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9. ABSTRACT

This literature-review study analyzes various approaches to defining and measuring disguised unemployment in the agricultural sector of low-income countries. The caloric technique is examined to determine its advantages, limitations, and possible applications in various research areas. Among the conclusions: Traditional Western concepts of employment and visible unemployment are inapplicable to rural sectors of low-income countries; differences in the cultural milieu make the volitional standard and the methods of measurement irrelevant. No single, unambiguous method of measuring the extent of disguised unemployment exists. An output-oriented approach does not accurately measure the intensity of work effort. Direct caloric measurements of intake and expenditure provide the most inclusive and least biased index of labor utilization, but these have little comparative value and fail to include the psychic dimension to labor fatigue. Nevertheless, that approach could be effectively used in future research designed to examine (1) the caloric requirements for optimum efficiency in performing particular agricultural operations; (2) the actual caloric consumption as it varies throughout the agricultural year and as it relates to performance of seasonal operations; and (3) the psychic costs incurred in performing agricultural operations at various nutritional levels.

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THE DEFINITION AND MEASUREMENT OF RURAL DISGUISED UNEMPLOYMENT IN LOW INCOME COUNTRIES--A REVIEW OF THE LITERATURE AND SPECULATIONS ON THE USE OF ENERGY

By

Peter Matlon

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THE DEFINITION AND MEASUREMENT OF RURAL DISGUISED UNEMPLOYMENT IN LOW INCOME COUNTRIES--A REVIEW OF THE LITERATURE AND SPECULATIONS ON THE USE OF ENERGY*

By

Peter Matlon+

Introduction

The phenomenon of large and increasing rates of unemployment has been identified by a growing body of economists as one of the most critical problems facing many low income countries in the decade of the seventies. Although techniques to quantify the extent of the problem in the urban industrial sector are reasonably well developed and in common use in both high and low income areas, comparable techniques for use in primarily agricultural regions are often divorced from the realities of the rural economy and lacking in sufficient rigor for meaningful policy application.

In addition, the bulk of the literature addressing this problem was developed in the 1950's and early 1960's. A central focus of these studies was on the ability of the rural sector to supply labor of low opportunity cost for employment in the lead industrial sector. Both the theory of development economics and the parameters of low income countries have undergone substantial evolution since that period.

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* The essay was first submitted as a term paper for Ag. Econ. 560: Food, Population, and Employment, Spring Term 1971-72. It is one of a series of studies on the economics of food and agriculture in the tropics directed by Professor Thomas T. Poleman, in recognition of a complex assignment courageously carried out.

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It has been proposed that the use of caloric expenditure as a common denominator for labor input provides an approach by which the elements of disguised unemployment can be more rigorously identified and quantified and with greater relevance to the nature of current employment problems. While its application and the technology associated with this method are relatively new, its basic outlines have been drawn in suggestions and references to be found in the earlier literature.

The objective of this paper is to present a systematic, critical review of the various approaches which have been proposed, and in some cases actually used, to define and measure disguised unemployment in the agricultural sector. An effort is made: 1) to make explicit the assumptions underlying the various methodologies; 2) to identify their perspectives and their precise foci; and 3) to assess their comparative strengths and weaknesses as they relate to current policy problems. With this review as background, the caloric technique is examined to determine its relationship to earlier work and to evaluate its advantages, and limitations, in filling what gaps do exist. Finally, suggestions are made as to current research needs and the possible applications of the caloric methodology in various research areas.

I. Visible Unemployment - The Cultural Bias

The concepts of employment and unemployment, as developed in traditional economic literature, have been derived largely from the economic, cultural, and institutional fabric of Western society.[1/] In the course of the industrial revolution the labor force was systematically allocated

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1/ See 23, pp. 989-994 for a more complete discussion of the cultural bias in traditional definitions of unemployment.

to the performance of specialized operations. For each operation certain norms evolved including specification of the work week, length of work day, and some standard of work efficiency. Through these norms employees and employers were able to establish a contract relationship by which obligations and remuneration were clearly established thereby reducing uncertainty for both, and minimizing the risk of work stoppages for the employer, a consideration which grew in importance with the growth of fixed capital costs. The composition of the labor force, by sex and age, was also institutionalized through social custom, negotiation, and in some cases, legislation. This evolution was reinforced by the development of institutional structures, such as trade unions, which further differentiated the functions performed by labor, management, and ownership in the production process.

Underlying the superstructure which emerged during the 18th and 19th centuries, was the increasing relevance of the concept "economic man." As products of both the philosophical heritage of Western society and of the rapidly evolving market economy, employers, employed, and self-employed became economic optimizers in the sense of attempting to maximize personal gain in accordance with some rationally considered utility function.[2/] Under these conditions employment became the expected way of life. As a corollary, unemployment was considered possible only when there was inadequate demand for wage employees or when there was a lack of productive work opportunities for those self-employed.

2/ Employers would most nearly fit this description in their conscious attempts to locate profit maximizing points on their total product curves. Employees and self-employed faced the more difficult and subtle problem of optimizing utility through an income-leisure trade-off. With the growth in consumer goods availability and the increasing cost of subsistence in an urban environment, it is likely that the opportunity cost of leisure increased thereby shifting the utility schedule of the urban work force towards an income bias.

In economic parlance, only "overt" or "visible unemployment" was considered relevant in the social context described.[3/] With few exceptions,[4/] "visible unemployment" has been defined as "a situation in which a person has no job, but is seeking one, or at least wants one, at the going wage." (23, p. 992). Basic to this definition is the concept of involuntary idleness to which we will return throughout this paper.

Given this definition of "visible unemployment," its measurement is reasonably straightforward. It involves simply an enumeration of those out of work but seeking or desiring employment. In most high income countries this is accomplished through gathering data already available in unemployment compensation rolls or through conducting sample surveys of the working-age population.

Before examining the transferability of this "Western" or industrial concept of unemployment to low income countries, it would be useful to review and identify the assumptions which underlie its application: 1) the time factor defining full employment in given occupations is standardized and regulated by institutional factors; 2) the labor force is an identifiable and quantifiable portion of the population; 3) labor can be viewed as a homogeneous quantity with no significant qualitative differences; i.e., work efficiency norms are established; 4) unemployment is

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3/ As early as 1936, Joan Robinson described "disguised unemployment" which she defined as the situation in which an employee accepts work in a position which is less productive and provides a lower income than his normal occupation due to conditions of general unemployment. This situation is generally considered to be relatively unimportant in the Western industrial context. Also, this use of the term "disguised unemployment" differs from the normal usage in reference to low income countries which is adhered to in the body of this paper.

4/ For a definition of visible unemployment based on actual and potential labor time, see 8, p. 704.

involuntary in the sense that the unemployed are actively seeking employment at the going wage rate; 5) the only limitations to increased employment are on the labor demand side; i.e., insufficient complementary factors of production to provide profitable and productive work opportunities; and 6) the members of the labor force are economically rational and impute to leisure a high opportunity cost (23, pp. 995-997).

