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UNEMPLOYMENT IN INDIA

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1. INTRODUCTION

This paper is devoted to a discussion of the grave national problem of unemployment which has defied solution in spite of two decades of planned development. I shall try to explain the reasons for the tragic phenomenon of positive unemployment growth associated with a positive output growth. But I begin by trying to clarify some issues of the unending controversy about the definition and measurement of unemployment in a dominantly agrarian household economy; and present some numbers, computed from National Sample Survey (NSS) data, which may be regarded as fair approximations of unemployment in the country in 1971 notwithstanding the continuing conceptual controversy. Finally, I discuss the most important question of the policy-mix which may be required in the Fifth and subsequent Plans to eliminate the scourge of unemployment.

Although the rural and urban unemployment problems are related, the argument of this paper focuses on the more masssive rural problem, except where the determination of employment in the economy as a whole is discussed. And the word 'unemployment' is used throughout the paper so as to include under-employment, except where it is specifically necessary to distinguish between the two magnitudes.

2. THE MEASUREMENT OF UNEMPLOYMENT

Logically there are only four major criteria according to which a person may be called unemployed or under-employed. We may call a person unemployed or under-employed if either

(1) he is gainfully occupied during the year for a number of hours (or days) less than some normal or optimal hours (or days) defined as full employment hours or days; or

(2) he earns an income per year less than some desirable minimum; or

(3) he is willing to do more work than he is doing at present : he may either be actively searching for more work or be available for more work if it is offered on terms to which he is accustomed; or

(4) he is removable from his present employment in the sense that his contribution to output is less than some normal productivity, and

therefore his removal would not reduce output if the productivity of the remaining workers is normalised with minor changes in technique and/or organization.

I shall refer to these criteria as (1) the time criterion, (2) the income criterion, (3) the willingness criterion, and (4) the productivity criterion respectively.

The Time Criterion

In the NSS labour force surveys, employment, unemployment and under-employment have been measured mainly on the basis of the time criterion. A person was defined as *employed* if he was gainfully occupied on at least one day during the reference period (which has been kept as one week beginning with the 14th Round in 1958-59) regardless of the hours of work put in. A person was defined as *unemployed* if he had no gainful employment throughout the reference week and was either seeking work, or available for work, at current rates of remuneration and in the prevailing conditions of work for at least one of the seven days of the week. A gainfully occupied person was defined as *severely under-employed* if he worked for 28 hours or less and *moderately under-employed* if he worked for more than 28 but less than 42 hours during the reference week. In the urban surveys (beginning with the 16th Round in 1960-61) a person was defined as *unemployed* if he had not worked even on a single day during the reference week and was looking for full-time work. Thus persons not looking for full-time work were excluded. Persons below the age of 14 and above the age of 60 years were also excluded. (Bhattacharyya, 1970.)

The Income Criterion

The income criterion has recently been used with great conviction by Dandekar and Rath (1971). They argue that :

"an adequate level of employment must be defined in terms of its capacity to provide minimum living to the population."

Thirty per cent of the rural population in 1969 (128.5 million people) needed an additional income of Rs. 64 per capita per annum in order to bring up their average expenditure to the minimum of Rs. 324.

"If this is to be done by providing additional employment, Rs. 822.4 crores becomes the measure of the rural unemployment and under-employment prevailing at the beginning of the Fourth Plan."

This estimate excludes the poorest 10 per cent of the rural population on the ground that their poverty

"may have to be relieved by means of social assistance rather than by providing additional employment."

For my present purpose the relevant aspect of the Dandekar-Rath approach is that they abandon the time criterion altogether for measuring unemployment and, in effect, reject the distinction between poverty, considered as consumption below a certain minimum, and unemployment, considered as an involuntary failure to get income-yielding work for the normal number of working days in an year.

The Willingness Criterion

It is of course possible that a person may or may not be willing to work for more time, regardless of the duration of work currently available and the income earned. A neo-classicist would argue that so long as the wage rate is positive the failure to get work must be voluntary. A reformulation of this old doctrine is available in a recent paper by A. C. Harberger (1970).

The core of the argument is that in every developing economy there is an 'unprotected' sector in the labour market and a sector 'protected' by collective bargaining and/or legislation. The wages are higher in the latter. Workers are voluntarily unemployed while they are in search of a job in the high-wage sector. When they fail to get one and the support of relatives and/ or their own saving, if any, runs out, they work in the low-wage sector. And those who have such support 'voluntarily' postpone their entry even into the low-wage sector. Therefore, everybody who is 'unemployed' is voluntarily unemployed in the sense that his reservation price is positive : he prefers to remain unemployed rather than work at a sufficiently low wage in the un-protect ed sector.

> "Supply price is not zero even for involuntarily unemployed labour. Such labour invariably has a reservation price, below which it is not willing to work." (Harberger, 1970.)

The Productivity Criterion

Ever since Joan Robinson defined disguised unemployment as a situation in which the marginal productivity of labour is zero, so that some labour can be removed from its present occupation without loss of output if the productivity of the remaining labour is normalised by minor techno-organizational adjustments, a number of attempts have been made either to establish empirically whether the marginal productivity of labour is zero or not (Schultz, 1956 and 1964; Jorgenson, 1969; and Harberger, 1970) or to measure "surplus labour" as the difference between the labour actually engaged and the labour "required" in a sector on the basis of some average productivity norm. (Mehra, 1966, and other studies cited in her paper.) Studies of the latter kind (using some productivity norm) have become more frequent (Ridker and Lubell, 1971) because it is easier to compare the required and the actual labour force in a sector than to estimate marginal productivity. Some of the exercises attempting to measure the marginal productivity of labour in agriculture have misfired, either because the production function was misspecified

or because the labour input in the function was defined as the actual labour time used. If this is done the marginal productivity must turn out to be positive. It is only when the labour input is defined as the entire labour force dependent on agriculture that there is some chance of its marginal productivity turning up as zero in a production function. Most of the production function analyses have shown little awareness of the difference between these two definitions of the labour input although it is critical for testing the hypothesis of zero marginal productivity.

