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Indian agriculture in the wake of economic policy reforms

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Abstract
Indian agriculture, the primary livelihood source for nearly half of the nation's population, has undergone a dramatic transformation since the introduction of economic reforms in 1991. While the initial stages of liberalization focused on industrial and financial sectors, agriculture was indirectly impacted through trade liberalization, reduction of subsidies, and changes in institutional support structures. The reforms brought new opportunities for export-led growth and market-driven diversification, but also introduced challenges related to input costs, rural indebtedness, and regional disparity. This paper critically analyzes the impact of economic policy reforms on Indian agriculture over the past three decades using data from the Economic Survey, Ministry of Agriculture & Farmers' Welfare, NABARD, RBI, and other official sources. It evaluates the outcomes of liberalization in terms of productivity, structural shifts, farmer welfare, trade competitiveness, and policy responsiveness. The study concludes with policy recommendations to align agricultural growth with sustainability, equity, and global resilience.

Keywords: WTO, PM-KISAN, PMFBY, eNAM, agricultural credit, FPOs, subsidies, agricultural GDP, economic reforms, Indian agriculture, agricultural policy, liberalization, rural economy, farmer welfare, agricultural trade, public investment, food security, market access, agrarian distress, sustainable agriculture

1. Introduction
Agriculture in India has traditionally served as a cornerstone of economic development, social structure, and national identity. As of 2023, the sector employs over 45% of the total workforce and contributes around 18.3% to the country's Gross Value Added (GVA) (MoAFW Annual Report, 2023-24). Although its share in GDP has steadily declined due to growth in manufacturing and services, agriculture continues to sustain over 600 million people, particularly in rural areas.
The Indian agricultural system has evolved through distinct policy phases from state-led interventions in the post-independence years to technology-driven intensification during the Green Revolution, and later, to market-oriented restructuring under the New Economic Policy (NEP) of 1991. The reforms of the early 1990s aimed to stabilize macroeconomic imbalances through liberalization, privatization, and globalization. Although agriculture was not directly targeted in the initial reform package, its indirect exposure to global markets, altered input regimes, changing investment patterns, and institutional reconfigurations significantly reshaped the sector.

2. Indian Agriculture before Reforms: Foundations and Fragilities
Prior to the economic reforms of 1991, Indian agriculture had already undergone significant changes, particularly following independence in 1947. The period between 1950 and 1990 was marked by state-led development planning, heavy public investment in irrigation and rural infrastructure, the implementation of land reform laws, and the Green Revolution. These interventions were aimed at achieving food security, rural employment, and poverty alleviation in a predominantly agrarian society.

2.1 Post-independence agrarian landscape
In the early years after independence, agriculture accounted for over 55% of the Gross Domestic Product (GDP) and employed more than 70% of the workforce (Planning Commission, First Five Year Plan, 1951). However, it was characterized by low productivity, fragmented land holdings, and feudal land tenure systems that left vast sections of the rural population landless or marginal farmers.

To address these issues, the government introduced a series of land reforms including:
- Abolition of the zamindari system.
- Implementation of land ceiling acts.
- Tenancy reforms.
- Consolidation of land holdings.

Despite good intentions, the implementation of these reforms was patchy across states. According to the 1985 report of the Ministry of Rural Development, only about 2% of cultivable land had been redistributed to landless laborers. Furthermore, the average size of operational land holdings continued to decline, reaching just 2.28 hectares by 1990.

2.2 The Green revolution and Food Security
The single most transformative development in Indian agriculture before liberalization was the Green Revolution of the mid-1960s. Spurred by food shortages and increased reliance on imports under PL-480 arrangements with the U.S., the government adopted High-Yielding Varieties (HYVs) of wheat and rice, accompanied by assured procurement prices, subsidized inputs, and expanded irrigation.
This period saw foodgrain production jump from 72 million tonnes in 1965 to over 176 million tonnes by 1990 (MoAFW, Agricultural Statistics at a Glance, 2022). States like Punjab, Haryana, and western Uttar Pradesh became the epicenters of this growth, leading India toward food self-sufficiency and drastically reducing dependence on food aid.

However, the green revolution also had its limitations:
- It benefited mainly irrigated regions, bypassing rain-fed and tribal areas.
- It contributed to ecological degradation due to intensive chemical input use.
- It accentuated regional and inter-class disparities in agricultural income.
- It encouraged mono-cropping and reduced agro-biodiversity.