Transferring this definition of unemployment to low income countries, one is faced with both conceptual problems and the more pedestrian problems of measurement. Although they are closely interrelated, the more obvious aspects of the measurement problem will be considered first.

As mentioned, the normal methodologies used to determine the extent of visible unemployment in high income countries are 1) an examination of unemployment compensation rolls, and 2) sample surveys of the working age population. Neither are directly applicable to the rural non-industrial sector in low income countries. In very limited situations in the industrial sectors, and in no instances in the rural sectors, do public institutions exist to provide compensation benefits to the unemployed. Thus some have concluded that visible unemployment can be best measured through labor intensive surveys involving direct observation of farming operations throughout a cropping cycle supplemented by interviews with the farmers. Although providing a more detailed accounting of the labor input in terms of time devoted to various activities (while drawing much more heavily on the researcher's resources), this approach confronts several obstacles of a different nature.

First, to avoid bias the sample distribution must take into adequate consideration the seasonal and regional variability of production processes and thus employment opportunities. Information of this type presupposes

a more accurate foreknowledge of employment patterns than are usually available even upon completion of such surveys. Second, who is to be sampled; that is, who is considered to be a member of the labor force? One must determine not only a realistic set of age and sex inclusion classes, but also, per the definition of visible employment, distinguish between voluntary and involuntary idleness. Third, how are the survey questions to be posed so as to elicit a response which is consistent with the concept of employment sought in the survey? This problem is confounded in determining the employment status of hired laborers as compared to self-employed peasants and unpaid family laborers.

The nature of such problems is well illustrated in these comments made by the Census Commissioners of Pakistan in reference to a census conducted there in 1951 (23, p. 1023):

> ". . . cultivators do not regard themselves as unemployed if the their families own land and they are maintained by the general activities of the household. Among cultivators, therefore, only landless labourers are likely to regard themselves as unemployed . . . the whole conception of unemployment is indefinite . . . persons seeking work in industry, business, or services regard themselves, not as unemployed, but as still engaged in the general work of their family."

In a study of surplus labor in Pakistan reported by Islam, assumptions as to the number of man days and hours per day constituting full employment had to be made (9). Only males were considered members of the work force, and the problem of volition was ignored. It is highly questionable whether the results of such a survey either reflect the extent of unemployment as defined in the Western context or are a realistic reflection of the problem examined even in the Pakistan context. Most important, from a policy perspective such estimates fail to indicate whether the employed

man-days are avialable for work, to what extent they are available for work outside the village, and on what terms (9, p. 252).

The conceptual difficulties encountered in applying the Western version of visible unemployment to the rural sector of low income countries revolve around five characteristics of employment in that context which are in direct opposition to the assumptions implicit in the Western concept:

1) Flexible time standard

Far from being rigidly determined, the amount of labor time per worker varies greatly in the rural sector as a function of the natural resource base, the system of cultivation employed, the labor density of the cultivated hectarage, seasonality, the availability of non-farm work, the presence or absence of labor saving tools and implements, and the level of nutrition and health. Moreover, variation in time input per laborer is evident in both hours per day and days per year dimensions.

2) Indeterminate labor force as a proportion of the population

The extent to which women and children are considered a part of the labor force varies greatly as a function of the factors mentioned above, and as a function of farm income and status, social-religious constraints affecting the status of women, and educational opportunities available to children.

3) Variable labor efficiency

The labor force cannot be considered a homogeneous factor of production with respect to labor productivity. Labor efficiency has been found to vary not only by sex and age but by size of holding, capital availability, quality of resources, system of cropping, and again, level of health and nutrition.

4) Seasonal employment patterns

Characteristic of agricultural employment in all countries, but most particularly in low income areas where climate control practices are less commonly available, is a cyclical climatically determined labor requirement pattern. This pattern may reflect the peak and slack labor demand periods associated with the cultivation of a single crop or the aggregated work requirements for the combination of crops grown. During peak periods it is common that a greater proportion of the total population is drawn into the active agricultural labor force. This often involves substantial seasonal flows of labor between the urban and rural sectors. In addition, the average amount of time involved in work per day, and the intensity of work per unit of time for the active labor force are believed also to increase at peak periods (9, p. 248).

5) Inapplicability of the volitional standard

It is the concensus of much of the literature that the distinction between voluntary and involuntary idleness is of little value in understanding the major proportion of labor surplus in the traditional rural sector. The explanations used in dismissing the distinction fall into two sets: sociological and economic.

The first argue that the productive processes in a subsistence agricultural society are so intertwined in the socio/cultural matrix as to lose their economic characteristics. The objectives in agricultural production might be maintenance of status and the fulfillment of social obligations, not income maximization. Thus a basic difficulty may arise even in defining a productive process within this social context. Certain activities might appear to a Western observer as being non-productive and a

form of involuntary idleness. Slack-season crafts or maintenance activities, religious festivities, and other social functions performed in the absence of alternative work activities might be interpreted in this fashion. Yet within the values of the given society these activities might be entirely legitimate and socially productive, with a high opportunity cost imputed to their non-performance.

In other cases income maximization through increased effort might be considered unsocial and looked at critically. Thorner describes this phenomenon as he interpreted it in India (32, p. 12):

> "The primary aim of all classes in the Agrarian Structure has not been to increase their income by adopting more efficient methods but to raise in social prestige by abstaining in so far as possible from physical labor."

Idleness in such a situation would, of course, be entirely voluntary.

A somewhat similar argument was made by early colonial administrations in an effort to explain the difficulty of recruiting native laborers in the midst of what appeared to be general idleness and labor surplus. Myrdal summarizes the main theme of these arguments as (23, p. 977),

> ". . . the natives tendency toward idleness and inefficiency, and their reluctance to seek wage employment was 'voluntary' in a sense, an expression of their wantlessness, very limited economic horizons, survival-mindedness, self-sufficiency, carefree disposition, and preference for a leisurely life."

A more economic formulation of this argument has been framed in the context of the target income earner and the backward bending labor supply curve (3). These arguments begin with the assumption that a laborer has a particular level of income to which he directs his efforts, perhaps a level slightly above subsistence for himself and for those whom he supports. If he can obtain that income with less than some arbitrarily

determined "full employment" time expenditure, the excess time might be considered voluntary idleness. Further, given an increase in his return to the effort he does expend, be it through a rise in the price of the commodities which he produces and sells, through the introduction of a labor-saving input, or through an increase in his wage rate, his hours of "employment" might actually fall.

Such a situation, however, can be considered an extreme or pure case of a more generalized phenomenon. Mellor provides an extremely useful conceptual framework for the analysis of this phenomenon in his "limited aspirations model." (21, pp. 519-526). Mellor distinguishes five relationships which influence the ultimate labor-leisure trade-off decision:

1) The transformation of utility from lesiure into labor. Of influence here are the psychic as well as physical costs associated with labor. The value associated with both labor and leisure can vary widely in both positive and negative values depending on the situation of the individual with respect to his available energy and health status, and with respect to his cultural environment.

