



Research Paper

Agri-environment growth for inclusive in India

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ABSTRACT

Agriculture plays a major role in economic growth and development. As the provider of food it is a cornerstone of human existence. As a furnisher of industrial raw materials it is an important contributor to economic activity in other sectors of the economy. Agriculture is a substantial user of natural resources, particularly land and water. Its activities have a major impact on the availability of these resources and their quality. As an industry founded on biology, agriculture has a major impact on ecosystems and on non-agricultural plants and animals, particularly in terms of biodiversity. As with most forms of human activity, agricultural activities can have negative environmental impacts (generate negative environmental externalities) manifested in soil degradation and erosion, air and water pollution, and loss of biodiversity. However, in contrast to many other forms of economic activity, agriculture can also generate positive externalities as reflected in the creation and maintenance of attractive landscapes, and contributing to the management of water supplies and maintenance of wildlife habitat. Given the above context, this study made an attempt to briefly review the contribution of agriculture to economic growth and environmental quality. It explores the possible solutions to boost up agricultural inclusive growth through technological innovations and further argued for sustainable natural resources management as well as supply chains system. It highlights the importance of gender issues in agriculture and financial inclusion. Finally, it is concluded that technological interventions combined with appropriate institutional innovations to strengthen farm delivery system and improve the distribution of growth benefits, where environmentally sustainable principles are being ensured. A descriptive methodology is followed.

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INTRODUCTION

The contribution of agriculture to economic growth and environmental quality

Agriculture plays a major role in economic growth and development. As the provider of food it is a cornerstone of human existence. As a furnisher of industrial raw materials it is an important contributor to economic activity in other sectors of the economy. Agriculture is a substantial user of natural resources, particularly land and water. Its activities have a major impact on the availability of these resources and their quality. As an industry founded on biology, agriculture has a major impact on ecosystems and on non-agricultural plants and animals, particularly in terms of biodiversity. As with most forms of human activity, agricultural activities can have negative environmental impacts (generate negative environmental externalities)

manifested in soil degradation and erosion, air and water pollution, and loss of biodiversity. However, in contrast to many other forms of economic activity, agriculture can also generate positive externalities as reflected in the creation and maintenance of attractive landscapes, and contributing to the management of water supplies and maintenance of wildlife habitat.

Agriculture's role in economic growth

Agriculture has played and continues to play a key role in global economic development. Pre-industrial economies

Table1: Annual growth rates in agricultural GDP, 1999/2000 to 2008/09.

Commodity groups	Growth rate (%)
All India	3.23
Cereals	1.65
Pulses	1.74
Oilseeds	4.63
Fruits and vegetables	2.77
Livestock	4.59
Fishery	4.30

Note: Growth rates are excluding abnormal year of 2002-03

were characterized by a large share of the economically active population engaged in an agricultural sector characterized by low labor productivity. The presence of surplus labour in agriculture was identified by Lewis (1955) as a pre-condition for growth in the rest of the economy. Lewis argued that the agricultural sector provides a source of labor (and capital) that can be redirected into other areas of the economy to fuel the expansion of output in those sectors. The exit of labour from US agriculture to more productive non-agricultural uses in the period after the Second World War has for example been identified as a major contributor to the high rate of economic growth experienced in the United States until the early 1970s (Denison, 1985). The key role played by increased agricultural productivity in economic growth in Japan (Ōkawa and Rosovsky, 1960 and 1973) and in Europe (Johnson, 1997) has also been documented. The Indian economy has been growing at an impressive rate of seven percent per annum during the last decade or so, while the agricultural sector has been maintaining a growth rate just above three percent during this period. This coupled with high dependence of the population on agriculture resulted in the widening of rural-urban income disparity. It is therefore necessary that Indian agriculture must grow faster for an inclusive economic growth. In order to accelerate and sustain agricultural growth, the ecological foundations (land, water, genetic resources, etc) should be strengthened and higher investment both from public and private sources should be encouraged. Also, necessary reforms to ensure participation of disadvantaged regions and groups in the growth process should be intensified. This brief discusses these issues and underscores the need for the ever green revolution with the right mix of technological, institutional and policy options.

