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Private-public investment for synergising growth in Indian agriculture

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Abstract

The particle explores the evolution and challenges of Indian agriculture, highlighting the sector's significant progress from 50.82 million metric tons of food grain production in 1950 to a projected 329.68 million metric tons in 2022-23. Despite this growth, increasing population and food demand, limited resources, climate change, and socio-economic issues pose considerable challenges. The paper argues for a synergistic approach between public and private sectors to enhance agricultural productivity, efficiency, and resilience. Public investment, particularly in agricultural research and development, is critical for innovation, productivity improvement, and addressing climate change and resource scarcity. However, public investment has declined, necessitating increased private sector involvement. Private investment brings essential capital, technology, market access, risk mitigation, infrastructure development, and value chain integration, driving modernization and sustainability in agriculture. The paper underscores the need for supportive policies and a liberalized regulatory environment to encourage private and corporate sector investments. By nurturing collaboration and leveraging private capital and expertise, the Indian agriculture sector can achieve sustainable growth, improve food security, reduce poverty, and enhance rural prosperity.

Keywords: Agricultural innovation, agricultural productivity, climate change, food security, private-public investment, rural prosperity, sustainable development

Introduction

Indian agriculture, which traces its roots back to around 10,000 years ago, has indeed witnessed significant progress and evolution over millennia. The journey of Indian agriculture reflects the country's rich agricultural heritage, diverse agro-ecological zones, and the resilience and ingenuity of its farming communities.

The increase in food grain production from 50.82 million metric tons (MT) in 1950 to 314.51 million metric tons in 2021-22 (Economic Survey, 2022-23) [5] and the projected record of 329.68 million metric tons in 2022-23 reflects the significant growth and transformation of India's agriculture sector over the decades. The growth of the agriculture and allied sectors at a positive rate of 3.9% in 2021-22 is indeed a positive development, indicating resilience and recovery despite challenges such as the COVID-19 pandemic, supply chain disruptions, and adverse weather events (PIB, Ministry of Agriculture and Farmers Welfare 2023) [7].

However, India became most populous country with a population of 1.428 billion surpassing China in 2023 (Anon, 2023) [2]. By 2050 and the food demand is expected to rise up to ~ 400 million tonnes by the year 2050 (IARI report, 2013). This puts immense pressure on land to feed its growing population. This also creates the problem of poverty and malnutrition accompanied with other socio-economic problems. There has been a gradual change in the agricultural scenario in India.

Several emerging challenges confront Indian farmers. These include limited land and water availability, which is further worsened by degradation of natural resources; climate changes; changes in demand and consumption patterns, moving toward high-value agriculture; increasing population pressure; and liberalization of trade (Lele *et al.*, 2010) [6]. According to the Survey conducted by the Ministry of Finance in 2023 [7], rural areas in India are home to 65 per cent of the country's population, as per data from 2021. Additionally, 47 per cent of the population relies on agriculture as their primary source of livelihood (PIB, Ministry of Finance 2023) [7]. Hence, the initiatives should be aimed at boosting agricultural productivity and incomes which can have a substantial impact on improving living standards, reducing poverty and addressing nutritional deficiencies across rural communities.

Meeting the target growth rate of 4.0% in agriculture, along with providing food security for the growing population, necessitates a significant structural transformation in Indian agriculture (Anon., 2014) [1].

A focused and targeted approach is indeed essential to ensure higher investments in the agriculture sector, which is vital for promoting sustainable agricultural development, enhancing food security, alleviating poverty and for the rural prosperity.

Constraints in investing in agriculture and allied sector

- Slow growth in minor irrigation and farm mechanization.
- Declining public sector investment in basic infrastructure.
- Limited credit absorptive capacity.
- Inadequate technology transfer mechanisms and poor

extension services.
- Insufficient infrastructure for agro-processing, storage, warehousing, value addition, and marketing.
- Restrictions on off-market purchases.
- Weather anomalies and output price fluctuations.
- Inadequate risk mitigation mechanisms.
- Absence of accurate land records.

To address these constraints, both public and private sectors, particularly corporate entities, need to invest in various aspects of agriculture, for enhancing agricultural productivity, efficiency, resilience and market access, ultimately contributing to the overall growth and sustainability of the agricultural sector.