2) The transformation of labor time into agricultural output. This is primarily a function of the individual's resource base, his management skills, and available technology.

3) The transformation of agricultural output into money. This can be considered a function of the availability of markets and the price level for one's produce.

4) The transformation of money into goods and services. The utility of money depends upon the extent to which it can be exchanged for desired consumer goods and services. Thus the availability of such goods and

services through marketing channels and their price level determine the nature and magnitude of the incentives to exchange leisure for a higher income level.

5) The transformation of goods and services into utility. This would be a function of one's level of income and tastes, and the cultural values associated with varying forms of consumption.

Mellor further assumes two conditions are characteristic of traditional agriculture. First, the productivity of labor is low resulting in average incomes not greatly different from the subsistence level. Second, the marginal utility of goods and services decreases rapidly once the subsistence level is attained. The precise level of subsistence income, as defined by Mellor, is not physiologically determined. Rather it is socially defined to the extent that one's consumption expectations are conditioned by social norms and the availability of consumer goods. Thus it can vary greatly between countries and between groups within a country. In any case, the range of income-leisure points around the subsistence level on one's utility function is a critical area of decision-making with respect to the alternatives of providing additional labor, or accepting periods of voluntary idleness.

The extent to which labor is offered by both employees and self-employed depends on the nature of each of the transformations enumerated above and on their cumulative effect. As one passes above the level of subsistence, several independent influences may interact. If the major proportion of the additional income is consumed in the form of food, as would be expected among low income laborers, one's nutritional and health status might improve to the extent that additional labor is less onerous, and thus more labor is offered. Or, if the increment to income is used to purchase inputs of a

labor-saving nature, the labor requirement to a produce a given level of output may be reduced. A third force might be that, given a decreasing marginal utility of goods and services beyond the subsistence level, the income aspirations may stabilize or fall, again reducing the labor offered.

In sum, the extent to which one can be considered voluntarily or involuntarily employed is a complex function of a number of individual and social variables. And the net effect of an increase in one's income level is indeterminate with respect to changes in labor offered. Further, it is likely that the supply response of an individual laborer and of the aggregate labor force might differ significantly with respect to each of these elements. Thus the net effect on gross labor services offered is a function of the changes in labor force participation rates, and time units offered per worker. And the net effect on output is a further function of these two factors plus changes in efficiency of labor effort and the level of technology.

To make meaningful statements concerning the extent of involuntary unemployment in the rural sector one would require information concerning each of the above relationships and a summary function which would weigh and properly combine them into some net result. Obviously this is beyond both the data and the currently available tools of economic analysis.5/

II. Disguised Unemployment--Its Definition and Place in Development Theory

Realizing the limitations of a direct application of the industrial concepts of employment and unemployment to the rural sector of low income countries, an alternative concept and set of approaches were developed

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5/ It is suggested later that, through the use of devices which monitor human behavior in work activities some additional rigor can be added to an analysis of the first two transformations outlined by Mellor (see pp. 40-41).

by economists during the post war period. The concept is "disguised unemployment" and the methodology is to estimate surplus labor through a measurement of labor's marginal product.

The essence of disguised unemployment, or underemployment, is the existence of a zero or negative marginal product of labor. Viner defines it as (33, p. 79)

> "a situation in which the removal from a working combination of factors of some units of labor, nothing else of consequence or worth mentioning being changed, will leave the aggregated procuct of the working combination undiminished, and may even increase it." (Emphasis added.)

Substantial disagreement exists among economists as to the existence of disguised unemployment in the rural sector of low-income countries. Partly this is a matter of definition and partly it is a problem of differences in methods of measurement. Critical to the definition of disguised unemployment is the ceteris paribus assumption underlined in the above passage. Leibenstein (12), Myrdal, and Viner, among others, adhere to a rather strict interpretation of the ceteris paribus condition allowing only a minimal reorganization of the processes of production following a withdrawal of labor. Nurkse allows for substantial reorganization of the work processes including consolidation of scattered, inefficiently sized plots of land (11, p. 134). Islam (9, p. 241) and Hsieh relax the constraint even further allowing for both changes in organization of the work process and also change in the form of capital equipment toward labor-saving devices "requiring little or no net addition to capital outlay." (8, p. 709). A further introduction of capital and more extensive changes in the pattern of production takes one out of the limits of what is normally defined as disguised unemployment into the concepts of "potential unemployment" (8, p. 710) or "labor reserve" (23, p. 999).

These differences in definition have accordingly led to a wide range of estimates as to the presence and magnitude of disguised unemployment. Those studies which allow for greater reorganization of production processes and an increased introduction of capital within the rural sector, of course, conclude that a greater body of surplus labor in the form of disguised unemployment exists.[6/]

A second problem area with respect to definition concerns the time period for which labor is withdrawn. If the withdrawal is permanent or at least encompasses an entire agricultural year the meaning and implications of disguised unemployment are very different from a definition including temporary, seasonal labor migration. This semantic difficulty, as is shown later, can lead to significant problems in interpreting various methods of measurement.

The existence and extent of disguised unemployment has traditionally played an important role in development theory. The position taken in this controversy has led Jorgenson to divide development theorists into two broad groups (10). Those who believe that a substantial surplus labor component exists in the rural sector are termed the "classical school" and include as its most important adherents Lewis (14) and Ranis and Fei (2). The crux of this school depends on the ability of the non-capitalist rural sector to transfer substantial amounts of surplus labor to the capitalist industrial sector without a significant decline in agricul-output holding capital and technology constant.

The "neo-classical" school, on the other hand, including among others Schultz (11, p. 131), Viner, Myrdal, and Jorgenson, argue that no substantial labor surplus exists. Rather, with a transfer of labor out of the

6/ For an excellent capsule statement of the controversy in historical perspective see 11.

agricultural sector, it is argued that output will decline unless the agricultural sector experiences a net increase in capital or a change in technology sufficient to increase the productivity of the remaining labor force.

The policy consequences of adopting either set of assumptions have in some instances substantially determined intersectoral investment patterns in a country's development strategy. Yet the methods of measuring the extent of disguised unemployment, in addition to the difficulty in selecting criteria to properly define the concept, have remained crude and in many cases, impractical.

III. Disguised Unemployment--Its Measurement

Kao, Anschel and Eicher group the most common methods of measuring disguised unemployment under two broad types, the "direct" and "indirect" approaches (11, p. 135).

The Direct Approach

The direct approach makes use of sample surveys to determine the extent of labor utilization or labor productivity. The first compares the amount of labor used in the production process to the total labor supply available. Assumptions must be made with respect to: 1) the participation rates of women and children in the work force; 2) the seasonal variability of labor demand; 3) coefficients of labor efficiency reducing male, female, and child labor to a common work unit; 4) homogeneity of labor efficiency and cropping patterns across farms; 5) the number of hours constituting a man day; and 6) the level of technology.

