,745,720.0
Swine	144,515	3.4	491,351.0
Poultry	2,842,630	0.7	1,989,841.0
Rabbits	148,720	0.9	133,848.0
Apiary	139,588	1.0	139,588.0
Silk Production (in boxes)	582	48.0	27,936.0
Total			15,167,301.0

III. Forestry-Fishing

Products	Production in tons	Man-Wage Days per weight unit	Total Man-Wage Days
Timber (m^3)	26,703.0	1.5	40,054.5
Fire Wood (zygia)*	2,051,100.0	0.1	205,110.0
Charcoal	3,930.3	6.2	24,367.9
Resin	7,631.9	31.2	238,115.3
Acorns	5,000.0	18.5	92,500.0
Lime	14,628.7	6.2	90,697.9
Total			690,845.6
Fishing	646.8	83.0	53,684.4
Grand Total...			744,530.0

* Zygia equals 128 Kg.

TABLE A — 11

EDESSA — VEROIA REGION, 1959

I. Farming

Products	Cultivated Area in stremmas	Man-Wage Days per stremma	Total Man-Wage Days
Wheat	205,142	2,720	557,986.2
Maize	54,935	3,600	197,766.0
Other Cereals	27,062	1,530	41,404.9
Tobacco	2,663	26,679	71,046.2
Cotton	88,347	8,070	712,960.3
Anise	15	6,200	93.0
Sesame	5,675	2,800	15,890.0
Sorgum	29	4,700	136.3
Dry Beans	7,716	5,700	43,981.2
Hay	1,000	2,180	2,180.0
Clover	25,490	6,080	154,979.2
Pastures	1,950	0,989	1,911.0
Staw Bundling			5,040.1
Melons - Water Melons	2,340	7,310	17,105.4
Potatoes	6,700	5,810	38,927.0
Vegetables	6,910	9,950	68,754.5
Table Grapes	2,500	8,800	22,000.0
Wine Grapes	6,100	7,170	43,737.0
Fresh Fruits (in trees)	3.351,455	0,572	1,917,032.3
Strawberries	780	12,600	9,828.0
Cattle Feed Legumes	20,045	3,750	75,168.8
Total (arboriculture not included)	465,399		3,997,927.4

Source: Computed from data supplied by the Agricultural Bank of Greece.

II. Husbandry

Animals	Animal Heads	Man-Wage Days per animal head	Total Man-Wage Days
Horses	4,270	21,000	89,670.0
Mules	2.350	16.00	37,600.0
Donkeys	5,460	9.80	53,508.0
Beef Cattle.....	15,110	19.00	287,090.0
Milk Cows	16,390	20.80	340,912.0
Calfs	4,237	9.80	41,522.6
Sheep	101,950	2.17	221,231.5
Goats	87'450	2.90	253,605.0
Swine	10,510	3.40	35,734.0
Poultry	291,450	0.70	204,015.0
Rabbits	2,900	0.90	2,610.0
Apiary	6,850	1.00	6,850.0
Silk Production (in boxes)	35	48.00	1,680.0
Total			1,576,028.1

III. Forestry-Fishing

Products	Production in tons	Man-Wage Days per weight unit	Total Man-Wage Days
Timber (m3)	9.008	1.5	13,512.0
Fire Wood (zygia)	162.402	0.1	16,240.2
Charcoal	2,233.4	6.2	13,847.1
Resin		31.2	
Acorns	70.5	18.5	1,304.3
Lime	866.6	6.2	5,372.9
Total			50,276.5
Fishing	—	—	—
Grand Total...			50,276.5

TABLE A – 12

DRAMA REGION, 1959

I. **Farming**

Products	Cultivated Area in stremmas	Man-Wage Days per stremma	Total Man-Wage Days
Wheat	150,613	2.500	376,532.5
Maize	47,000	3.500	164,500.0
Rice	5,500	6.000	33,000.0
Other Cereals	22,993	1.530	35,179.3
Tobacco	66,219	27.500	1,821,022.5
Cotton	7,000	3.700	25,900.0
Sesame	1,250	2.800	3,500.0
Ground Nuts-Sun Flower Seed	3,228	4.400	14,203.2
Anise.....	515	6.200	3,193.0
Dry Beans	5,905	5.700	33,658.5
Hay.....	2,850	2.180	6,213.0
Clover	18,000	4.700	84,600.0
Pastures	910	0.380	345.8
Straw Bundling			3,690.5
Melons - Water Melons ..	950	7.310	6,944.5
Potatoes	1,035	5.610	5,806.4
Vegetables	9,412	9.960	93,743.5
Table Grapes	1,710	9.960	17,031.6
Wine Grapes	9,500	7.180	68,210.0
Fresh Fruits (in trees)...	171,540	0.327	56,093.6
Strawberries	10	12.60	126.0
Cattle Feed Legumes ..	12,295	3.750	46,106.3
T o t a l ..... (arboriculture not included)	366,895		2,899,600.2

S o u r c e : Computed from data supplied by the Agricultural Bank of Greece.