Aligning public agricultural investment with farmer capital needs

Over the past five decades, the share of public capital formation in agriculture has progressively declined. Currently, the bulk of investments in agriculture and allied activities, standing at 82%, originate from the private household sector. Following this, the public sector contributes 15%, while the private corporate sector accounts for the remaining portion of agricultural investments (Bathla and Kumari, 2017) [3]. The key concerns regarding agricultural investments in increasing investment through personal savings, institutional lending and corporate sector engagement are;

- "crowding in" effect of public investment which drives down corporate sector investment
- impact of input subsidies on private investment
- rationalization of subsidies to enhance farmer investment and crop productivity

Identifying the most effective types of public investment to reduce poverty and regional inequalities is crucial, along with improving capital use efficiency in irrigation systems through better governance. Futuristic public investment requirements aim to boost farmers' income and address climate change risks.

The average per-hectare real public expenditure in agriculture and irrigation, which includes flood control, has risen from approximately ₹1,900 during the 1980s to ₹5,100 between 2010–11 and 2015–16. In terms of capital expenditure, or public investment, the average spending in agriculture has consistently remained below ₹500 per hectare, while significantly higher investments have been made in irrigation. Specifically, irrigation expenditure has increased from ₹1,079 per hectare during the 1980s to ₹3,330 per hectare in the recent period. (Bathla *et al*., 2023) [4].

Public investment in agricultural research and development

Public investment, as per Golait and Lokare (2008) [9], reduces rural poverty by boosting agricultural production, agribusiness, and rural non-farm employment, while also lowering food prices. Agricultural research, education, and rural infrastructure investments are most effective for agricultural growth and poverty reduction, with regional analysis showing that investments in less favored areas yield the highest poverty reduction and economic returns.

Public investment in agricultural research and development (R&D) is critical for driving innovation, improving productivity, enhancing resilience and ensuring food security in agricultural systems. It enables the development of new crop varieties, sustainable farming practices, pest and disease management strategies, and technologies tailored to the needs of farmers and agroecological contexts. Additionally, agricultural R&D contributes to addressing emerging challenges such as climate change, water scarcity, soil degradation, and food safety.

Public investment in agricultural R&D supports various activities, including

1. Funding research initiatives focused on understanding fundamental aspects of agriculture
2. Supporting technology transfer and extension services to disseminate research findings, best practices and innovations to farmers, agricultural stakeholders, and rural communities
3. Investing in research infrastructure, laboratories, experimental farms, field stations, germplasm banks and research centers to facilitate scientific experimentation, data collection, and innovation in agricultural science.
4. Providing scholarships, fellowships, training programs, and career development opportunities for scientists, researchers, extension workers and agricultural professionals to build expertise, and strengthen institutional capacity in agricultural R&D.
5. Encouraging entrepreneurship, technology commercialization, and startup incubation in the agricultural sector to translate research outcomes into marketable products
6. Advocating for supportive policies, regulatory frameworks, intellectual property rights and funding mechanisms that incentivize investment in agricultural R&D, support innovation ecosystems, and promote sustainable agricultural development.

However, the proportion of public sector investment in agriculture has experienced a steeper decline in recent times compared to the 1980s. It is 11.4 per cent investment in 1980s and 6.5 per cent in 1990s, it declined more sharpely in 2011-12 to 5.4 percent and 4.3 percent in 2019-20. However, private investment in agriculture increased to 9.3 percent in 2020-21 (Press Information Bureau, Ministry of Finance, Government of India, 2022).

Critical role of Agricultural Extension from public sectors

Agricultural extension services play a crucial role in bridging the gap between agricultural research and on-the-ground implementation, thereby facilitating the adoption of innovations and best practices by farmers. While agriculture growth depends on various factors, including climate, investments and market conditions, effective agricultural extension is essential for disseminating knowledge, building capacity, and promoting sustainable agricultural practices.