The only distinction between this measurement of disguised unemployment and attempts at determining visible unemployment as discussed earlier is the relaxed restriction regarding the voluntary or involuntary nature of idleness. In this case all idleness is assumed to be voluntary. If the resultant measure of disguised unemployment obtained in this way is to have policy significance, these assumptions must not only be realistic, but must remain static.

The second direct approach focuses specifically on the value of the marginal product of labor. This has been done in a number of studies by fitting a production function to available data. Mellor and Stevens published such a study on Thailand in 1956 concluding that the marginal product of labor did, in fact, approach zero (20). The following assumptions were made in this study: 1) a stock concept of labor was applied measuring the labor input in terms of man equivalents; 2) a man equivalent equals 12 months of available time for farm work by all persons over 15 years of age capable of performing farm work; 3) labor that is available for farm work but doing no work, and labor on the field but not contributing to output are likewise considered members of the work force; 4) seasonal variability in labor demand are ignored; and 5) all farms have a similar rice production function.

Several weaknesses in this study are apparent. The inclusion of all women as part of the active work force and the failure to allow for seasonal variation in demand both are probably unrealsitic assumptions and would invariably lead to the conclusion that a substantial labor surplus was present. Moreover, the assumption of a homogeneous production function ignores differences in land types and levels of technology which may vary greatly even within rather small regions.

A similar study of India conducted by Paglin more recently resulted in an opposite conclusion (27). Through regression analysis of farm management data Paglin concluded that there was no significant labor surplus in rural India as a whole. In particular he noted that even on small farms with a high labor-to-land ratio, increased labor inputs in the form of more intensive production techniques resulted in increased production. Or more simply, on a per farm basis the marginal productivity of labor was found to be positive.

What do these studies tell us? Due to the different nature of the data employed, due to the varying assumptions, and different social settings of each, they are of very little comparative value. Moreover, the statistical tools employed in determining the value of the marginal product of labor may be inapplicable. Montgomery has found that (22)

> "the choice of the functional form (used in the regression analysis) predetermines conclusions. Logarithmic functions always show positive marginal products and quadratic functions always will arrive at a point of zero marginal product. The bias is so immediate that the tool is unuseable."

And finally, under certain circumstances it is possible that full employment can coexist with a zero or negative marginal product of labor thereby undercutting the relationship which is fundamental to this approach. Given a full employment or even labor shortage situation, if there is a positive relationship between one's level of consumption and work efficiency, a withdrawal of labor resulting in a higher per capita level of income and consumption (assuming that the average product is greater than the marginal product and that the total product is shared by the smaller work force) may lead to an increase in work efficiency. If the increase in work efficiency due to improved consumption of foodstuffs is sufficient

to offset or cancel the negative production effect of the decrease in the size of the work force, the labor withdrawal can result in a constant or even larger total product. Leibenstein (12), Wonnacott (34) and others argue that this relationship is characteristic of most low income countries where the rural labor force lives at a near subsistence level. This approach is examined in more detail in a later section. It is introduced here simply to suggest yet another problem which can confuse the results of the labor productivity measurement of disguised unemplcyment.

The Indirect Approach

Indirect methods attempt to compare labor requirements for producing the current agricultural output with the available labor supply through an analysis of secondary data. A large number of variations within this general framwwork have been devised differing most particularly with respect to the units of measurement selected to determine and represent the available, actual, and required levels of labor.

The first method considered is the standard farm size approach. Through an examination of comparative farm management data the researcher must make a judgment as to an optimal number of hectares to be worked by a single worker or by an average sized farm family. The actual land holding pattern is then compared to this standard with the implicit conclusion that smaller holdings represent a reservoir of disguised unemployment. Mathur (16) has used this general methodology in an attempt to quantify the labor surplus in rural India.

Several problems run through this approach. The results present only an estimate of the number or proportion of farms on which disguised unemployment is evident. It does not indicate the extent of the unemployment problem in terms of labor units and thus is of limited value in

attempting to quantify the effective labor surplus in a way consistent with the traditional definition of disguised unemployment. Furthermore, the determination of a unique standard farm size allows for no differences between farms and regions with respect to resource base, crops grown, systems of cultivation, level of technology applied, work efficiency and intensity, management levels, capital and other non-land inputs. Similarly arbitrary is the method for determining the "optimality" of the standard land holding. Whether or not factor proportions are to be determined through the application of the real economic costs imputed to land, labor, and capital or through the use of market prices (thereby incorporating the distortions present in the latter) is left unclear. Significantly different results might be obtained under different pricing systems. Lastly, this method is basically static and permits no change in the factors which determine the optimality of farm scale.

Many of these same problems are found in a second indirect method which approaches the measurement of labor surplus through a comparison of population densities. Often expressed in the context of "optimum population" arguments, a comparison is made between the actual density of population with a density judged to be adequate to produce the same total output under the same general system of cultivation (25). Typically, the "adequate" population density is borrowed from that level observed in settings elsewhere where the land base and level of technology are similar. In effect, this method merely aggregates the kinds of calculations made on a micro level in the standard farm size approach without actually performing them. Although this method does produce a quantified estimate of the labor surplus, unlike the first, it also assumes away all but the most obvious dissimilarities with respect to populations and their natural,

social, and technological environments. Basically an exercise in comparative statics, the conclusions derived through this method are of very little value in highlighting the key relationships and bottlenecks which are of interest to a policy maker examining the effects of labor withdrawal from the rural sector.

A third indirect method measures labor input in terms of time units of work. Comparing the number of hours required to produce a given output with the total labor hours actually expended or available in a population, an estimate of the surplus labor component is derived as the difference. The literature contains a large number of case studies in which this approach has been employed.7/ Three variants of this approach may be distinguished.

In the first, estimates of the total "available" labor time are made by making assumptions as to: 1) the composition of the labor force; 2) the standard work year; and 3) the standard work day. Next, the "actual" amount of labor time devoted to productive agricultural and non-agricultural activities is estimated either through direct interview and questionnaire techniques applied to a sample of the peasant population or through the less direct method of estimating the labor time spent per unit of land blown up by the arable land base.8/ The difference between the two is interpreted as representing the amount of surplus labor measured in units of time.

The methodological limitations to this approach are immediately apparent. First, it fails to distinguish between visible and disguised

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7/ For further references see 9, pp. 247-250; 11, p. 138; and 23, p. 176.