There has been much greater awareness of another critical difference, *viz.*, the difference between labour removable for certain days in the year when farm labour demand hits the seasonal trough and labour removable permanently without significant loss of output.

In the following argument I shall not discuss the productivity criterion further because with the available evidence the existence of zero marginal productivity cannot be proved. The existence of low average and marginal productivity, however, is too obvious to require proof; it is reflected in low incomes; and therefore for the operational purpose of measuring unemployment by statistical surveys the income criterion may be deemed to be a good proxy for the productivity criterion.

Most of the controversy about definitions of unemployment has arisen because of a strong urge to seek, defend or use a single criterion which may be useful for all purposes. But this urge is evidently irrational and unnecessary. We ought, instead, to accept the simple fact that if the necessary data are available, the application of each one of the 3 or 4 criteria can give us 3 or 4 different estimates of unemployment for the same population; the combination of two or more of these will yield many more estimates;[1] and each of these different estimates may have its own utility in the sense that each answers an important but different policy question.

In order to illustrate this truth, I present in Table I, on the basis of data relating to 487 male workers in 4 villages of Rajasthan, all the 7 possible estimates of unemployment based on one or more of the 3 criteria : time, income and willingness. The reference week is the first week of January, 1972. Workers who were gainfully occupied for less than 36 hours in the week are defined as "idle." Workers earning an income of less than Rs. 60 per month are defined as "poor." And workers who are willing to work more in prevailing conditions are defined as "willing."

The poor (33 per cent) are clearly more numerous than the idle (28 per cent); and the idle more numerous than the willing (14 per cent). Since all the poor are not idle and all the idle are not poor, those who are idle as well as poor are fewer (12 per cent) than the idle or the poor. Less than a fifth of the poor and less than a third of the idle are willing to work more.

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1. In general, n criteria will yield (2^n-1) different estimates if one or more criteria are used at a time.

And those who are idle *and* poor *and* willing are only about 5 per cent of the total male working force in these villages.

TABLE I—PROPORTION OF THE UNEMPLOYED AMONG 487 MALE WORKERS IN 4 RAJASTHAN VILLAGES ACCORDING TO DIFFERENT CRITERIA, JANUARY, 1972*

Symbol	Category	Percentage
(I)	Idle	27.72
(P)	Poor	32.62
(W)	Willing	13.96
(IP)	Idle and Poor	12.11
(IW)	Idle and Willing	9.03
(PW)	Poor and Willing	5.95
(IPW)	Idle and Poor and Willing	4.52

* Based on data very kindly provided by Mrs. Kanta Ahuja, Department of Economics, University of Rajasthan, from her field survey material.

If we had similar data for the whole country we could rank the proportions in each of the 7 categories in the national labour force. But in the labour force survey data of the NSS we can only get the proportions of workers in *three* of our categories (I, W, and IW) because figures were collected only according to two criteria: idleness and willingness. If income (or consumption expenditure) data for the sample families in the labour force surveys had also been tabulated along with the data on idleness and willingness, we would have obtained proportions in all the categories of Table I. It is a pity that this was not done.

Averaging the ratios for the 17th, 19th, and 21st Rounds we find that 17.7 per cent of the labour force is idle, that is, wholly unemployed or getting work for 28 hours or less in the reference week; about 12.4 per cent is willing, that is, wholly unemployed, or severely or moderately under-employed *and* available for additional work; and 9.1 per cent is idle and willing, that is, wholly unemployed or severely under-employed *and* available for additional work.[2]

We already know from other analyses of family expenditure data that at least 30 per cent of the population is poor.[3] Thus, once again, with all-India data, we can safely maintain the view that the poor are more numerous than the idle; the idle are more numerous than the willing; and only a fraction of the idle are willing to work more.

2. The derivation of these ratios from the basic NSS data required considerable processing. (See Table II.) Thanks are due to Narain Sinha for help in the processing.
3. Strictly speaking this ratio can be compared with other ratios only if we interpret it to imply that the income of at least 30 per cent of the *labour force* is low and as a result at least 30 per cent of the population has inadequate consumption.

It is, of course, more important to rank the proportions in the different categories for policy purposes than by mere magnitude.

It is clear, first of all, that the elimination of poverty is a much more gigantic undertaking than the elimination of the idleness of those who are available for additional work. Any attempt to identify the two by definition cannot help the policy-makers. Fundamentally, of course, it is poverty that must be eliminated. But the poverty of the employed, the unemployed, the self-employed and the unemployable requires different treatment. The unemployables need simple income transfers; the self-employed (small farmers and artisans) need additional inputs, credit, and knowledge; the employed need more effective unionism; and the unemployed need work and/or means of production.

A comprehensive anti-poverty policy would thus include social assistance schemes, concessional input supply schemes, militant trade unionism and land and property reform, whereas the core of a rural unemployment relief policy would now be a massive rural works programme. Nothing is gained by identifying the two.

Secondly, in a democratic set-up willingness to work more can be regarded as a necessary characteristic of those who are defined as unemployed or under-employed.[4] Of those who are willing to work more the first priority in any unemployment relief policy should obviously be given to those who are below the poverty line and idle as well (IPW), and the next to those who are idle (IW).

The criterion of willingness clearly reduces the magnitude of the relief problem, for only a fraction of the poor and the idle are willing to work more. But on the other hand, questions asked and answered about willingness in field surveys are most likely to be vague and incomplete; and it is possible that the actual offer of employment opportunities in every part of the country will increase the number of the willing, especially if the opportunities match the kind of labour that the idle and the poor can offer.

Finally, if we are forced to choose a single category which approximates most closely to the state of "unemployment," we should choose the category of those who are idle and willing to work more (IW). This view revalidates the basic approach of the NSS labour force surveys in which the time criterion and the willingness criterion were correctly combined in defining the unemployed. With this (IW) definition, 9.1 per cent of the national labour force—9.7 per cent in the rural areas and 5.8 per cent in the urban areas—may be held to be unemployed. This rate, it should be noted, is nearly twice the rates which would cause intense political upheaval in other parts of the world. Applying the average IW ratios of the NSS labour force surveys in the 17th, 19th and 21st Rounds to the estimated 1971 labour force we come up with the approximate numbers of the unemployed shown in Table II.