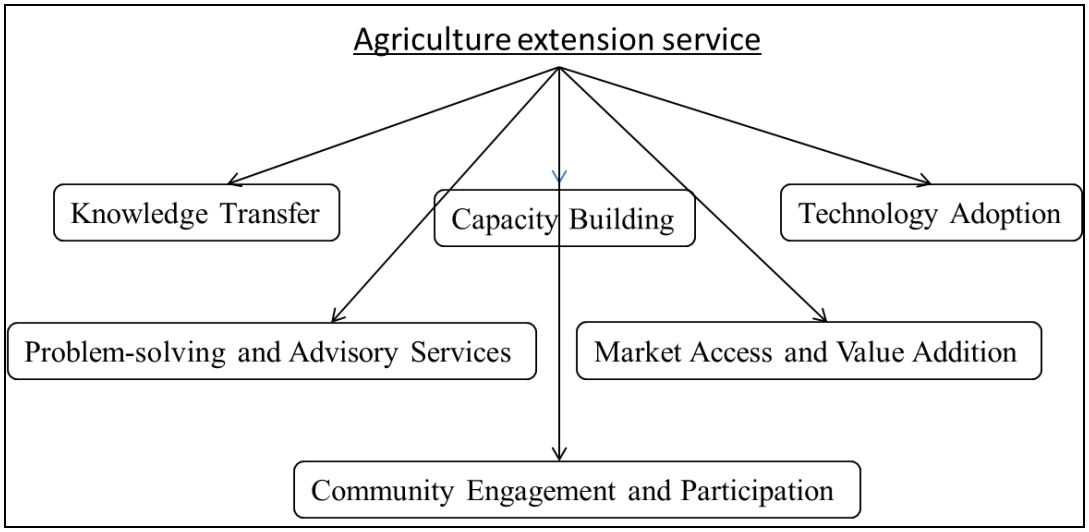


Fig 1: Role of agriculture extension management system

Agricultural extension is a critical component of agricultural development strategies, serving as a catalyst for innovation, empowerment, and inclusive growth in rural areas. By investing in robust extension systems, strengthening linkages between research, education, and practice, and leveraging technology and participatory approaches, countries can enhance the effectiveness, relevance and impact of agricultural extension services in addressing the evolving needs and aspirations of farmers and rural communities and also for effective use of public investment in agriculture.

Significance of private investment in empowering agriculture in India

Private sector investment encompasses both corporate and household investments. Corporate sector investment includes contributions from organized entities like large private companies, as well as unorganized entities like sugar and milk cooperatives. On the other hand, household sector investment consists of expenditures on farm equipment, machinery, irrigation, land improvement, and land reclamation. Household investments, comprising about 90% of the total, play a dominant role in private investment. These investments empower farmers to enhance productivity and intensity in growing existing crops, as well as explore non-conventional or high-value crops.

Private investment including corporate sector in agriculture saw a notable increase of 9.3 per cent in the fiscal year 2020-21, as highlighted in the Economic Survey 2022-23 [5]. However, despite this growth, the agriculture sector requires further attention. The Survey, presented to the Parliament on January 31, 2023, acknowledges the sector's overall performance but underscores the necessity for a "re-orientation" in light of various challenges. These challenges include the adverse effects of climate change, escalating input costs, fragmented landholdings, inadequate farm mechanization, low productivity and disguised unemployment, among others. Addressing these challenges is crucial for revitalizing and sustaining growth in the agriculture sector.

Private investment plays a pivotal role in driving innovation, modernization, and growth in the agriculture sector. Here's why private investment is considered critical for agriculture:

1. **Capital Infusion**: Provides the necessary capital for farmers to invest in modern technologies, machinery, equipment, and infrastructure, which are essential for enhancing productivity, efficiency and competitiveness in agriculture.
2. **Technology Adoption**: Private investors often bring cutting-edge technologies, research and innovation to the agriculture sector, enabling farmers to adopt advanced practices, precision agriculture techniques, biotechnology solutions, and digital tools that improve crop yields, reduce input costs and mitigate risks.
3. **Market Access and Value Addition**: Facilitates the development of market linkages, value chains, and agribusiness enterprises, creating opportunities for farmers to access domestic and international markets, receive fair prices for their produce and capture value-added opportunities through processing, packaging, and branding.
4. **Risk Sharing and Insurance**: Offer risk-sharing mechanisms, insurance products, and financial services tailored to the needs of farmers, helping them manage production risks, price volatility, weather-related disasters and market uncertainties more effectively.
5. **Infrastructure Development**: Private investment in agricultural infrastructure, such as storage facilities, cold chains, transportation networks, and market infrastructure, enhances supply chain efficiency, reduces post-harvest losses, improves market access and strengthens food security.
6. **Value Chain Integration**: Supports integration and collaboration across the agricultural value chain, from input suppliers and producers to processors, distributors, retailers, and consumers, creating synergies, economies of scale and efficiency gains that benefit all stakeholders.
7. **Job Creation and Economic Growth**: Stimulates job creation, entrepreneurship, and economic growth in rural areas by fostering agribusiness development, agro-industrialization and rural enterprise diversification, thereby contributing to poverty reduction and socio-economic development.
8. **Sustainability and Environmental Stewardship**: Increasingly prioritize sustainable agriculture practices,

environmental stewardship, and corporate social responsibility initiatives, promoting resource efficiency, biodiversity conservation, climate resilience and responsible agri-business practices.

The NITI Aayog working paper titled 'From Green Revolution to Amrit Kaal' indicates that,

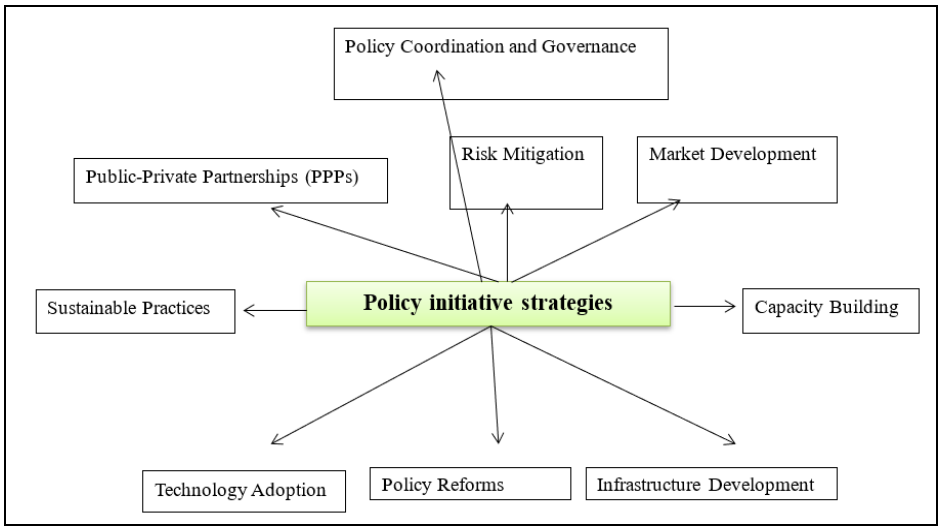
- Around 80% of investments in agriculture (mainly refer to land, input and production-related investments, does not include investments in markets, storage, transport, grading and other post-harvest infrastructure) come from private sources, with farmers themselves being the primary contributors.
- The corporate sector's share in overall public and private investment in agriculture has consistently remained low, at less than 0.2 per cent. This suggests significant potential for expansion in corporate sector investment.
- Securing investment in this particular segment of agriculture continues to pose a substantial challenge.

NITI Aayog emphasize on transition to modernizing agriculture through the adoption of knowledge- and skill-intensive practices. This includes

- Encouraging private and corporate sector investments,
- Establishing producer institutions,
- Implementing integrated food system mechanisms
- Developing innovative producer-end user linkages.

To enable these changes, liberalization in the agriculture sector is essential, characterized by a supportive regulatory environment and responsible public and private investments in agriculture.

Conceptual framework and policy initiatives



Conclusion

private investment is indispensable for driving agricultural transformation, better inclusive growth and ensuring the sustainability and resilience of food systems. By leveraging private capital, expertise and innovation, governments, policymakers and stakeholders can unlock the full potential of agriculture to address global challenges, meet rising food demand, and create a more prosperous and sustainable future for farmers and consumers alike.

By implementing these strategies, governments can create an enabling environment that encourages private sector investments in agriculture, driving innovation, growth and prosperity in the sector

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