8/ A brief, but rather complete discussion of the techniques and problems encountered in this method is provided by 8, p. 705-709, and 9, p. 244.

unemployment; in fact, as structured, it is probably geared more to an estimate of the former than the latter. In particular, it tells little about what one should expect to occur to total output with a withdrawal of labor. Second, it is unclear whether the difference between available labor time and actual labor time is due to an insufficiency of the actual or due to an overestimation of the available built into the assumptions which are necessary to generate it. For reasons described earlier (see page 7), it is very difficult to arrive at an unambiguous specification of the rural work force and of a standard work day, and work year, in low-income countries. It is just as likely that this approach merely identifies incorrect or unrealistic assumptions as it does a labor surplus.

A second approach also begins with an estimate of the total available labor time based on the same set of assumptions but compares this with an estimated labor time "requirement" for producing the current level of output. The labor time requirement is estimated from time-work data obtained through observing production under similar conditions elsewhere or from similar data gathered from observing apparently efficient production units within the country under study.

It is hardly an improvement. Not only does this method build in the same problems in connection with the assumptions described immediately above, but it adds to them the problem of determining time "requirements" from data obtained under dissimilar conditions. Its only improvement is a greater inclusion of the disguised unemployment component of the labor surplus.

The third approach focuses directly on one component of disguised unemployment with a complete exclusion of overt unemployment. This is

done by comparing the actual amount of labor time incurred in productive activities with the labor time requirement. This last method is only a slight improvement over the first two. Although the meaning of its results can be more readily interpreted in terms of disguised unemployment, they are still no more accurate than the estimates of the actual labor time expenditure and no more relevant than the realism of the assumptions which underlie the requirement estimate.

Some Conclusions on Existing Methods

Four points should be made which help place the results of these various approaches into better perspective.

First, and possibly most obvious, it is likely that each of these methods, even when "properly" employed, will generate different estimates of surplus labor under the same conditions. This is due not only to differences in the assumptions which underlie them, but also because different aspects of the labor surplus are being measured. As we've seen, of the three labor time approaches, one measures visible unemployment, one focuses on disguised unemployment, while one examines a combination of the two. It is essential when using the results of such surveys that one is clear as to just what is being measured. Too often the literature confuses rather than clarifies through an inconsistent use of the terminology or, more often, by making comparisons between dissimilar measures.

Second, the extent of disguised unemployment as measured is a function of the changes in the current production process which one assumes to take place. This was mentioned earlier with respect to the wide range of interpretations given to the *ceteris paribus* condition of the definition of disguised unemployment, but it is an important point which is often overlooked. In all but one of the indirect methods current labor use patterns

are contrasted with an "adequate" or "requirement" level of labor input associated with a constant output. The nature of this "requirement" level is established on a set of explicit or implicit assumptions as to the kinds of changes one imagines in the production process. Without specifying the alternative production process and the measures which may be necessary to induce the required changes, the measure of disguised unemployment is devoid of meaning and useless with respect to policy.

Third, none of the methods described is particularly well adapted to sorting out the seasonal variation in employment. With respect to visible unemployment, Hsieh distinguishes between the chronic component, which he defines as the existence of unemployed surplus labor during peak as well as slack periods, and the seasonal component, which is defined as labor which is visibly unemployed during only slack periods (8, p. 708).

Disguised unemployment is less easily dealt with. Clearly the marginal productivity of labor varies between peak and slack seasons, yet most studies which attempt to measure the marginal product directly through regression analysis ignore the seasonality of the estimate obtained. If there is full employment of labor during the peak period, a withdrawal of labor for the entire year could substantially reduce the amount harvested, or planted, thus reducing the total product. A direct measurement of the marginal product for the entire year would therefore realize a significant positive value. Yet this value would fail to reflect the extended periods of low or even zero productivity of labor during slack agricultural periods. On the other hand, the direct measurement of labor's marginal product through sample surveys conducted during the slack period would erroneously conclude that substantial amounts of labor could be withdrawn without effecting the total product.

The indirect methods are no more effective in disaggregating the seasonality problem. The standard farm size approach and the labor density approach both lump together the peak and slack labor requirements into the standard holding or adequate density measure. Full employment so determined completely misses the seasonal presence of disguised unemployment. Much the same kind of problem is encountered in establishing the total labor time requirement and total available labor time in the work-time approaches. Depending on the assumptions made with respect to the standard work year and work day, the seasonal variable may or may not be included. But again, the existence of even substantial labor time surplus would not necessarily indicate that the marginal product of labor is zero. Unless an excess of actual or available work time[9/] is demonstrated during the peak season, a withdrawal of labor for an entire agricultural year could lead to a decrease in total output. Surplus available or actual work time accumulated during slack periods would not therefore represent disguised unemployment in the sense of a zero marginal productivity with respect to annual output.

Fourth, it should be underlined that the first four methods discussed implicitly assume that the only output of positive value in the rural sector is agricultural. Labor engaged in non-agricultural activities is presumed to have a zero marginal product since the fruits of such labor are not included in the output being measured. This bias is found in the direct approaches and in the standard farm size and density of population approaches. To the extent that the labor time "requirement" estimate includes productive non-agricultural activities, this problem should not be present in the work-time approaches. The inclusion, however, is very uneven in much of the literature.

9/ "Actual" work time is included here to provide for the presence of "work spreading."

IV. The Effective Labor Supply--Use of Energy As a Measure of Work Intensity

The definition and measurement of disguised unemployment is unduly confused in much of the literature through a failure to distinguish explicitly between the elements which constitute the total labor supply. Myrdal has suggested three dimensions in which labor utilization can vary.[10/] His focus, however, is on the output side of labor utilization rather than on labor strictly considered as an input. With some modification, Myrdal's general framework can be used to provide modestly improved rigor to a consideration of the aggregate labor supply.

Four elements can be distinguished as components of the labor supply. These are 1) the proportion of the population considered to be part of the labor force; 2) the proportion of the labor force which is actively employed; 3) the duration of this active participation in time units; and 4) the intensity of the working acitivity. These in turn can be expressed as four ratios, the product of which may be defined as the effective labor supply.

$$\frac{\text{labor force}}{\text{population}} \times \frac{\text{working members}}{\text{labor force}} \times \frac{\text{man-hours}}{\text{working members}} \times \frac{\text{labor intensity}}{\text{man-hours}}$$

These ratios provide us with a simplified overview of the scope of the approaches reviewed earlier. A measure of visible unemployment is represented in the second ratio. Its accuracy depends in turn on the realism of the assumptions applied to estimate the first. The first three ratios represent the key relationships examined in the time-work measures.

10/ These are with respect to 1) participation rates, 2) duration of productive activity, and 3) labor efficiency. Myrdal expresses the level of actual labor utilization as the product of these three in the form of the following ratios (23, p. 1016):

$$\frac{\text{working members}}{\text{labor force}} \times \frac{\text{man-hours}}{\text{working members}} \times \frac{\text{output}}{\text{man-hours}}$$

The direct measurement of the marginal product of labor is less easily derived. Depending on the study cited, and thus on the particular assumptions involved, this measure is represented by the product of the last three or the last two ratios, where labor intensity is measured as output per unit of labor time input.