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4. In a communist state presumably willingness would be irrelevant and all the idle would be required to work.

TABLE II—ESTIMATED UNEMPLOYMENT, INDIA, 1971

Category	Unit	Rural			Urban			India		
		Males	Females	Total	Males	Females	Total	Males	Females	Total
Unemployed	(crores)	0.3616	0.4644	0.8260	0.0758	0.0233	0.0991	0.4374	0.4877	0.9251
	(per cent)	(2.75)	(6.91)	(4.16)	(2.39)	(4.16)	(2.66)	(2.68)	(6.70)	(3.92)
Unemployed plus Under-employed Available for Additional Work	(crores)	1.4662	1.1558	2.6220	—	—	0.3073	—	—	2.9293
	(per cent)	(11.15)	(17.20)	(13.20)			(8.24)			(12.41)
Unemployed plus Severely Under-employed Available for Additional Work	(crores)	0.9928	0.9354	1.9282	—	—	0.2171	—	—	2.1453
	(per cent)	(7.55)	(13.92)	(9.70)			(5.82)			(9.09)

Figures in parentheses are percentages of the estimated labour force in each category. The labour force in each of the four categories—rural males, rural females, urban males and urban females—has been estimated by applying the 1961 Census participation rate of each category to the 1971 Census population of each category. Considering the definitions used, the 1961 Census participation rates are regarded as better than the NSS participation rates or the 1971 Census participation rates. And there are reasons to believe (see text) that the participation rates cannot have fallen during 1961-1971.

In the NSS labour force survey reports, the unemployment ratios are usually given as fractions of the total population, and the under-employment ratios are given as fractions of the employed. These ratios have been converted into fractions of the labour force by dividing the unemployment/population ratio by the participation rate, and by multiplying the under-employment/employment ratio by the employment/labour force ratio.

This procedure can be defended (*a*) because as the Committee of Experts on Unemployment Estimates (1970) noted, the NSS definitions of the unemployed would tend to under-estimate their number (Report, p. 17); (*b*) because the time series of unemployment/population ratios in the NSS data for the 'sixties show no statistically significant trend;[5] and (*c*) because there are macro reasons to believe that the unemployment ratios could not have fallen.

I would earnestly urge that the widespread impression that no meaningful figures of the magnitude of the unemployment problem in India are available has no basis. The numbers in Table II do indicate correctly the minimum order of magnitude of our unemployment problem. Including the wholly unemployed and the severely under-employed available for additional work *nearly 2.15 crores of our workers are unemployed—about 1.93 crores in the rural areas and 22 lakhs in the urban areas.*

It would be extremely helpful if in future surveys of the labour force, we could get the proportions and numbers in all the categories distinguished in Table I, so that the unemployment situation can be monitored from year to year.

It is unfortunate that the rural labour force surveys of the NSS were discontinued after the 17th Round, although in the 18th Round some data were tabulated from the integrated household schedules 16 and 17.

The suspension of these surveys was apparently due to the conclusion reached by some authorities that the data thrown up by these surveys were not useful for policy purposes.

> "It was felt that the concept of unemployment, as the term is generally understood, was not applicable to rural areas and the method of working out equivalent full-time unemployment from partial period of unemployment was arbitrary. It was also felt that the information so derived was of no use for policy purposes." (Committee of Experts, 1970, p. 25.)

The surveys have now been resumed on the recommendation of the Committee of Experts. But it is remarkable that the Committee itself did not consider it worthwhile to present any estimates at all; it merely summarised in the appendices and criticised in the text of its Report whatever data were available. Since the Report of the Committee has accentuated the prevailing feeling that nothing is known about unemployment in the country, and we have taken a different view, it is necessary to consider the Committee's criticism of the NSS data. The criticism is summarised in the following propositions.

First,

> "One may ... question the validity of a measurement of intensity with reference to hours of work." (Committee of Experts, 1970, p. 17.)

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5. The six available ratios for the rural and urban areas have been tested for statistically significant trends.

Second,

"the percentage of unemployed reported in a given NSS round is . . . an average of the varying weekly situations recorded for different periods during the year over which the investigation is spread. There is no reason to believe that those classified as unemployed during the specific reference week preceding the data of survey of a household or households would necessarily be without work throughout the year. The fact that the sample is spread over the entire year does not remove this limitation; it means an aggregation of the weekly situations in regard to the unemployment status of individuals rather than the continuing unemployment of the same set of individuals." . (Committee of Experts, 1970, p. 16.)

Third,[6]

"the use of this 'available for work' criterion without reference to any wage rate is meaningless and the data based on this approach will be a kind of 'hotch potch' aggregate." (Committee of Experts, 1970, p. 37.)

The second criticism needs to be considered first, for it raises the important issue of the information that should be sought. The Committee's statement quoted above and another statement on page 17 of the Report gives the impression that it is important to measure the number of individuals suffering from "continuing" unemployment or those "without work throughout the year." But it is obvious that this is not an important piece of information in a country where very few are regularly unemployed, and irregularity of work availability is the essence of the unemployment problem. Moreover, the only way to get at the number of persons suffering from chronic unemployment in India (in the absence of exhaustive employment exchange reporting) would be to record the labour-time disposition of every worker every week in the year. The cost of obtaining this information on an all-India basis may be simply prohibitive.

But, secondly, it must be realised that the identity of persons who are unemployed or under-employed on a particular date or during a particular week is not important. What is important, say, in the context of a programme to relieve under-employment in India, is the number of persons who would be available for work if it is provided, regardless of their identity and the duration of their unemployment during the year. In a work guarantee programme, for example, if any person who is unemployed on any day can go and work on a project site, the names of persons who report for work (the muster roll) may and will change from day to day, but if we average the daily or weekly muster roll over the year we will get the average daily or weekly unemployment, and if we divide it by the labour force we will get an

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6. This particular criticism has been voiced only by a member of the Committee.

extremely meaningful average rate of unemployment. The NSS procedure gives precisely this kind of information. The quantum of suffering that exists in the form of unemployment, the suffering that is relieved by a works programme, and the cost of such a programme, are directly related to the mean and variance of the average weekly unemployment rate. This "average of the varying weekly situations" is the most important information we need.