Agricultural growth

The current agricultural growth rate of more than 3% is not disappointing but this should be seen in terms of economic viability of small farmers and high incidence of rural poverty in some parts of the country. For example, small farmers occupy 60-80% of the land in the eastern region

and the incidence of poverty ranges from 28-46% in this region. Therefore, agriculture sector must grow to increase farm income and reduce rural poverty. The experience of East Asian countries shows that higher growth can be realized in smallholder agriculture but there should be rapid transfer of people from agriculture to industrial or rural non-farm sector. In India, when employment elasticity is low in agriculture, the growth of non-farm sector becomes critical and this again depends on agricultural growth and rural infrastructure. There are three major growth trends in Indian agriculture. The first trend relates to higher growth rates of coarse cereals, particularly maize, oilseeds and cotton in recent period. The growth in maize and cotton is primarily technology driven. In oilseeds, area expansion, price incentive and better seed varieties were responsible for yield growth. The second major welcome trend is impressive agricultural growth in some states like Gujarat where institutional reforms to expand irrigation and transfer of technology were the major contributing factors (Shah et al., 2009). The third major trend has been the rapid growth of high value commodities like fruits, vegetables, livestock and fisheries. Price incentives mainly because of rising demand and strong market linkages prompted farmers to diversify towards these commodities. This was accompanied by supply-side factors like improved availability of seed and other planting material. The evidence indicates that these sectors will continue to grow faster and therefore, will compete for area with food grains. Thus, there is a need for raising productivity of food grains so as to release area for the high value commodities, and this will require better technologies and input delivery system in newer regions like eastern India. Table 1 shows the annual growth rates in agricultural GDP (1999/2000 to 2008/09)

Innovation system

Since much of the hope for increase in agricultural productivity is pinned on technological innovations, it is imperative to strengthen the innovation system. The first and foremost requirement for this is enhancing public investment for agricultural R&D. The annual growth in the

Table 2: Trends in public investment in agricultural research (2004-05 prices).

Indicator	1991	2001	2009
Public investment (Rs crore)	1,5997	2,472	3,376
Public investment as percentage of AgGDP	0.45	0.47	0.61
Investment per hectare of agricultural land	118	174	240

Note: Investment intensity data are triennium averages ending in the year indicated in the column.

public investment has slowed down from close to 6% in 1990s to 3% during the last decade. The investment intensity, that is, public investment as a percentage of agricultural gross domestic product (AgGDP), is nearly 0.6% for research and nearly 0.2% for extension. This is far less not only in terms of the investment made by other countries including China and Brazil, but also much lower considering the increase in capital-intensity of R&D. Private investment though growing fast, still remains at the periphery in terms of its overall share (15%) in the total investment. Biotechnology research, which is attracting more private investment, is concentrated in pharmaceutical, and agri-biotech commands only 14% of the total turnover. In order to attract private investment and to foster partnership with the public sector, an institutional mechanism for cost and benefit sharing in the framework of intellectual property rights is evolving. In the new IPR mechanisms, benefits are shared with the innovator, whilst protecting the rights of farmers and local communities. Although the institutional mechanism is in place, the actors are learning to use this regime to realize their objectives. The bottom-line shall be determined by the cost-effectiveness and the credibility of the IPR mechanisms and capacity of the participating institutions (Pal et al., 2007). Table 2 shows the trends in public investment in agricultural research with 2004-05 prices.

Sustainable natural resources management

Sustainable use of natural resources, enhancement of ecosystem services like reduction in green house gases and building resilience to climate change are essential for sustainable agricultural growth. These sustainability issues are more serious in fragile and rain fed regions therefore very important for inclusive growth. Technological options promoting conservation and efficient use of natural resources and institutional reforms to improve incentives for adoption of environment-friendly farm practices can contribute to sustainable production systems. Institutional reforms should also promote incentives for cooperative solutions for common property resources. These solutions should be based on collective learning and involve low transaction cost for their implementation. Management of irrigation water resources is a classical example and institutional reforms directed to improve the efficiency of surface irrigation can reduce the pressure on groundwater resources