The wide scope for variation in the composition of the first three ratios and some of the factors which contribute to this variation have already been discussed. It would be useful at this point to examine more closely the last.

It is extremely difficult to derive a useful, consistent, and unambiguous standard by which to measure the intensity of work effort. Mathur suggests making a distinction between "effective working strength", which he defines as the strength or energy which is actually expended in taking part in productive work, and "passive working strength" which he defines as the unused energy or labor potential which is available but not drawn on in directly productive activities (16, pp. 178-180). The sum of these two elements Mathur defines as "potential working strength." The passive working strength is reflected not only in the time spent in non-productive activities but also in a deficiency in the intensity of work effort; that in work spreading.

The phenomenon of "work spreading" is a common theme in much of the unemployment literature. It has been observed that in a situation of labor surplus, either visible or disguised unemployment, an individual laborer or a household takes greater time to perform an operation than in periods when there is full employment. The result is a spreading of work through a generally decreased pace of activity and through more frequent and longer periods of leisure interspersed with the periods of work.

Time-work methods of measurement might catch the increased periods of leisure (through a very intensive observation of the work subjects) but would have difficulty in distinguishing the decreased pace of work operations from otherwise normal changes in the production process. This is also the case with direct methods of measuring the marginal productivity of labor which analyze the relationship between the quantity of the labor input and product output. The marginal product derived under conditions of work spreading would register low labor efficiency, but would be unable to differentiate between the inefficiency due to lowered intensity of work effort and the usually low marginal product of labor associated with the characteristics of the work force and quality and quantity of non-labor inputs.

But there is a more fundamental problem encountered in attempting to use the traditional input-output relationship to get a handle on the extent of work spreading. What we are looking for is a measure of the effort, both physical and psychic, which is applied by a unit of labor in accomplishing a task which can be netted out of the total energy reserves of that unit. To measure effort according to the amount of a given commodity which is finally produced tends to blur the view of labor as a source of potential energy which can be expended in a productive process into one which sees labor as merely one input associated with a complementary set of factors in such a process. That is, the distinction between effective and potential working strength components is lost.

Two examples may help put this distinction into sharper relief. We are told that the American farmer today can produce enough output to feed 47 non-farm persons. This compares with a typical African farm family

which is unable to produce enough surplus agricultural output to feed even one additional family unit. The difference in these situations is, of course, the vast gap separating the two with respect to the quantity and quality of purchased non-labor inputs and techniques embodying very dissimilar levels of technology. Hearing this, no one would infer that the African farmer was only one-forty-seventh as employed as his American counterpart, nor that the intensity of his work effort was commensurately lower. Yet this is the same step which is taken in measuring labor intensity or work effort on a basis of its marginal product.

One might argue that due to the differences in capital inputs, the two situations are, in effect, incomparable. This is undoubtedly correct. But take as a second example, two smallholder African peasants employing similar techniques and similar limited capital resources producing the same crop over identical acreages. In this case, however, one farmer has a more fertile soil on which his holding is located. All else equal, the man on the better land should produce a larger total output per unit of time worked. In no sense can the man on the inferior land be said to be less fully employed than the other, nor could we infer from their different marginal products corresponding differences in intensity of labor effort.[11/]

In addition to non-labor inputs, labor itself is extremely heterogeneous with respect to intelligence, resourcefulness, management abilities and skills. Thus it is only when the quality and quantity of both non-labor and labor inputs are held constant does the marginal product of labor yield a meaningful comparative measure of labor effort and work spreading.

11/ This general approach, including a population growth factor, was used by Mellor and Stevens in their analysis of labor surplus in Thailand. See 20.

Energy as a Common Denominator of Labor Input

The direct measurement of energy expenditure has been suggested as a viable alternative to assess the effective working strength as defined by Mathur. By netting energy expenditure out of the total available supply of energy one can obtain an estimate of the passive working strength, and thus disguised unemployment, embodied in the rural labor force. It is possible to envisage several levels of generality on which such a study could be conducted, ranging from the broadest definition of potential labor supply to more problem and group-specific determinations of particular components of disguised unemployment.

The procedure followed on the broadest level might involve the following steps. First, through an analysis of food consumption data in a given area an estimate of total caloric availability in excess of basal and minimum activity requirements could be made. This would be used as an index of the potential labor supply. Second, through the use of heart-rate monitoring devices, surveys could be conducted on a sample of the entire population to determine the actual energy expenditure associated with agricultural and non-agricultural activities. This would be used as index of the effective labor supply. The difference between these two totals would provide one with an energy defined index of disguised unemployment.

Alternatively one might define the potential labor supply as the number of work units provided if the nutritional requirements of the population were actually met. Comparing this potentially available energy supply with the actual energy expenditure of the population one would derive again a difference representing surplus labor. This estimate, however, would include a component of labor "lost" to production due to

nutritional deficiencies. Both Mathur and Leibenstein define disguised unemployment in this broader sense.

Use on a less general but more problem specific level might be directed toward a particular segment of the work force to determine the variability in disguised unemployment with seasonal changes and changes in systems of cultivation or levels of technology.

Several advantages of this approach are apparent. First, it is the only method available which can accurately identify and quantify the work spreading dimension of disguised unemployment. Second, it is able to aggregate the four dimensions in which the labor supply varies to provide a unique index of labor force utilization which is independent of the output produced. Third, on the broadest level it avoids the problem of introducing a cultural bias into our definition of "productive" and "non-productive" activity by including all forms of energy expenditure. And fourth, it avoids cultural bias in defining the composition of the labor force--the entire population is included.

The limitations of this approach, however, are substantial. First, an energy oriented approach to the measurement of disguised unemployment is limited in application to systems of cultivation where capital inputs, particularly those of a labor saving bias, are insignificant. Given the introduction of labor saving devices the energy component of work intensity would be replaced by supplemental animal or mechanical power sources.

Thus the approach is basically static. Once the level of technology is changed with the introduction of labor-saving capital, the index of full employment, and thus of disguised unemployment, are inapplicable. Modifications in the values attributed to the employment indexes would, after some

minimum level of capital intensity had been reached, be meaningless as the approach itself becomes inapplicable.

Third, it follows that such an index of disguised unemployment would have little comparative meaning in contrasting two situations which differed with respect to factor proportions and factor quality. This would be the case in situations where different degrees of capital intensity had been reached as well as under different cropping systems or ecological environments where the physical components of labor activity differed.

Fourth, it is difficult to conceptualize a meaningful index of full employment against which the effective working strength (actual energy expenditure) should be compared. If actual caloric consumption is used as a measure of full employment we may find ourselves in the absurd situation of measuring an increase in disguised unemployment as diets improve more rapidly than physical activity. In a subsistence situation where the population consumes simply enough calories to stay alive at some minimal level of activity, this may make sense. At greater than subsistence levels of consumption, the standard breaks down. A similar problem exists if the requirement level of caloric intake is taken as a standard of full employment. Since the level of activity of the population is a component in the determination of its caloric requirements, there is a problem of circularity in distinguishing between potential and effective working strengths.

