

BHAGAVAN M.R.: A Critique of Appropriate Technology for Underdeveloped Countries. Research Report No. 4 Scandinavian Institute of African Studies Uppsala. 1979.

Bhagavan's report is in two chapters. Chapter one is essentially a critique of the OECD, World Bank and USAID approaches to the question of appropriate technology for developing countries. In Chapter two the author critically reviews the choice of techniques arguments in manufacturing. Here the author takes a close and critical look at the book published recently by the ILO on this subject (A.S. Bhalla ed Technology and Employment in Industry. Geneva 1975).

In chapter one the author summarises the OECD, World Bank and USAID approaches. The author presents the views of these organizations on issues like drawbacks of modern technology, definitions of other technologies, the innovation system and promotion of appropriate technology.

The author criticizes the OECD, World Bank and USAID premise that the underdeveloped countries (UDCs) cannot, within the foreseeable future, increase the size of their modern industrial sectors to meet the development requirements of their entire populations. This premise, the author argues, collapses where structural changes and mobilization of labour for building capital projects take place, and where the internal and external political situations have changed dramatically leading to revolutionary regimes which have altered the structure of their economies in favour of the masses (e.g. China, North Korea, Vietnam, Cuba, Mozambique, Angola).

The argument that use of capital intensive techniques causes unemployment in urban areas is criticized by the author on the grounds that the principal cause of migration of the rural population to urban areas is the breakdown of agricultural production and agrarian system. The solution, it is argued, lies in the pursuance of a strategy of high rates of growth in industrial and agricultural production geared to mass consumption and producer goods. The author does not elaborate on the requirements of such a strategy neither does he specify that the implementation of such a strategy is only possible under specific social and political systems.

Contrary to the other approaches, the author argues that modern technology and modern industry have stimulated rather than inhibited the awareness of the need to innovate locally. While I think this is correct, it does not seem to be sufficient ground to reject the argument that imported modern technologies contribute to inhibiting the local innovative capacity. Whether modern technology inhibits or stimulates local innovations depends on the type of modern technology chosen and the sector into which it is used and the local technologies existing and operating in the sector. It does not seem legitimate to make universal conclusive statements on this issue. I have argued elsewhere

(Wangwe 1980) that policies about choice of technology, trade, manpower development and choice of industrial activities can greatly influence the outcome of the relationship between modern technology and the local innovative capacity.

In the petty commodity production mode (the informal sector), the author argues, meaningful innovations have to be based mainly on the mobilization of labour. Organization of collective labour at the small community level is identified by the author as the prime software that will be required. The author cautions that these should be initiated and led by members of the local community with maximum participation and minimum coercion. The function of appropriate technology groups as the OECD stipulate should not be to spread technically detailed information about hardware but this function should not extend to software, the author concedes to this.

The author proceeds to argue that the fact that the approaches (OECD, World Bank and USAID) attribute to the innovation process an inherent non-egalitarian impact is a reflection of their failure to see that the non-egalitarian impact of innovation arises from the class nature of society. What the author fails to see is the interdependence between technology and inequality in society. While the class structure in society leads to the non-egalitarian impact of the innovative process the latter may reinforce non-egalitarian tendencies in society.

On the domestic skills the author rightly disagrees with the blanket fashion argument that more modern industries cannot be set up in UDCs because of present lack of sufficient numbers of skilled workers. While quantity and quality of available manpower should be taken into account in making technological decisions it is important to realize that manpower training and manpower planning in general cannot be divorced from technological considerations either.

The author tackles the important question of who benefits from appropriate technology. He argues that appropriate technology cannot benefit the poor under the present political-economic configurations in non-socialist UDCs. Appropriate technology, he concludes, will benefit innovators in the petty commodity production mode, the established and emerging small capitalists in agriculture and industry and perhaps most of all the business firms in North America, Western Europe and Japan. I find it improper to pose the question of who will benefit from appropriate technology independent of the political and social-economic structure of specific countries. This is therefore a question to be tackled country by country and its answer cannot be sought in the blanket fashion.

In chapter two the author critically reviews the choice of techniques arguments in manufacturing. The author specifically raises critical points on the recent book published by the ILO on this topic (Bhalla 1975). He questions the method, the assumptions and the models used in the book in the choice of techniques calculations and proceeds to discuss the results of the case studies presented in the book.

The author criticizes the method used for being based on neo-classical economic theory where profitability is judged via economic efficiency and where calculation of

economic efficiency use only capital and labour.

The author points out that the ILO study makes some assumptions which are so unrealistic that it is legitimate to reject calculations based on them. Problems in measurement of capital and labour are discussed. The neglect of capital intensity in the intermediate products industries and the effect of monopoly on value added figures render the calculations of little use. The author then proceeds to summarize the results of the case studies presented in the ILO study. The author argues that the choices implied by results of the case studies in the ILO study diverge from the choice actually made by firms and governments precisely because of weakness in the method, assumptions and models used.

The thrust of the critique of the ILO book by the author is based on the "method, assumptions and models" used. In my opinion the contributors to the book do not appear to use a common model in their analysis; at least not all of them rely entirely on the neoclassical model. The neoclassical approach focuses on capital and labour and their factor prices as if that is all that matters in choice of technology. The empirical case studies (in the ILO study) on copper and aluminium, textiles, sugar processing, cement blocks show clearly the significance of the price and quality of raw material inputs. Contrary to the author's view that the ILO study ignores working capital and heterogeneity of labour the case study on sugar processing demonstrates the significance of working capital while the case study on can manufacture demonstrates the significance of different qualities of labour. Contrary to the neoclassical tradition, the role of the product-mix or product quality has been shown in the case of cement blocks, can making and sugar processing. Contrary to the assertion that the studies on the choice of technology assume perfect competition it is clear from studies on second-hand equipment, can making and Colombian engineering industry that different market structures influence choice of technology. On the whole the author rightly points out that the neo-classical model is an inadequate tool for the analysis of choice of technology. The author, however, may mislead the reader by giving the impression that the current arguments on choice of techniques in manufacturing industry are represented wholly in the neoclassical tradition. It is more proper to regard the neoclassical choice of techniques arguments as one set of arguments within the more broad debate on this issue. Clearly, in some respects as shown above, even the ILO study goes beyond the realms of neoclassical economic theory.

S. M. Wangwe

REFERENCES

1. Bhalla, A.S. (ed) *Technology and Employment in Industry* Geneva 1975.
2. Stewart, F. *Technology and underdevelopment* MacMillan 1977
3. Wangwe, S.M. *Capacity utilization and Capacity creation in manufacturing with special reference to the engineering sector*. Unpublished Ph.D. thesis. University of Dar es Salaam, 1980.