II. Husbandry

Animals	Animal Heads	Man-Wage Days per animal head	Total Man-Wage Days
Horses	2,283	21.0	47,943.0
Mules	1,405	16.0	22,480.0
Donkeys	5,862	9.8	57,447.6
Beef Cattle.....	15,304	19.0	290,776.0
Milk Cows	18,020	20.8	374,816.0
Calfs	774	9.8	7,585.2
Sheep	69,930	1.7	118,881.0
Goats	39,912	2.9	115,744.8
Swine	4,390	3.4	14,926.0
Poultry	133,410	0.7	93,387.0
Rabbits	1,540	0.9	1,386.0
Apiary	8,950	1.0	8,950.0
Silk Production (in boxes)			
Total			1,154,322.6

III. Forestry-Fishing

Products	Production in tons	Man-Wage Days per Weight unit	Total Man-Wage Days
Timber (m^3)	1.530.0	1.5	2,295.0
Fire Wood (zygia)	131,000.0	0.1	13,100.0
Charcoal	72.0	6.2	446.4
Lime	180.4	6.2	1,118.5
Acorns	77.0	18.5	142.5
Resins.....			
Total			17,102.4
Fishing	—	—	
Grand Total...			17,102.4

TABLE A—13

LARISSA REGION, 1959

I. **Farming**

Products	Cultivated Area in stremmas	Man-Wage Days per stremma	Total Man-Wage Days
Wheat	763,000	0.700	534,100.0
Maize	5,100	2.900	14,790.0
Other Cereals	87,840	1.530	134,395.2
Tobacco	9,115	13.820	125,969.3
Cotton	55,000	7.320	402,600.0
Anise - Flax	200	6.200	1,240.0
Sesame	80	2.800	224.0
Sorgum	20	4.700	94.0
Dry Beans	14.888	5.700	84,861.6
Hay			18,101.5
Clover	1.550	6.080	9,424.0
Pastures	1.000	0.980	980.0
Straw Bundling			17,950.9
Melons-Water Melons	3.500	7.310	25,585.0
Potatoes	2.500	5.610	14,025.0
Vegetables	5.564	9.960	55,417.4
Olive Groves (in trees)	300.000	0.384	115,200.0
Table Grapes	1.100	8.800	9,680.0
Wine Grapes	4.050	7.180	29,079.0
Fresh Fruits (in trees)	131.000	0.327	42,837.0
Strawberries	3	12.600	37.8
Cattle Feed Legumes	61.310	3.750	229,912.5
Total	1,015.820		1,866,504.2

(arboriculture not included)

Source: Computed from data supplied by the Agricultural Bank of Greece.

II. Husbandry

Animals	Animal Heads	Man-Wage Days per animal head	Total Man-Wage Days
Horses	6.450	21.0	135,450.0
Mules	1.760	16.0	28,160.0
Donkeys	4.150	9.8	40,670.0
Beef Cattle.....	507	19.0	9,633.0
Milk Cows	7.700	20.8	160,160.0
Calfs	125	9.8	1,225.0
Sheep	230.668	3.0	692,004.0
Goats	25.700	2.9	74,530.0
Swine	4.950	3.4	16,830.0
Poultry	354.000	0.7	247,800.0
Rabbits	4.500	0.9	4,050.0
Apiary	9.000	1.0	9,000.0
Silk Production (in boxes)	120	48.0	5,760.0
Total			1,425,272.0

III. Forestry-Fishing

Products	Production in tons	Man-Wage Days per weignt unit	Total Man-Wage Days
Timber (m^3)	6,800.0	1.5	10,200.0
Fire Wood (zygia)	85,000.0	0.1	8,500.0
Charcoal	184.0	6.2	1,140.8
Lime	242.0	6.2	1,500.4
Acorns	206.5	8.5	3,820.3
Resins.....		31.2	
Total.....			25,161.5
Fishing	9	83.0	747.0
Grand Total..			25,908.5

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