Fifth, this method would not provide us with a definitive statement regarding the production effects of labor withdrawal except in the full employment situation where there would be negligible difference between the potential and effective working strengths. And as discussed earlier, the production effect of labor withdrawal is the traditional criteria applied to definitions of disguised unemployment.

And sixth, it is unclear what information of policy relevance this index would provide. The human laborer is a multi-dimensional factor of production which probably can't be measured from the single perspective of caloric energy expenditure. The laborer incurs not only physical costs, but psychic costs as well in his participation in the production process. It has been found that relative rates of depletion of one's store of psychic and physical energy differ between individuals and between tasks (31, pp. 46-48). A laborer may reach a state of mental or emotional fatigue well in advance of depleting his store of physical energy. In these cases full employment would have to be defined as the expenditure of some upper threshold of psychic energy (however determined), or calories, whichever comes first.

Moreover, many forms of employment are constrained by neither a physical nor psychic fatigue threshold. Jobs such as herding which are demanding of time and attention, but which may be relaxing both physically and emotionally are suggested in this regard.

Thus, a caloric definition of disguised unemployment would have relevance when applied not only in situations where labor is the only significant input, but in the more limited range of cases where physical fatigue is the initial constraint to an increase in work participation, duration, and/or intensity. This isn't to say that the calorie constraint actually has to be reached for the measurement to have meaning, rather that it would be the first threshold reached as work intensity or duration increases.

The more limited situation where labor is effectively constrained by insufficient ingestion of calories introduces yet another possible source

of disguised unemployment, and one which requires an adjustment in our energy focused definition of disguised unemployment. Leibenstein, Mazumdar (17) and Wonnacott have provided an analysis of the phenomenon of decreased work input due to caloric deficiencies which they believe to characterize many low income countries.[12/]

12/ Fundamental to their analysis is what is termed the "wage-productivity relationship." (12, p. 93). This states that the productivity of labor is a positive function of the wages received by labor. The relationship is based on three assumptions: 1) at a subsistence level of income, a high proportion of increments to income will be spent on food; 2) there is a direct positive relationship between one's nutritional status and the amount of effort expended in work activities, again at near subsistence levels of income; and 3) work incentives are held constant. The first assumption, of course, is simply a rephrasing of the relationship described by Engels. The second is explained by an increase in work intensity per unit of time (decrease in work spreading) and by an increase in the supply of work time itself (a decrease in leisure and absenteeism due to health reasons). In the framework of the disaggregated analysis presented earlier, this would represent an increase in the values of the third and fourth ratios due to an increase of food consumption above some minimum requirement level.

As was briefly outlined earlier, the validity of these assumptions in a given situation can lead to contradictory estimates of the value of the marginal product of labor. Although an additional input of labor might lead to an increase in the total output thus yielding a positive marginal product, a decrease of sufficient laborers might also lead to an increase in the total product if the total wages or income is distributed to a smaller labor force and consumed in the form of food. In the latter case, the withdrawal of laborers would, holding total income constant and assuming no income sharing with non-laborers, result in a higher per capita income and consumption. If the resultant increase in work intensity were sufficient to outweigh the negative production effect of a smaller work force, a larger total product might be realized. The value of the marginal product derived from this perspective, of course, is negative.

The literature cited uses this basic set of assumptions to develop an analysis of employment and wages policies. In particular, they derive a somewhat sophistic body of explanations to explain the enigma of a positive wage rate under conditions of apparent disguised unemployment; that is, under conditions of a zero marginal product of labor--circumstances which contradict the traditional marginal productivity theory of wages.

The subtleties of their arguments are interesting but not within the scope of this paper. Two points of direct relevance, however, do emerge in their analysis. First, Leibenstein suggests that situations of apparent man-power surplus may instead be labor shortage situations due to low nutritional levels and resultant low levels of worker participation, duration, and intensity of work effort. Seasonal nutritional shortfalls suggest themselves in this context. Second, and in a sense the converse of the first, a situation of apparent full employment may in fact include disguised unemployment represented in the form of low work intensity due again to nutritional shortfalls.

It is likely that caloric consumption and measurements could be of help in analyzing these types of situations. Through this approach it should be possible to determine more precisely the nature and possible causes of seasonal labor shortages--situations which seem to be best described in such cases.

The underlying relationship which runs through all of these arguments is the assumption that labor intensity is a function of the laborer's nutritional level. While there is a relatively ample literature on this subject, and although the notion itself seems intuitively sound, the evidence brought forward to prove its validity is not completely satisfying. Even a brief review of the methodologies and results of the studies which have attempted to quantify this relationship is beyond the purpose of this paper. In any case, excellent summaries of the work that has been done are available elsewhere.[13/]

The available studies in this area, however, are deficient in several respects. Much of the literature is anecdotal rather than analytical. A

13/ See in particular 5, 15, and 4.

sufficient specification of the independent variables other than available calories is rarely presented to make a valid judgment as to the production effects directly attributable to changes in the diet. Often controls are entirely lacking or systems of incentives are introduced in conjunction with improvements in the diet. Moreover, little work has been done which is specifically focused on farmers in tropical conditions. That which has been so focused has examined the balance between caloric expenditures and intakes but with little direct effort to examine their relationship to output (24). Finally, these studies fail to identify whether or not the caloric intake and expenditure balance is achieved through a regulation of intake which is adequate to required expenditure or through a cutback in expenditure to meet an intake shortfall.

As Davey has concluded, available evidence is simply inadequate to determine the direction of this causal relationship which is critical to the analyses described above (4, pp. 5-6). In particular, it is inadequate to make a definitive statement as to whether or not caloric availabilities are an effective limiting factor to increased productivity, and thus full employment, as defined by Leibenstein.

VI. Concluding Remarks and Research Needs

A number of conclusions emerge from the above analysis.

First, traditional Western or industrial concepts of employment and visible unemployment are inapplicable to conditions characteristic of the rural sector in low income countries. In particular the volitional standard explicit in Western definitions and methods of measurement have little relevance to the cultural milieu within which the rural labor force offers its services.

Second, there is no single, unambiguous and universally applicable method of measuring the extent of disguised unemployment in low income areas. The extent of disguised unemployment, determined through whatever measure applied, is a direct function of the changes which one imagines in the production process. It is, therefore, a function of the policies which one arbitrarily specifies to bring about a reorganization of existing systems of production and to change the labor intensity and level of technology of the production process.

Third, an output oriented approach to the measurement of labor utilization does not accurately measure the intensity of work effort and thus fails to consider the extent of surplus work units embodied in the labor force.

