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FARM MECHANISATION AND EMPLOYMENT IN DEVELOPING COUNTRIES

BY

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FARM MECHANISATION[1] AND EMPLOYMENT IN DEVELOPING COUNTRIES

If we, like the ILO Employment Mission to Kenya, regard the following:-

Low or poverty levels of income obtained by many producers and their families;

Gross inequality of earnings; etc., between town and country and between regions, districts are individuals;

Under-utilisation and low productivity of the labour force;

Frustration of job seekers (mainly the young) unable to obtain the type of work or the remuneration which they think reasonable;

- as aspects of the employment problem of LDCs then, in most cases, successful pursuit of economic growth in LDCs has clearly not solved the employment problem. Indeed successful growth, as conventionally measured, has frequently exacerbated the situation particularly from the income distribution point of view. This has, for example, been well documented in the case of the "Green Revolution" in India and Pakistan and mechanisation of agriculture in some Latin American countries.

Resolving the purely economic problem has been seen to be inadequate and this has led to a re-ranking of development objectives. In particular some countries are now giving priority to strategies which attempt to deal with one or more aspects of the employment problem. In this context, the criteria for mechanisation at the farm level can no longer relate to the exclusive objectives of increasing farm output and incomes. The effects of income increasing innovations on rural income distribution and on employment can no longer be disregarded. On economic development and social welfare grounds, that is, private benefits arising from mechanisation cannot be encouraged at the cost of increasing income inequalities and unemployment.

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1. In this paper relating only to the use of tractors on small holdings.

Multi-objectives of mechanisation

Viewed from the long term the process of development must involve the substitution of mechanical power for human and animal effort; this would appear essential to the achievement of a sustained increase in real per capita incomes. But it is the immediate and short-term consequences of farm mechanisation that are of predominant importance to the welfare of the LDCs. Here, it is not simply a matter of considering the economics of mechanisation, at the farm level, but also its impact on social and political structures and on the distribution of economic power. It is evident that the consequences of mechanisation do not stop at the farm gate; they extend into the social and political fabric of society and also raise the problem of technology transfer from rich to poor countries. The short-term question of mechanisation is, therefore, how fast should it proceed and what form should it take? And this implies that policies relating to mechanisation should be selective and, in each situation, be aware of the consequences, not only on the level of incomes but also on the distribution of incomes and employment.

The key issue for consideration is "the paradox of mechanisation", a phrase attributed to Bell and relating to the "replacement of increasingly abundant workers by increasingly costly machines". The recent effects of this have been to increase rural income inequality and unemployment and, in the absence of specifically designed policies, these effects have deprived small farmers (partly or wholly) of any economic benefits of mechanisation. Inequality is involved at the micro and macro level. At the micro level, tractors represent a very large, lumpy investment and, as loans are commonly advanced against collateral, their purchase is far beyond the capacity of small peasant farmers. Hence, technical and credit constraints associated with mechanisation investment work in favour of large farmers and increase the skewed distribution of farm incomes. At the macro level, the scale economies which bias mechanisation in favour of the larger

farmers mean that increased market supplies come principally from this source. Over time, these increased supplies tend to lower market prices so that in terms of aggregate supply, small farmers are likely to be absolutely worse off in income terms, as a result of mechanisation bias in favour of big farmers.

The bias of mechanisation in favour of the larger farmers also gives rise to the possibility of increasing rural unemployment where landlords reduce the size of the tenant holdings or where they evict, altogether, share croppers and other tenants. And, of course, the more obvious substitution of capital for labour in farming operations will frequently result in a reduction of the labour force on the large, mechanised farms. This could, to some extent, be offset where tractors are a land-releasing innovation; that is, where oxen were previously the main source of motive power.

On the other side, there is the "dilemma of mechanisation", the need to reduce the physical toil and drudgery of agricultural work which is the main feature of peasant agriculture. It is one of the causes of the drift from agriculture to the towns, particularly among young people and school leavers. A policy of making agriculture more attractive to youth, thereby reducing rural/urban migration, must provide more attractive incomes and less physical toil.

Recorded experience of mechanisation

Although in the last decade or so mechanisation of agriculture has proceeded at a rapid pace in some countries, implying existence of private net benefits accruing from this innovation, few studies have attempted to measure the externalities mechanisation has created, in the form of increasing disparity of rural incomes and rural unemployment. Exceptions to this relate to some recent studies of mechni sation in Latin America and in South Asia. In Latin America,

Abercrombie has clearly shown that mechanisation has created substantial rural unemployment and increased rural income inequality.[2] He estimates that three workers are displaced by each tractor in Chile and about four workers in Colombia and Guatemala. Overall, he estimates that, on a very conservative basis, "a total of approximately 2.5 million jobs have been displaced by tractors at present in use in Latin American agriculture". He also shows that labour displacement increased from mechanisation as the size of farm increases and that continued mechanisation will have similar employment destroying effects.