The measurement of under-employment by the hours criterion and its conversion into equivalent full-time man-days of unemployment is exactly what we need to compute the cost of a works programme. The cost will be the man-days of under-employment multiplied by the wage-cost plus non-wage cost per man-day.

This information could be "of no use for policy purposes" only if the government had no intention of doing anything about unemployment, in which case all information would be equally useless.

The time criterion, as we have seen, can be combined with other criteria, to generate other useful estimates; but measurement of idleness by the time criterion alone is fundamental and extremely useful.[7]

The NSS did use the "availability for work" criterion also. The criticism that the use of the criterion "without reference to any wage rate" is "meaningless" is, again, very weak. For when a question about "availability for further work" is asked, the investigator as well as the worker naturally and almost unconsciously assume that availability refers to availability at current wages and in prevailing working conditions to which the worker has been accustomed in the recent past. Figures of potential labour supply on this assumption are the best we can hope to get. We cannot possibly expect investigators of an all-India survey to obtain workers' likely responses to a schedule of many alternative hypothetical wages and working conditions. We should note in this connection that availability for work also occurs in the definition of the unemployed almost everywhere; and analysts recognize that the "normal" wage rate serves as a guide to job search; and the "normal" rate is the rate recently earned by the worker or by workers similarly placed. (See USDL, 1968 and Lucas and Rapping, 1969.)

We may conclude, then, that the NSS labour force survey definitions have been basically well-conceived and have yielded valuable data. The Expert Committee's criticism of these definitions does not stand much scru-

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7. The Committee of Experts recommended that the data should be "collected about the number of days on which a person is employed or unemployed during the reference week, without recording the number of hours of work each day." (Committee of Experts, 1970, p. 17.)
   Professor M. L. Dantwala has informed me after I presented this paper that subsequently "in the 25th and 27th Rounds of the NSS, intensity of work performed on each day of the reference week has been measured as one-half or full, according to whether the hours of work were (a) four hours or less, or (b) more than four hours respectively."

tiny; it merely created unnecessary scepticism about what we know about our unemployment situation.[8]

The main improvements which need to be made in the NSS procedure are that (1) the data should be collected and tabulated on the basis of larger regional samples; (2) the number of sub-rounds should be increased and the period of each sub-round synchronized with a definite phase of the annual work cycle of every region; (3) income (or expenditure) data should be collected and tabulated along with data on idleness and willingness about the same sample workers; and (4) idleness and willingness should also be tabulated with more characteristics of the unemployed.

3. THE EXPLANATION OF UNEMPLOYMENT GROWTH

Any strategy for eliminating unemployment must be based on a correct diagnosis of the strange phenomenon of a positive growth of unemployment associated with a positive growth of output which has characterized the Indian experience in the last 20 years. A full explanation of this phenomenon would require an empirical growth model which generates, without excessive error, the path traversed by all the important macro variables in India during the last 20 years, and, in particular, the path of total employment. A macro model is indispensable, for aggregate employment is necessarily determined by and with all other macro magnitudes. I am not aware of any such model with reasonable predictive power formulated so far. But at a highly aggregative level the basic mechanism which can produce positive unemployment growth along with a positive output growth can be easily formulated and understood.

Unemployment is the difference between the labour force (the supply of labour) and employment (the demand for labour). The supply is the product of population and the participation rate and the demand may be treated as the product of the capital stock and labour intensity (or the labour-capital ratio which is the reciprocal of capital intensity). If we make the classical assumption that a proportion is saved out of profit and nothing is saved out of wage-income, the employment growth rate will be the sum of the rate of change of labour intensity and the product of the saving rate and the profit rate. The labour force growth rate will be the sum of the popula-

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8. It is an interesting commentary on public psychology that estimates of the incidence of poverty (exceeding 280 million persons) based on NSS data are widely regarded as authentic but the estimates of the incidence of unemployment based on NSS data (only about 21.5 million persons) are not believed, although the former are subject to many more qualifications on technical grounds and are based on more arbitrary adjustments than the latter.

Having stated that the NSS estimates of unemployment could only "under-estimate the degree of unemployment" (p. 17) the Committee could have computed and presented the low estimate of unemployment of the order of 2.15 crores. But for some unstated reason it didn't.

If the reason was that this number included the unemployed as well as the under-employed, the estimate could have been presented with this clarification.

If the reason was that this number did not represent the continuing unemployment of the same persons, again the estimate could be presented with the clarification that it only indicated the average weekly unemployment rate regardless of the identity of the persons unemployed from week to week.

It will always remain an intellectual mystery that the Expert Committee on Unemployment Estimates (1970) took great pains not to present any estimates !

tion and participation growth rates. And income growth rate will be a function of the wage rate, the saving rate, the profit rate and its rate of change, and labour intensity and its rate of change. For full employment growth (with a constant participation rate) it is necessary that the population growth rate be equal to the employment growth rate. (See Appendix for an algebraic summary of these relationships.)

The most crucial relationship is the one which expresses the employment growth rate as a function of the reinvestment rate, the profit rate and the rate of change of labour intensity, because these rates represent the three fundamental forces which determine employment in a developing economy: (1) the rate of investment, (2) the efficiency (surplus-generating power) of investment, and (3) the embodiment of investment (the rate and pattern of technological change).

It is extremely instructive to examine the employment growth prospects indicated by this relationship when we give realistic ranges of values, derived from recent Indian experience, to the three causal variables. Thus if we assume the profit rate to be 10 per cent per annum, the rate of reinvestment out of profit to be 40—60 per cent and the rate of decline in the labour-capital ratio to be 2—5 per cent per annum,[9] the employment growth rate will be

9. In the case of every ratio we have chosen values which will not under-estimate employment growth but rather indicate maximum feasible employment growth. The values are derived from the following sources.