Fourth, direct caloric measurements provide the most inclusive and least biased index of labor utilization of the methodologies reviewed. As a method to determine the extent of disguised unemployment however, the approach has validity only in those situations where labor is the only significant non-land input. Further, caloric measurements have little comparative value in a dynamic agricultural environment and in making cross-regional comparisons unless the production systems examined are similar with respect to factor proportions, levels of technology, and resource bases.

Fifth, an additional limitation of the caloric approach to the measurement of labor utilization is its failure to include the psychic dimension to labor fatigue. With the development of multi-input monitoring devices which include a quantification of both physical and psychic costs incurred this obstacle may well be overcome. The relevance and meaning

of the measurements so obtained, however, would nevertheless be subject to the reservations mentioned under the second summary point.

The Changing Economic Environment

The concern given to the measurement of rural disguised unemployment in this paper notwithstanding, it is at least questionable whether or not an exact quantification of the labor surplus is necessary or even particularly useful for policy purposes. The set of approaches reviewed in the first three sections of this paper were developed in the late 1940's and early 1950's during which the rate of urbanization in low income countries was still relatively low. Economic growth at that time was equated with industrialization,and development theorists concerned themselves with the problems of promoting capital formation to accelerate the expansion of the industrial sector. Development, when viewed from the labor perspective, was seen as the process of transferring low productivity agricultural workers to high productivity industrial employment thereby raising the average product per worker and national income.

Of primary importance in this framework was the ability of the rural sector to supply a continuing flow of low wage labor to the industrial sector without a subsequent decline in agricultural output such that there would be a sufficient supply of wage goods to feed the growing urban work force. As we've seen, two schools of development theory emerged out of this analysis which disagreed on the critical value assigned to the marginal product of agricultural labor. Within the context of economic theory and considering the low potential for agricultural growth in most low-income countries in the 1950's, this orientation was understandable and quite possibly valid.

It is no longer. Most low-income countries today are experiencing a rapid rate of rural to urban migration unmatched by a commensurate job creating capacity in the urban industrial sector. The result is growing, and in some cases, already substantial problems of urban unemployment. Thus the backup of disguised unemployed in the rural areas need no longer be viewed as a short-run source of additional manpower for transfer to industrial growth centers. Because of the existing unemployed in the cities, it is redundant in this role. Nor should it be viewed as a problem in itself. Rather, in the short run at least, rural disguised unemployment may well be of positive value since the social costs associated with it are certainly less than the corresponding costs associated with visible urban unemployment.

It is the opinion of much of the literature that the most effective solution to the urban unemployment problem lies not in an accelerated generation of urban job opportunities, but in the expansion of rural employment coincident with increased per capita income in that sector. This conclusion follows from the apparent nature of the rural-urban labor transfer, that is, from the dynamics of the labor supply. Recent migration models, in particular the Harris-Todaro formulation (7), explain labor flows as a function of the differential in incomes between sectors and the likelihood of finding employment in the urban sectors. It follows that policies which focus exclusively on increasing the demand for urban labor may induce a larger inflow of labor into the sector thereby largely offsetting what gains have been made in absorbing the unemployed originally present.

Priorities for Future Research

Research, therefore, should be focused on the development of principles and guidelines which can contribute to a more efficient creation of income raising rural employment capable of absorbing a broad spectrum of the rural labor force.[14/] If the concept of rural employment is to be relevant to current policy it should be expressed in terms which are applicable to these objectives. The reformulation of the concept of labor supply as presented in the last section may be a useful step in this direction.

There are three areas in which an energy-oriented approach to the measurement of labor input might be usefully applied in further research in these directions. First, the relationship between income (consumption) and work force participation, duration, and work intensity might be examined

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14/ The equity and income raising aspects are emphasized here as a counter to the simplistic and erroneous notion that the problem is one of increasing the labor input per unit of output. If the Harris-Todaro hypothesis is correct, labor can be induced to remain in the rural sector only if the per capita level of income, and thus average product of the agricultural sector, is raised. Rural employment strategies which merely attempt to increase the labor input in rural production functions without both increasing the returns to labor and distributing the increments to income to the lower income groups who constitute a large proportion of the potential migrants, may only exacerbate the problem. This is most clearly the case with respect to subsistence agriculture where income is a direct function of output. Employment creation in the construction of rural infrastructure is a slightly different case since the wages to labor so employed may be subsidized and are thus not directly dependent upon the efficiency of labor use. Here the problem is at least partially a lack of expertise on the administration of labor intensive public works projects.

in the context of subsistence farming under different ecological conditions and levels of technology. In particular, it would be useful to determine whether or not seasonal food shortages do in fact reduce the size of the total agricultural product thereby reducing per capita income and consumption for the following year. Several aspects could be examined: 1) the caloric requirements for optimum efficiency in performing particular agricultural operations; 2) the actual caloric consumption as it varies throughout the agricultural year and as it relates to the performance of seasonal operations; and 3) the psychic costs incurred in the performance of agricultural operations as a function of variable nutritional levels; that is, does the psychic fatigue threshold vary with one's nutritional level and does it operate as a constraint on labor force participation, duration and intensity? Such a study would provide valuable insights into the seasonal nature of disguised unemployment. It would also provide a testing ground for the "hunger-breeds-hunger" hypothesis.

Two other areas of research would have relevance to both farming operations and construction of rural infrastructure. These relate back to the first two of the five relationships which Mellor has outlined as determining the nature of the leisure-income transformation (see page 8). To review, these relationships are psychic and physical costs of transforming leisure time into work time, and the transformation of labor time into output. Of particular interest here would be to determine the acceptability of alternative labor intensive technologies by determining the psychic and physical costs associated with performing agricultural operations with different forms of labor-complementing capital.

A related application is the determination of labor inputs per unit of land given alternative cropping systems, techniques, and capital inputs. Labor coefficients and bottlenecks to new production systems over a given land base may be identified through this approach.

Studies of this type have been initiated by Poleman and Beeghly in the Philippines in the production of rice (2). Due to instrument limitations, however, only the physical energy costs have been measured. Anticipated improvements in the technology of the monitoring instruments currently in use to include the psychic component of activity should prove valuable in this exercise. A related area of research has been suggested by McGregor in which this general approach is applied to determine the capability of traditional agricultural systems to absorb additions to the rural labor force.[15/]

A third area of equal importance would be the use of this approach to determine optimal patterns of labor management in the administration of labor-intensive rural public works projects. Traditionally, Western economists have had very little to contribute in the design and operation of labor intensive work projects. Although there is a growing body of opinion suggesting that these forms of employment may in the short-run be critical to relieving current unemployment pressures while providing the kinds of infrastructure to stimulate broader rural development in the longer run, there is a paucity of experience and expertise in the administration of such projects without a conscripted, highly disciplined work force, the determination of psychic and physical cost curves associated with various construction operations could be useful in establishing efficient and acceptable work patterns. These kinds of information can be valuable in developing principles of labor management for types of projects alien to Western experience yet which may be vital in the context of low income countries in the near future.

15/ For application to the rural sector in Fiji see 18.

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