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Agricultural Growth and Rural Poverty Reduction in India by Seema Bathla, Pramod Kumar Joshi and Anjani Kumar, 132 pp., Springer Nature Singapore Pte Ltd. (2020), €114.39

Green revolution transformed the Indian agriculture during 1960s in terms of significant yield improvement and record grain production, achieved with agrarian reforms and public investment towards adoption of high yielding varieties and irrigation development. The benefits, however, have started to fade and new challenges have emerged over time *viz.* uneven performance of agriculture across states, largescale variations in the size of landholdings, non-viability of increasingly smallholdings, moderate private investment, fewer off-farm employment opportunities, price risk and climate risk *etc.* The eastern and few western states could not benefit much from the green revolution on account of moderate public policy support. Public investment has been proven to have positive impact on agricultural productivity and thereby it contributes to reduction in poverty. Prof. Seema Bathla, P. K. Joshi and Anjani Kumar have elucidated these welfare effects of public intervention in Indian agriculture in their book *Agricultural Growth and Rural Poverty Reduction in India.* The authors have well achieved the purpose by clearly emphasising the contributions of social and economic public investments and of private investments to agricultural income and inclusive growth.

The authors have highlighted that the imbalance in sectoral income and employment generation, as evident from the lower share of agriculture in total economic output (14 per cent) relative to the share in total employment (49 per cent), has been the major cause of growing rural-urban and regional divide in the country. Thus, improvement in agriculture sector performance alongside creation of employment opportunities in non-agricultural sectors is necessary for bridging this gap. The performance of Indian agriculture in terms of annual growth has been modest (2-3 per cent) in the past, which moderated from 1996-97 onwards but then rebounded between 2004-05 and 2013-14 (4 per cent) owing to substantial budgetary allocations for agriculture, irrigation and input subsidies, besides increases in minimum support prices. The income

inequality (Gini index) for both per capita agricultural and non-agricultural income increased during 1980s and after some moderation in 1990s, it has increased continuously thereafter, particularly for non-agricultural income. This inequality can be attributed to large inter-state discrepancies in public spending, as shown by higher expenditure towards the rural sector by high income states as compared to low income states. Rural areas have more than 50 per cent contribution to aggregate decline in poverty and therefore, technology adoption and increased investment in agricultural research, extension and development have been observed as crucial factors in poverty reduction. Hence, this book explores the relation between public and private investment in agriculture and assesses the impact on farm productivity, income and poverty alleviation at sub-national level by categorising the states into high, middle and low-income category based on average per capita income during the period 1981-82 to 2013-14.

Chapter 2 explains the context and rationale behind public intervention in agriculture and its welfare effects. Public expenditure impacts the production level and employment in an economy by increasing a person's ability to work, save and invest more. Increased public spending also influences private investment, which then increases the size of the market for manufactured goods and hence production and employment. The justification for public intervention in agriculture arises from economic inefficiencies due to market failure resulting from market imperfections, information asymmetries and externalities. Such inefficiencies often do not allow Pareto-optimal outcomes. Public intervention in rural areas aims to achieve social welfare goals *i.e.* income growth and its equitable distribution as well as poverty reduction. Literature often cites the likely trade-off between efficiency and equity in public expenditure, but it happens only when it is linked with economic growth. The book has underlined the strong synergies between the two while pursuing the goal of poverty reduction.

Chapter 3 analyses the temporal and spatial trends in public expenditure, input subsidies and their outcome. There has been a high correlation between level of economic development and a state government's ability to spend, but investment spending has shown much higher growth during 2000s in low income states than high and medium income states. In spite of higher

investment expenditure by poorer states, they have not been able to reach the level of richer states in terms of productivity, income and poverty reduction. The composition of government expenditure reflects the spending priorities of respective state governments which has been education, irrigation, agriculture and health across three state groups. The composition of expenditure on agriculture across all three state groups shows crop husbandry being the largest receiver of funds followed by forestry, animal husbandry and food storage. Agricultural research and development received much lower funds in all three state groups, contrary to the other developed countries, which is worrisome because of observed decline in productivity growth and also due to the fact that it is not undertaken by private sector in India. Among the major input subsidies, *i.e.* irrigation, power, fertiliser and credit, highest increase was witnessed in fertiliser subsidies per hectare. Here too, inter-state disparities have been observed as average public spending per hectare on total input subsidies was lower in low income states than in middle income states and high-income states. Considering the outcome of public spending, in spite of sizable public expenditure on irrigation, the percentage of irrigated area under canals has been less than 20 per cent across major states, indicating inefficiency in the use of public resources. However, road density has shown significant improvement across the states. But there has been again a dismal situation for per hectare electricity consumption in agriculture in low income states and the number of years of schooling of rural population. Hence, wide inter-state disparities in investments and their outcome undermine many public policy decisions.