and therefore, could promote conjunctive use of surface and groundwater. It is found that good governance, clarity of objectives, appropriate scale (size and scope), compliance with rules, and use of powers are also positively associated with the performance. The management expertise and adaptability to local conditions also affect the distribution of benefits especially among the rural poor. There is an increasing awareness about ecosystem and environmental services and the vulnerability of Indian agriculture to climate change. Ecosystem services and farm income are adversely affected by erratic and extreme weather events, which are found to be of higher magnitude in semi-arid regions. These regions have become more vulnerable to climate change because of their greater exposure and sensitivity to climate change, especially temperature and rainfall, and the limited adaptive capacity of the farmers. The expected loss of productivity and income may be up to 10% (IPCC 2007). Therefore, building resilience of agriculture through appropriate technological and policy interventions, risk management and information systems should be accorded high priority.

Accelerating of agricultural value chains

Agricultural market reforms are directed to promote innovations for the creation and distribution of value along the supply chains. In the process, supply chains are getting shorter by the elimination of those intermediaries which do not add any value. Therefore, these innovations reduce the cost, link production with consumption and improve the overall efficiency. In the process, some of the inefficient chains and processes are being replaced by better ones. For the viability of innovative business models three things are important: a) market information flows backward to the farmers, b) desirability of having farmers as partners in venture capital for increasing their share, and c) good business model with adequate institutional and technological support. One of the important concerns is to serve small holders who now occupy more than 40% of agricultural lands. There are a few examples which suggest the possibility of inclusion of small holders. A viable business model should meet the requirements of amenable to scaling up, financial sustainability and better economic efficiency.

Gender issues in agriculture

Mainstreaming gender issues in agriculture development is essential for inclusive growth as it affects a large section of rural population. On efficiency grounds also, any exclusion of

rural women will adversely affect child health and education, which in turn have far-reaching effect on labor productivity and economic growth. The options often discussed for social and economic empowerment of women are: increasing women's access and control over productive assets like land; entrepreneurship and skill development; education and legal provisions for their representation in development programs. Efforts are being made on these lines but the progress is rather mixed. The Hindu Succession Act (2005) giving property rights to daughters has been implemented with great variability from state to state, and social traditions still have more say in the rights and control of land. Even the tradition of daughter's right in parental property in southern India has also become weak. Therefore, skill development, education and participation in welfare programs could be more effective for the empowerment of rural women.

Financial inclusion

Financial exclusion, defined as inability to access necessary financial services in time at affordable cost, is a major impediment to inclusive growth. Although the share of marginal and small farmers in the total credit is higher than their share in land area, but this is declining and the institutions like regional rural banks are also neglecting the rural poor. More than 51% of farm households are excluded from both institutional and informal sources of credit, while 73% of farm households do not have access to institutional credit. The incidence of exclusion is more in the central, eastern and north-eastern regions, where 64% of the farm households are financially-excluded. Credit needs for medical and social purposes, slowdown of agricultural growth, institutional norms and procedures, and weak financial positions of some institutions have contributed to the financial exclusion. Recent innovations like Kisan Credit Cards, Joint-liability Groups and Self-help Groups have made some difference but innovations in the delivery system are essential for financial inclusion of farmers and rural

poor.

CONCLUSION

Agriculture, being the primary activity, particularly for a large populated country like India, remains the most important part of the economy, with direct impact on people's livelihood. Therefore, finding out environmentally sustainable solutions requires detailed understanding regarding space and people, located in major parts of the country. Acceleration of agricultural growth is necessary to reduce rural-urban income disparity, enable the growth of non-farm sector for income diversification, control inflation and alleviate rural poverty. Concerted efforts in this direction should entail technological interventions combined with appropriate institutional innovations to strengthen farm delivery system and improve the distribution of growth benefits. These innovations should specifically address the issues of aggregation of production by a large number of small holders, improvement of delivery of inputs, credit and technology, and marketing efficiency. Importance of these factors has been demonstrated by the states like Gujarat showing high agricultural growth. The issue of human capital development is also important to grapple with the increasing sophistication of technologies, farm practices, marketing and processing.

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