The ratio of profit (excluding depreciation but including tax provision) to total capital employed in 1500 limited companies in India covering all manufacturing sectors averaged 8.97 per cent during 1966-68. (RBIB, Vol. XXIV, No. 10, October, 1970, p. 1626.) Similar studies for earlier years reveal very little variance in this ratio around a mean value of about 9.4 per cent. (RBIB, Vol. XI, No. 9, September, 1957, Vol. XVI, No. 6, June, 1962, Vol. XXI, No. 12, December, 1967.) The private sector manufacturing companies can be supposed to be earning the highest feasible profit rates in the economy. In the public sector the profit rate has been much lower. Therefore it seems reasonable to assume the rate of profit to be constant at 10 per cent. In view of the facts cited this estimate would not cause an under-estimate of employment growth.

The rate of investment out of profit is approximated by the ratio of profit retained to profit after tax. This ratio averaged 35.3 per cent during 1951-1960 and 37.3 per cent during 1961-1969 in organized manufacturing. (The sources are the same as in the previous paragraph.) For the public sector we find that the ratio of Central Government saving to total Central revenue has averaged 32.2 per cent. (GOI, 1970, p. 13.) This must be the maximum feasible reinvestment rate in the public sector on the implicit assumption that the whole revenue is "profit." In the States, of course, the rate is much lower. These figures suggest that .4 is a good (high) estimate of the reinvestment rate. The reasonableness of this value can also be seen on the basis of the following reasoning.

The ratio of aggregate annual net investment to NNP averaged 6.4, 10.0 and 11.8 per cent in the first three Plans. (K. N. Raj, 1969, p. 12.) And the share of property income in national product had risen to 26 per cent in 1961 and could be 30 per cent in later years. (Chowdhury and Mukherjee, 1971, p. 61.) Therefore even if all investment came out of property income the reinvestment rate could only be 40 per cent.

We have assumed the range of this rate to be 40 to 60 per cent.

The labour-capital ratio in organized manufacturing industries declined by 50.4 per cent over the 12-year period 1946-1951/1958-63, or at an annual rate of about 5 per cent. (Krishna and Mehta, 1968.) The "labour on farm" per rupee of durable assets declined by about 0.5 per cent per year during 1951-1961. (Shukla, 1965.) Giving appropriate weights (see footnote 10), the aggregate labour-capital ratio (in terms of fully employed man-years per rupee) can be assumed to be falling by at least 2 per cent per year.

The recent acceleration of mechanization and capital-intensification in agriculture and construction could only have accentuated the rate of decline in the labour-capital ratio.

We have used these sources only to get approximate indicative ranges of values of the parameters entering our relationships. For more reliable estimates one must await further improvements in the Indian data on investment, employment and profit rates.

as shown in Table III. The working force may be assumed to have been growing at the same rate as population during 1961-1971 (2.3 per cent a year). The table suggests that only with a very low rate of change in the labour-capital ratio (−.02) and a very high rate of reinvestment (.5 or .6) will the employment growth rate exceed the labour force growth rate. With 9 pairs of assumed values of the reinvestment rate and the decline in labour intensity unemployment must grow if labour force growth exceeds 2 per cent.

TABLE III—EMPLOYMENT GROWTH RATE WITH VARYING ASSUMPTIONS

Rate of change of labour intensity	Reinvestment rate		
	.4	.5	.6
	Feasible employment growth		
—.02	.0192	.0290	.0388
—.03	.0088	.0185	.0282
—.04	—.0016	.0080	.0176
—.05	—.0120	—.0025	.0070

The same parameter values are also consistent with a 2 to 4 per cent annual growth in national income.[10]

Thus we can rationally account for our experience of economic development with growing unemployment as the outcome of the very unfavourable values of the major parameters associated with our growth process—the low profit and reinvestment rates and the high rate of decline in labour intensity.

Using our relationships we can also compute the values which each parameter should have for full employment when the values of other parameters are given.[11] The computations are shown in Table IV. If the profit rate is only 10 per cent, we see that the reinvestment rate should rise to 46—79 per cent depending upon the rate of decline in the labour-capital ratio. If the rate of reinvestment is low at 40 per cent then the rate of profit should rise to 11.5—19.7 per cent. And if the rate of profit remains 10 per cent, the decline in the labour-capital ratio should be restricted to 3.3 per cent if the reinvestment rate is 60 per cent, and only 1.4 per cent if the reinvestment rate is 40 per cent.

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10. For calculating income growth we have assumed that the wage rate equals the average annual per capita consumption expenditure in rural India in 1961, Rs. 261.2 (Dandekar, 1971.) The initial labour-capital ratio is computed as the weighted sum of its value in agriculture (.00221) and in industry (.000154) in 1961, the weights being the approximate proportions of capital in agriculture and non-agriculture 0.6 : 0.4. (See Shukla, 1965, p. 116; Krishna and Mehta, 1968; and RBIB, Vol. XVII, No. 1, January, 1963, p. 10.)

11. The labour force growth rate is assumed to be 2.5 per cent, which is a little more than the current rate, in order to allow for the absorption of some of the backlog of unemployment.

TABLE IV—PARAMETER VALUES REQUIRED FOR FULL EMPLOYMENT

Given				Required		
Labour force growth rate	Profit rate	Rate of change of labour intensity	Reinvestment rate	Reinvestment rate	Profit rate	Rate of change of labour intensity
.025	.1	—.02	—	.4592	—	—
.025	.1	—.05	—	.7895	—	—
.025	—	—.02	.4	—	.1148	—
.025	—	—.05	.4	—	.1974	—
.025	.1	—	.4	—	—	—.0144
.025	.1	—	.6	—	—	—.0330

Considering the near-constancy of the profit rate and the reinvestment rate, or, what is the same thing, the very slow rise in the aggregate investment rate, the values required for full employment may not be reached for a considerable time. Meanwhile labour force growth may not decelerate and uncontrolled technical change may continue to reduce the labour-capital ratio at the present rate. We cannot therefore predict that growth with present parameters will automatically step up the employment growth rate to the required level within a socially acceptable period of time.