Chapter 4 estimates the responsiveness of private capital formation to public capital formation and input subsidies in agriculture to identify the 'crowding in' effect. A perceptible increase in private capital formation has been observed over the study period with largest share of residential plots and buildings which may be an indicative of increasing urbanisation, land fragmentation and shifting of households towards nuclear families. But this increase in the expenditure towards residential plots and buildings has come at the expense of investment in agriculture. The composition of private investment in agriculture and allied activities has been towards agricultural implements, machinery, irrigation sources, transport and livestock. Private investment in agriculture was found to be significantly determined by public

investment in agriculture as well as input subsidy across all states barring the middle-income states. The terms of trade or price incentive has been observed as a major determinant of farmers' investment decision. The price incentives for farmers need to be strengthened to encourage higher investments and thus the adoption of new technology and farming practices. State level analysis showed mixed results, suggesting the need for geographical targeting of public investment with an emphasis on the type of investment and input subsidy that will best compound its influence on private investment.

Chapter 5 presents the empirical results and an assessment of marginal returns from various types of incremental investments and subsidies in low, middle and high-income states. The major factors contributing to poverty reduction in rural areas have been agricultural productivity, remunerative farm prices and non-farm employment with better wages. Relative prices were identified to matter most in high income states followed by non-farm employment. The factors influencing land productivity have been spending on agricultural research and development, fertiliser, irrigation, electricity and labour. Irrigation use has been induced more by private than by public investment in agriculture. Rural non-farm employment and non-farm wages were observed to be enhanced by increase in non-farm income, education and health of workers. The study did not find evidence to support the 'crowding-in' or complementarity relation between private irrigation investment and public expenditure in canal irrigation at the national level, except in middle income states. Coming to marginal returns on various categories of investment in agriculture, higher pay-offs were identified for every ₹ 1 new private investment in well irrigation (₹ 9.51) and public investment in agricultural research and development (₹ 2.47), followed by education (₹ 2.39) and health (₹ 1.83). The marginal impact of various public spending on rural poverty was the highest for rural development, followed by investment in well irrigation, public health, energy and education. Finally, a trade-off though a mild one, observed between efficiency and equity objectives across state groups. Overall, to achieve growth with equity, a differential or location-specific public expenditure policy across states is advocated.

The final chapter draws policy inferences at state level for strategising public investment with the overall goal of accelerating private investment

and meeting future challenges in agriculture, employment generation and rural development. Owing to the significant effect of public spending 'in' (agriculture and irrigation) and 'for' (health, education, roads, rural industry, telecommunication) agriculture on agricultural income, more resources should be allocated towards economic services. An increase in public investment *i.e.* well targeted beyond canal irrigation commensurate with farmers' changing investment portfolio would strengthen the complementarity between public and private investment. This would be again supplemented by making available minor and micro irrigation systems and favourable credit policy in rural areas. The observed spatially heterogeneous effect of input subsidies suggest that these should be redirected towards less favourable areas to enable farmers to increase input uses and facilitate asset creation. The book has also delved into the question of bringing efficiency in the distribution of input subsidies to farmers while maintaining sustainable use of natural resources.

The book's strength lies in addressing some crucial concerns like whether there is a crowding in or crowding out of private investment by farm households in response to public investment, the impact of investments and input subsidies on agricultural income and poverty alleviation and identifying the nexus between efficiency and welfare objective of public investment. Overall, the book benefits the readers to understand several key issues in the farm sector, the complex interaction between various forms of public policy interventions and outcomes, and different ways to enhance the contribution of public policy to poverty reduction in rural areas.

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