2.3 Role of the state in agricultural development
Until 1991, agriculture remained highly regulated and insulated from global market forces. The government controlled both input and output markets through:
- Minimum Support Prices (MSPs) for key crops
- Public distribution system (PDS) for food security
- Input subsidies for fertilizers, electricity, irrigation, and seeds
- Credit through cooperative and public sector banks
- Export-import controls on agricultural commodities

This interventionist regime, often termed the “command economy” model, helped create buffer stocks, stabilized prices, and offered a safety net for farmers. However, it also led to inefficiencies, fiscal burden due to growing subsidies, low private investment, and slow diversification.
By the late 1980s, agriculture’s share in GDP had dropped to around 30%, while it still employed over 65% of the workforce (Economic Survey, 1990-91). Rural poverty remained high at 38.7% in 1987-88 (Planning Commission, 1991), and growth in agricultural productivity began stagnating in the face of declining marginal returns to Green Revolution technologies.

2.4 Signs of stagnation before reforms
As India approached the 1990s, several structural and systemic issues became evident:
- Public investment in agriculture, especially in irrigation and R&D, began to decline from its peak levels in the 1970s (NABARD, 2021).
- Fertilizer and power subsidies grew disproportionately, placing a fiscal burden on state governments without corresponding improvements in productivity.
- Marketing infrastructure remained underdeveloped, with over 85% of farmers dependent on informal channels or middlemen (NSSO, 1990).
- Credit access remained skewed in favor of large farmers, with smallholders and landless laborers relying on moneylenders.

These issues made agriculture increasingly vulnerable to both domestic economic shocks and external pressures. By the time India entered the balance-of-payments crisis in 1991, the agricultural sector was ripe for reform, albeit with caution due to its socio-political sensitivity

3. Economic Reforms of 1991: Liberalization and Its Agricultural Spillovers
The year 1991 marked a watershed moment in India's economic history. Facing a severe balance of payments crisis, the Indian government under Prime Minister P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh launched a broad set of economic reforms aimed at liberalizing the economy, reducing fiscal deficits, and integrating with global markets. These reforms, encapsulated under the New Economic Policy (NEP), were primarily directed at industrial deregulation, trade liberalization, financial sector restructuring, and reduction in the role of the public sector. While agriculture was not explicitly the focus of the initial reform agenda, it experienced significant second-order effects as the reforms began to reshape the macroeconomic environment.
The reforms brought about fundamental shifts in the way agriculture interacted with the national economy and the global market. One of the earliest and most pronounced changes was the gradual dismantling of trade barriers, including the reduction of import tariffs and removal of quantitative restrictions on agricultural commodities. In the context of commitments made under the World Trade Organization (WTO) Agreement on Agriculture, India converted non-tariff barriers into tariffs and established bound rates for agricultural products. This shift from a protectionist to a more liberal trade regime exposed Indian agriculture to international price volatility and competition, especially in crops such as oilseeds, pulses, and cotton.

According to the Ministry of Commerce and Industry, the bound tariff for most agricultural commodities was set between 100% and 150%, although applied tariffs were generally much lower to encourage competitiveness and meet domestic demand.

Another major impact of the reforms was the rationalization of subsidies and curtailment of public expenditure, especially in input support systems. The Economic Survey (1996-97) noted that real public investment in agriculture, particularly in irrigation and rural infrastructure, declined consistently from the mid-1980s onward, a trend that continued through the reform period. While subsidies on fertilizers, power, and irrigation were retained to some extent due to political compulsions, their distribution became more regressive. Large and medium farmers, especially in irrigated regions, benefited disproportionately, while marginal and rainfed farmers remained underserved. The skewed structure of subsidies led to inefficiencies such as overuse of nitrogen-based fertilizers, depletion of groundwater, and regional disparities in agricultural growth.

The post-1991 period also witnessed changes in the institutional architecture of agricultural credit. Directed lending targets for priority sectors were redefined, and the banking system underwent reforms that prioritized financial viability over social objectives. As a result, small and marginal farmers began to find it increasingly difficult to access institutional credit. According to NABARD's 2019 report on rural credit, the share of institutional loans to agriculture stagnated, and non-institutional sources such as moneylenders remained prevalent in several states, particularly in eastern and central India.

Reforms also introduced new dynamics in the marketing of agricultural produce. Although the Agricultural Produce Market Committee (APMC) Act continued to regulate market yards in most states, the push for creating a unified national market gained momentum. The introduction of contract farming, direct marketing, and private mandis in selected states represented early efforts to move toward a market-oriented regime. However, these initiatives remained fragmented and uneven in their implementation due to the lack of enabling legislation and infrastructure.

Another indirect but important consequence of economic reforms was the emergence of agri-exports as a strategic priority. With India becoming self-sufficient in food grain production by the late 1980s, the focus began to shift toward high-value agricultural exports such as basmati rice, marine products, cotton, and horticultural commodities. According to the Agricultural and Processed Food Products Export Development Authority (APEDA), India's agricultural exports grew from Rs. 6,548 crore in 1991-92 to over Rs. 2.7 lakh crore by 2021-22. However, this export push was accompanied by rising concerns over food security, environmental sustainability, and the marginalization of subsistence farmers who lacked access to export-oriented technologies and markets.