Consider next the relaxation of some of the simplifying assumptions implicit in our computations. The abstraction from depreciation, trade and government activity should not affect the main implications of our employment growth relationship provided that the investment magnitudes used in the relationship are (1) net of depreciation; (2) include private as well as government investment; and (3) include domestic saving as well as the import surplus. The magnitudes we have used already meet these conditions.

The question of disaggregation requires some discussion. The basic issue is whether changes in the composition of output accentuate or reduce the decline in labour intensity due to technical change. There is some *a priori* presumption in favour of the view that the normal pattern of income elasticities of demand for various types of goods and services tends to shift this composition in favour of capital-intensive sectors. Deliberate planning to develop the capital goods and overhead base of the economy has the same effect. And an exercise to decompose employment growth between 1961 and 1965 with the input-output tables for these years clearly showed that the changes in the composition of the final demand vector accounted for a very small part of employment growth; the major explanatory factors were overall growth and technical change. (Krishna, 1972.)

In any case for a macro exercise it is sufficient to note that in India, the labour-capital ratio has, in fact, been falling. This means that changes in demand must have either reinforced or only weakly counteracted the tendency of technical progress to reduce the aggregate labour intensity. Technical progress based simply on a wholesale transfer of capital intensive Western technology must have this consequence. And policies which result in the underpricing of capital and foreign exchange and the overpricing of labour for investment decisions further accelerate the decline in labour intensity.

If this intensity must be assumed to be declining at a certain rate as an empirical fact, then disaggregation will only provide some detail of how it has declined but will not materially change the main conclusion derived above from aggregative relationships.

This is that net technological unemployment would not be eliminated automatically except with a very high and rapidly rising rate of investment which this country has not been able to achieve so far and may not be able to achieve in the very near future.

We must acknowledge that the stagnation of profit and reinvestment rates (or the national saving rate), due to chronic and apparently incurable structural and managerial inefficiencies, have made nonsense of all the choice-of-technique models on which our planning was premised—models which predicted high growth based on the high and rising surplus rates created by advanced techniques. The advanced techniques were duly installed, but high and rising surpluses sufficient to offset the initial negative employment effects of these techniques never materialized. And the country skidded into an unemployment trap in spite of positive income growth.

4. EMPLOYMENT POLICY

The policy implications of our diagnosis can be easily derived. Policy-makers must try to influence all the 4 major variables which determine employment growth : the population growth rate and the participation rate on the supply side and the rate of investment and technical change on the demand side.

There is no need for further comment on the need to reduce the birth rate because this need is already universally recognized. We should only note that there is a 15-year lag between a decline in the birth rate and a decline in the labour force entry rate. The persons who will enter the labour force in the next 15 years have already been born in the last 15 years. And any deceleration of population growth in the next 15 years will ease the employment problem only in the last decade of the century. Therefore the population growth rate is not a relevant variable in the contemplation of an employment strategy for the next three Five-Year Plans.

As regards the trend of the participation rate there is much conflicting evidence. (Visaria, 1970.) We can only surmise, *a priori*, that factors which

tend to increase the participation rate may operate more strongly than factors which reduce it. Factors such as the expansion of female education, the pressure of inflation on the budget of every family, rising expectations about consumption standards and the slow erosion of joint family and kinship ties which supported a high dependency ratio in the past, should be forcing the participation rate upward. The factors which can tend to reduce it would include a change in the age composition of the population in favour of children and old persons, accelerated urbanization which reduces the female participation rate, and the progressive withdrawal of children from the labour force due to the spread of schooling. But it is doubtful whether these factors can offset the strong positive effect of other factors on the participation rate. In any case, whatever be the natural trend of the participation rate it is nearly impossible for a democratic government to restrict entry into the labour force by fiat before or after education. And, therefore, there is little hope of reducing the incidence of unemployment by influencing the participation rate.

The maximization of the investment rate must remain the most important ingredient of employment policy. Economists have made a number of suggestions from time to time about the means of mobilizing additional resources for investment, *e.g.*, mobilization of black money (at least Rs. 7,000 crores according to the Wanchoo Committee); accelerated collection of tax and non-tax arrears due to the governments (at least Rs. 840 crores); taxation of large agricultural incomes and improvements in the taxation of wealth (which can yield Rs. 400 crores a year according to the Raj Committee); nationalisation of unoccupied urban land; improvement of public sector management so as to earn 8 to 10 per cent return on the aggregate investment (which now stands at about Rs. 5,000 crores); recovery of overdue co-operative loans (about Rs. 320 crores); auctioning of non-priority foreign exchange; and open market gold transactions. But the present political power structure does not permit the effective employment of any of these means except the two or three soft ones. Most of the soft options of resource mobilization have already been utilized; and the hard measures which are now necessary seem to be politically infeasible. In fact, a ceiling on the rate of investment appears to have emerged as one of the ceilings which our economy *can* maintain. For the last 6 years the investment/NDP ratio which recorded a peak of 13.4 per cent in 1965 has been declining or stagnating; it has been less than 10 per cent in the last 4 years, although it was projected in the Second and the Third Plans to be 16—18 per cent in 1971.

We can only express the hope that the investment stalemate will end in the next Plan. For without a break-through on the investment front no economist can promise much relief on the employment front. In a poor developing economy investment growth and employment growth are highly complementary.

Measures are also needed to influence the rate and pattern of technological change so that employment growth does not lag behind investment

growth as much as it has done in India. In a large number of sectors where there is no effective choice of techniques, the unique technique has to be used. But in other sectors where current or potential employment is high and uncontrolled technological change threatens a massive net displacement of labour, a policy of distributing growing output optimally between many coexisting techniques will have to be implemented for some time. Such a policy is different from the policy of choosing a single technique. Most of the theorising on the choice of techniques has unfortunately been preoccupied merely with the derivation of an optimal global capital intensity. (This complaint has been voiced by Tinbergen, 1958, and Srinivasan, 1969.) But if reliable investment, employment and output data are available about alternative techniques, models can easily be developed to allocate output optimally between different techniques and to phase out inferior techniques over optimal periods so that cost is minimized and surplus is maximized subject to a capital supply constraint and/or a constraint on the rate of labour displacement. Such a model has been presented elsewhere. (Krishna, 1971.) The use of such models can rationalise our small industry and technology policy.

