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THE GREEN REVOLUTION

By

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The term 'Green Revolution' refers to the adoption in the mid 1960s of the new high yielding varieties (HYV) of food grains. The Green Revolution technology enabled a three-fold increase in the output of food grains between 1967 to 1992[1], thereby accelerating economic growth during the period[2]. The most important feature of the new technology was that it required the *timely* application of a *combination* of HYV seeds, chemical fertilizers and irrigation water[3]. This meant that rich farmers who had the financial capability to ensure the right quantities of the input package and its timely application could achieve greater cropping intensity and higher yields per acre compared to poorer farmers. In the context of Pakistan's agrarian structure, this was to have profound economic, social and ecological consequences. Thus the new technology not only affected the *rate* of economic growth by specifying a new relationship between inputs and outputs, but also affected the *nature* of economic growth by changing the

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1 Shahid Javed Burki, Pakistan: Fifty Years of Nationhood, Vanguard Books, 1999, Lahore. Page-123.

2 Slow growth of agriculture output during the 1950s became the principal constraint to sustaining overall GDP growth. Agriculture products were the major source of foreign exchange earnings at the time; this combined with rising food import bills built up balance of payments pressures leading to a relatively slow GDP growth during the 1950s. See, Akmal Hussain, Pakistan: Land Reforms Reconsidered, in Hamza Alavi and John Harriss (ed.), South Asia, Macmillan, London, 1989. Page 59.

3 Leslie Nulty, The Green Revolution in West Pakistan, Implications of Technological Change, Preager Publishers, New York, 1972.

relationship between social groups, the distribution of income and the ecological environment.

The Green Revolution technology itself was scale neutral, yet it increased economic and social inequality because it was adopted within an agrarian structure characterized by a highly unequal distribution of land ownership and wide spread prevalence of tenancy. The large land owners attracted by the high profitability made possible by the HYV technology, tended to resume their formerly rented out land for cultivation themselves on large farms with tractors[4]. This land resumption resulted in a polarization in the size distribution of farms together with increased landlessness of the poor peasants. The percentage share of both large farms (over 150 acres), and small sized farms (less than 7.5 acres) increased while that of lower medium sized farms (7.5 to 25 acres) decreased. The reason was that the land resumption hit medium sized farms relatively more than small sized farms[5]. The phenomenon of polarization was accompanied by growing landlessness amongst the poor peasantry following tenant eviction associated with land resumption. The evidence shows that during the period 1961 to 1973 as many as 794,042 peasants entered the category of wage labourers, which constituted 43 percent of the total agricultural labourers in Pakistan[6].

Following the Green Revolution, as landowners began to resume rented out land to operate their own farms with hired labour and capital investment, the growth of capitalist farming was accelerated. However instead of being accompanied by a growing independence of the poor peasantry (as in Europe), in Pakistan, capitalism in agriculture was accompanied by increased social and economic dependence of the poor peasants on the land owners. This is because the emerging market was mediated by the persistent

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4 The nature and implications of this phenomenon were first examined in a doctoral thesis: Akmal Hussain, The Impact of Agriculture Growth on the Agrarian Structure of Pakistan with special reference to the Punjab province: 1960 to 1978, University of Sussex, D.Phil thesis, September 1980.

5 Akmal Hussain, Pakistan: Land Reforms Reconsidered, in Hamza Alavi and John Harriss (ed.), South Asia, Macmillan, London, 1989. Page 65. For details of the polarization and landlessness phenomenon, see, Akmal Hussain, D.Phil. thesis, op.cit. Chapter 3.

6 Akmal Hussain, Strategic Issues in Pakistan's Economic Policy, Progressive Publishers, Lahore, 1988. Page 187.

social and political powers of the landlords. The local institutions for the development of agriculture inputs and for the sale of output are heavily influenced by the big landlords. Consequently, the poor peasants in order to acquire inputs, credit and even the rental of tube-well water often depend on the landlord. This means for the landlords increased leverage and for the peasants intensified dependence. Recent evidence suggests that as many as 38.5 percent of poor peasants are obliged to work on the landlord's farm without a wage and poor peasants lose as much as one third of their income due to asymmetric markets and power structures at the local level[7].

Apart from increasing interpersonal income inequality the Green Revolution in Pakistan also accentuated regional economic disparities. This is because the yield increase associated with the adoption of HYV seeds required irrigation, and since the Punjab and Sindh had a relatively larger proportion of their area under irrigation, they experienced much faster growth in their incomes compared to Baluchistan and the Northwest Frontier Province. For the same reason the intra provincial regional income disparities between the irrigated and non-irrigated districts also increased[8].

The new HYV seeds were built on the displacement of genetic diversity and were not well adapted to the microbiology of local soils[9]. Consequently they were more subject to pest attacks compared to the traditional varieties, thereby inducing increased pesticide use. Similarly the absence of adequate soil testing facilities at the farm level meant that the particular dosage of fertilizers used by the farmer (DAP and Urea) was often not congruent with the nutrient requirements of the soil[10]. The use of often improper pesticides, chemical fertilizers and over use of top soil and associated humus loss has

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7 See, UNDP-Pakistan National Human Development Report, 2003, Oxford University Press, Karachi, 2003. Pages 60 to 63.

8 Naved Hamid and Akmal Hussain, Regional Inequalities and Capitalist Development, Pakistan Economic and Social Review, Autumn 1974.

9 Vandana Shiva, The Violence of the Green Revolution, Zed Press, London, 1991. Page 81.

10 Inspite of increasing applications of chemical fertilizers, there was decreasing soil fertility over time. This was because the new HYV technology involved rapid and continuous removal of micronutrients from the top soil resulting in micronutrient deficiencies in the decade following the Green Revolution. See, Vandana Shiva, op.cit. Page 114.

resulted in increased soil degradation in the decades following the Green Revolution. Recent evidence suggests that soil degradation resulting from improper agricultural practices in the post Green Revolution period is a major factor in the observed decline in the yield response to input use in Pakistan's agriculture[11].

We have suggested that while the HYV technology enabled a sharp acceleration in agricultural growth, it was accompanied by social polarization and increased inter personal and inter regional inequality. The sustainability of growth was also constrained by the soil depletion inherent in the biochemistry of the new seeds. The sustainability of agriculture growth in the future would require policy initiatives to establish a new institutional framework for changing the structures of power in favour of the poor, actualizing the yield potential of small farmers, and enabling ecologically rational agricultural practices.

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[11] Derek Byerlee: Agricultural Productivity in Pakistan, Problems and Potential, World Bank Agriculture Sector Review, cited in World Bank Report No. 13092 – PAK.

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