The process of increasing farm income inequality and unemployment as a consequence of rapid, large farm mechanisation, has been well documented by Gotsch in the case of Pakistan.[3] He clearly shows the substantial inequality of income induced by mechanisation and arising largely from unequal land tenure arrangements of that country. The employment effects are, however, not so clear cut. These vary significantly between the different regions and indeed between different studies of the same area. His linear programming results relating to the Punjab indicate that in the absence of tube wells, mechanisation leads to a 30% decline in labour input whereas a 25% increase of labour input arises when supplementary water is available.

In Africa, where communal ownership of land and owner occupying small holders prevail, mechanisation has proceeded relatively slowly with little marked effect on income distribution and employment. And whilst a faster rate of mechanisation would undoubtedly give rise to some degree of increase in income disparity and labour displacement, there the problem is, given its firmly based uni-modal farm structure, one of identifying situations where the use of tractors is economic. There is, moreover, a need to evaluate the forms of mechanisation which are appropriate to its small holder structure.

The best of both worlds

It must also be recorded that there are cases where mechanisation increases both income and employment. This can arise where mechanisation releases labour for profitable employment elsewhere; either outside the agricultural sector or, within the agricultural sector, - where cultivable land is available, where it gives rise to more labour-intensive farming systems, where it makes double cropping possible, where it is land releasing (displaces oxen) and where it is land augmenting, (in combination with HYV crops). Several recent studies have identified such situations:-

a) Inukai's study of rice farmers in Thailand where the use of tractors allows the transplanting rather than the broadcasting of rice which increases incomes and employment[5];

b) Gotsch's study of Pakistan, where his linear programming exercises indicate that mechanisation could be economic, and at the same time, increase employment when mechanisation was used in farming systems which included HYV and tubewell irrigation;[3]

c) Clayton's linear programming study of smallholder farming in the Central Province of Kenya where the mechanisation of family farms, in the coffee and pyrenthrum ecological zones, could increase farm incomes and employment;[6]

d) The study by D. Forbes-Watt who noted that mechanised cotton cultivation in Lango District, Uganda is economic and employment generating "therefore, by releasing labour normally used for cotton land preparation, tractor hire enables farmers to use this freed labour to cultivate more millet. In turn, this enables them to brew more beer and thus hire more labour to intensively cultivate (and harvest) the larger cotton crop".[7]

It is clearly important to identify situations (such as those quoted above) where mechanisation can increase both income and employment. This implies an urgent need for studies to be undertaken

to estimate the economic, income distribution and employment effects of mechanisation. Above all, it emphasizes the need for policies of selective mechanisation - selective in the sense of encouraging mechanisation not only when it is income increasing but also when it is either employment neutral or, preferably, employment generating and when it does not increase rural income disparity.

Income trade-offs and mechanisation

As I say, there are many situations where the mechanisation of agriculture is profitable in terms of private benefits but unprofitable or undesirable in social terms. Since the role of agriculture in LDCs is no longer considered to be one of supplying labour to industry but rather, at their current levels of population growth, that of retaining the rural population in the countryside and acting as major employer of the working population, the debate in general is no longer whether or when farm mechanisation is economic (except in the African or similar contexts) but how best to slow down the rate of mechanisation whenever it is a threat to employment. Slowing down the rate of mechanisation implies policies of selective mechanisation and the use of appropriate technologies which, in some cases, will involve the continued use of hand labour.

In any event, the application of policies of selective mechanisation in the sense it is used here, could well give rise to the possibilities of a trade-off situation, when additional growth might have to be sacrificed to achieve more employment, a more equitable income distribution and a more stable socio-political structure. The justification for embarking upon a trade-off between income and other objectives is that social progress is no less important than economic progress; that is, development must embrace both these ideals. In this

context, employment is regarded not as a cost but as a benefit. This whole area of discussion has, however, to be treated with discretion. Just as a strategy aimed at all-out economic growth can involve unacceptable levels of trade-off in terms of increased unemployment, a widening of income disparities and increased political tensions, so a strategy giving exaggerated emphasis to employment generation might well lead to unacceptable levels of trade-off in terms of income. Nevertheless, at this point in time, the conventional wisdom of development must be reconsidered and mechanisation strategies adopted which come to Terms with the possibilities of trade-offs.

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