Two other issues in the area of technological change, more familiar to agricultural economists, need some clarification. It is natural that agricultural economists try to work out the direct as well as the indirect employment effects of given rates and types of technological change in each of the five major operations required in crop production: seed-bed preparation, irrigation, interculture, harvesting and threshing. But much of the work done so far to measure the employment effects of technological change in general, and tractorisation in particular, still remains somewhat unsatisfactory in respect of the methodology adopted. Since technical change in agriculture is highly divisible, disaggregated, heterogeneous, and partly mechanical and partly hydro-bio-chemical, and affects the labour requirements of different processes and crops at varying positive and negative rates, our methodology should be capable of predicting the employment effects of any mixed bag of changes and decomposing the change in the overall labour coefficient per hectare into the separate contribution of each change, so that different changes can be ranked according to their employment effects. And of course, it should be capable of measuring *indirect* as well as *direct* effects.

Two recent exercises illustrate the methodology (a) for measuring the direct separate effect of each technological change or each set of technological changes on the demand for labour per hectare of crop area, and (b) for measuring the four major positive indirect employment effects of technological change and income growth in the farm sector via the growth of (1) final demand for farm output; (2) intermediate demand for farm-produced inputs; (3) final demand for non-farm goods; and (4) input demand for non-farm goods. (Krishna, 1972.)

Exercise (a) with Punjab wheat and rice data showed that the important direct positive employment effects of technological change are the cropping

intensity effect, the crop-mix effect, the irrigation effect and the variety effect. But the total direct negative effects far outweigh the positive effects. Among the negative effects, the threshing effect is dominant, the ploughing and pumping effects are very small.

The all-India input-output exercise showed that the indirect positive employment effects of 5 per cent growth in farm output with technical change would exceed the negative direct effect. The percentage distribution of the additional demand for labour would be :

Direct negative effect	..	—149
Farm final demand effect	..	132
Farm input demand effect	..	43
Non-farm final demand effect	..	42
Non-farm input demand effect	..	32
Total	..	100

Thus there seem to be some solid grounds for the belief that the direct employment effect of many unregulated innovations in the farm sector is negative but the indirect effects are positive and larger. But the most significant result of the last-mentioned exercise is that the overall employment growth rate may still not exceed the labour force growth rate and unemployment can continue to increase.

These exercises also showed up the yawning gaps in available data which do not permit reliable measurements of the direct and indirect employment effects of technological change in agriculture in each region and the country as a whole. We should hope that reliable input-output and labour-output coefficients for each operation, with each technique, for each crop of each region, and the rate of adoption of each innovation will soon be made available by the Directorates of Economics and Statistics and Agro-Economic Centres, so that these effects may be projected with some precision and the ranking of different changes may help the State to regulate their rate of adoption by means of appropriate quantitative regulation or input taxes/subsidies.

5. WORK GUARANTEE AND RURAL WORKS

As soon as we accept the conclusion of section 3 that mere growth of the present type at the present rate will continue to be associated with positive unemployment growth the case for short-run relief to the unemployed becomes unassailable. A society which has failed to reduce the unemployment problem in two decades of development cannot ask its unemployed to wait indefinitely for the utterly uncertain prospect of employment growth catching up with population growth or income growth.

Thus a dualist expenditure programme becomes necessary. The major part of the development expenditure will continue to be invested in the expan-

sion of capacity to meet the anticipated final and intermediate demands generated by the growth of income, but another part has to be directly devoted to a massive work guarantee programme structured in such a way that it also creates durable productive assets.

The government has already announced an allocation of about Rs. 11,000 crores for a minimum needs-cum-rural works programme for the Fifth Plan period. As an initial allocation it appears to be reasonable, for at a wage rate of Rs. 3 per man-day or Rs. 750 per man-year, an outlay of Rs. 2,200 crores a year can finance the wage-bill of about 2.1 crore man-years. Non-wage costs and leakages would enormously reduce the employment generation potential of this outlay but considering the magnitude of the unemployment problem this outlay should not be less.

The list of activities which a rural works programme should promote is well-known : the provision of schools, health services, homesites, domestic water supply and electricity, and urban renewal under the heading of "minimum needs ;" and land reclamation, minor irrigation, soil conservation, road construction, forestry, animal husbandry, electrification, and agro-industrial and marketing activity under the heading of "productive works."

A working group of the Bhagwati Committee has recently estimated (conservatively) that the first four of the productive activities can absorb 5.92 million man-years (of 273 days each), in the construction phase itself during 1974-79.

The best available labour/outlay coefficients of the construction phase of some of these activities, based on past experience of government schemes, in terms of current prices, would grade them roughly as follows :

Activity	Man-day/Rupee
Road construction	.131
Irrigation	.041
Animal husbandry, forestry and fishery	.016 to .028
Land reclamation and conservation	.016

The different activities under the works programme can be given a roughly similar ranking subject to the limits of feasible expansion of each activity.

From the point of view of continuing employment, irrigation deserves more emphasis than any other single activity, for the extension of irrigation alone increases labour demand per hectare in crop production from a weighted

average of 64 man-days to 115 man-days or about 80 per cent. The feasible coverage of minor irrigation works alone can yield at least 700 million man-days of continuing additional employment from the Fifth Plan onwards. Irrigation, and rural electrification, are also the greatest generators of the indirect demand for labour.

In view of past experience the proposal to pump Rs. 11,000 crores for works in the rural areas evokes the grave anxiety that if the quality of a large number of local projects is as bad as it has been, and the leakage of funds due to corruption is as great as it has been, there may be neither a substantial addition to productive capacity nor a significant income transfer to show for the enormous outlay. Instead of reducing the poverty and idleness of the poorest, it may further enrich the rural oligarchy and bureaucracy, and increase inequity and tension in the countryside. Therefore, two critical requirements of the success of a massive works programme are : a radical restructuring of the district development administration, and a radical politicisation of the under-employed rural proletariat. Strong and well-staffed Project Formulation Bureaus must be established in every district to prepare shelves of technically and economically sound local projects. Recognized private consultancy firms can also be mobilized for this task. And the unemployed, the landless, the crop-sharers and the insecure tenants must be organized into militant unions to demand that project funds and benefits really reach the poorest and are not swallowed by contractors, rich farmers and petty bureaucrats through whom they are channelled. Incidentally, these unions should also demand that land reform laws be implemented within specified periods of time, and that in the distribution of credit and inputs, the small and marginal farmers receive fixed minimum quotas. Without militant rural unionism, laws and policies have not benefited and will not benefit the mass of the rural proletariat. I would even suggest that the Government should subsidize the organization of rural unions—regardless of the nature of the parties who organize them—in proportion to the certified membership of each union.

The work guarantee principle will have to be built into the works programme in one region after another as the capacity to implement large shelves of local projects grows. There are two fundamental ethical reasons in support of the "right to work." First, the existence of unemployment of the order of 9 per cent of the labour force is not a failure of the working class but a failure of society as a whole for which the workers suffer. They must receive compensation for this suffering, along with an opportunity to work with self-respect. Second, if the right to property is constitutionally protected, subject to some restrictions, there is no reason why the right to work should not be similarly protected. Property and work are both desired as durable sources of income; and if one source of income, which the propertied classes have, is protected, there is no reason why the other source of income which the propertyless have is not protected.

A side advantage of a work guarantee scheme is that under such a scheme the unemployed and under-employed will define themselves. In a country like India no statistical survey can measure the number of unemployed persons in a region as meaningfully and correctly as an operative work guarantee scheme. The estimate of unemployment which a work guarantee scheme will throw up will be based simultaneously on the idle-time, minimum income and willingness criteria. For work is guaranteed only for those who report for work for a full day. The wage is slightly less than or equal to the daily wage for unskilled work in the slack season. Under these conditions only the genuinely unemployed would report for work. The work requirement will rule out those who have other sources of income. And the wage rate will rule out those who can earn more in some regular employment.

The foremost economic problem created by a massive works programme will be the extra inflationary pressure generated in the consumption goods market. Anticipating this, the consistency exercise for the allocation of investment between commodity production sectors in the Fifth Plan period will have to be carried out after adding this extra demand to the final bill of goods. If the balance between productive and relief outlay turns out to be unmaintainable their shares in the total may have to be revised. And resource mobilization will have to be progressive and non-inflationary.

If the works programme eventually has the features listed above, the phenomenon of workers not reporting, or very few workers reporting, for work at work sites in some areas, which has puzzled some administrators, can be correctly evaluated. If the projects are sufficiently large in number, widely dispersed, and call for a wide variety of unskilled and skilled capacities which are under-employed—in other words, if they suit the under-employed in respect of timing, location and skill requirements, carry open and changing muster rolls, and pay wages promptly, there is no reason at all why they should not attract them. When all these conditions are fulfilled and no or very little labour is offered, we can confidently, and indeed cheerfully, conclude that the area where it happens over the major part of the year the evil of unemployment (as well as poverty in the sense of a daily consumption below the project wage) has been exorcised. But if the under-employed do not report for work either because there is a close list of those who are eligible to work on the projects (and bribing is necessary to be included in it !) or wage payment is delayed for months; or the work does not suit them in respect of timing, location or the skill required; then the small muster roll only proves that the net advantage of reporting for work is less than the net advantage of not reporting; it does not prove that there is no unemployment. Failure to attract labour *under appropriate conditions* will be the success of the work guarantee programme. In fact such failure should be the aim of the programme.

I should like to conclude this long presentation with the thought that the sincere enforcement of a ceiling on family land and/or wealth may be beyond

the capacity of our present polity; but a regime of guaranteed employment and the enforcement of a floor for family consumption is the least it should try to achieve; and the effort to achieve this minimum is likely to encounter little resistance. The knowledge of the dimensions, causation, and the solutions of our unemployment problem does exist; and in the economy as a whole the natural and financial resources needed to solve the problem do also exist. We have only to muster the will to mobilize the needed resources and operate the needed "systems" with efficiency. With all its limitations, the nation's knowledge system is doing its duty to study and hammer out solutions of the unemployment problem, but the political and administrative systems are not performing as well as they should. And so "between the intention and the act falls the shadow." We can only pray that at least the feeble light of a guaranteed minimum of work and consumption for *all* our people will replace this shadow and the lengthening shadows of poverty it will produce as our population keeps growing towards the one billion level by the end of this century.

APPENDIX

Using the familiar notation : K = capital; L = employment; N = population; Y = national income; w = wage rate; r = profit rate; s = rate of saving out of profit; n = the rate of growth of the labour force; p = participation rate; and m = the labour-capital ratio L/K; we can write :

(1) $\quad L = mK$

(2) $\quad \triangle K = srK$, so that $\triangle K/K = sr$

(3) $\quad Y = wL + rK = (wm + r)K$

It follows that the rate of growth of employment is :

(4) $\quad \triangle L/L = (\triangle m/m) + sr \left[1 + (\triangle m/m) \right]$

The rate of growth of the labour force

(5) $\quad n = (\triangle p/p) + (\triangle N/N) + \dfrac{\triangle p \cdot \triangle N}{pN}$

The rate of growth of income with a given wage rate is :

(6) $\quad \dfrac{\triangle Y}{Y} = sr + \dfrac{w \cdot \triangle m + \triangle r}{wm + r} + \dfrac{sr(\triangle r + w \cdot \triangle m)}{wm + r}$

For full employment growth with a constant p it is necessary that

(7) $\quad n = (\triangle m/m) + sr \left[1 + (\triangle m/m) \right]$

This last condition for full employment can be rewritten in many ways :

(8) $\quad s = \dfrac{(\triangle N/N) - (\triangle m/m)}{r[1 + (\triangle m/m)]}$

(9) $\quad r = \dfrac{(\triangle N/N) - (\triangle m/m)}{s[1 + (\triangle m/m)]}$

(10) $\quad \dfrac{\triangle m}{m} = \dfrac{(\triangle N/N) - sr}{1 + sr}$

Equation (4) above is used for computations in Table III and equations (8), (9), and (10) for computations in Table IV.

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