In essence, the economic reforms of 1991 catalyzed a new policy environment in which agriculture was expected to operate more competitively, with reduced dependence on state support and greater exposure to global markets. While the reforms succeeded in initiating diversification, improving export performance, and stimulating private sector participation in agri-input and processing industries, they also created new vulnerabilities. The reduction in public investment, inadequate access to credit, weak marketing infrastructure, and volatility in global commodity prices posed significant challenges to inclusive agricultural growth.

These reform-induced changes laid the groundwork for a gradual, albeit uneven, transformation of Indian agriculture in the decades that followed. They also set the stage for policy debates that continue to shape agricultural discourse in India, debates on price support, input subsidies, trade protection, and institutional reform. The next section of this paper will delve into the measurable impacts of these reforms on key agricultural indicators, using data from the Ministry of Agriculture, RBI, and other official sources to evaluate performance trends in the post-reform era.

4. Agricultural growth and investment trends post-reforms

The economic liberalization of 1991 marked a gradual but visible shift in Indian agriculture's structural trajectory. Although agriculture was not directly targeted in the initial reform agenda, its exposure to macroeconomic changes, market integration, and institutional restructuring was significant. One of the most noticeable outcomes has been the consistent decline in agriculture's share of GDP from nearly 29% in 1990-91 to around 18.3% in 2022-23, even as it continued to employ over 45% of the national workforce (MoAFW, 2023). This indicates a widening gap between agriculture and the rest of the economy, characteristic of a dual-sector model where the benefits of growth accrue disproportionately to non-farm sectors.

Despite this structural shift, the Gross Value Added (GVA) of agriculture has grown in absolute terms, albeit at a moderate and uneven pace. During the Eighth Five Year Plan (1992-97), the sector recorded an average annual growth of 3.7%, which declined to 2.5% in the Tenth Plan and later improved marginally to around 3.6% in the Twelfth Plan (Planning Commission & NITI Aayog). Factors contributing to this sluggishness include stagnant productivity in rain fed areas, inadequate irrigation coverage, and weak rural infrastructure.

One of the critical setbacks during the post-reform years has been the decline in public investment in agriculture. Gross Capital Formation (GCF) in agriculture, which stood at about 18% of GVA in the early 1980s, fell to around 13% by the early 2000s and hovered near 16.4% in 2021-22 (Economic Survey, 2022-23). The reduced focus on irrigation, extension services, and market infrastructure was only partially offset by a rise in private investment, which remained concentrated in commercially profitable crops and well-irrigated regions. Initiatives such as PM-KUSUM, Agriculture Infrastructure Fund, and RKVY have attempted to address the investment deficit, but the gap remains substantial, particularly in eastern and central India.

Productivity improvements in major cereals like rice and wheat have occurred steadily, supported by continued adoption of High Yielding Varieties (HYVs) and improved irrigation. ICAR data shows that wheat yields rose from 2.2 tonnes/ha in 1990 to 3.5 tonnes/ha in 2021, while rice yields increased from 1.9 to 2.8 tonnes/ha during the same period. However, this progress was not uniform across all crops. Pulses and oilseeds, for instance, lagged significantly until the introduction of focused missions such as NMOOP. Even today, India relies on imports for more than 60% of its edible oil requirements, underscoring the productivity challenges in these segments.

Equally important is the imbalance in input usage. The continued provision of subsidies, especially on urea, has led to nutrient imbalances and environmental degradation. The optimal NPK (Nitrogen: Phosphorus: Potassium) ratio of 4:2:1 has been distorted to nearly 8.5:3:1 in several states (Fertilizer Association of India, 2019), compromising long-term soil fertility and crop efficiency. Efforts like the Nutrient Based Subsidy (NBS) Scheme have sought to rationalize input use, but the policy distortions persist due to political resistance and uneven implementation.

This decline was largely driven by a reduction in public investment in irrigation, extension services, and rural infrastructure. Although private investment increased, overall Gross Capital Formation (GCF) in agriculture as a percentage of agricultural GVA remained stagnant over the decade. This is clearly illustrated in Table 1 below.

Table 1: Gross Capital Formation (GCF) in agriculture and allied sectors (as % of GVA at Current Prices)

Year	GCF in Agriculture & Allied Sectors (% of Agri-GVA)
2011-12	17.7%
2013-14	16.8%
2015-16	15.1%
2017-18	15.6%
2019-20	16.3%
2021-22	16.4%

Source: Ministry of Finance, *Economic Survey 2022-23*, Volume II, Chapter 7

The figures reflect a plateauing of investment since 2011, despite rising needs for modernization, mechanization, and climate adaptation in the sector.

5. Credit Access, Regional Inequality, and Sectoral Disparities

The impact of liberalization on agricultural credit has been complex. While total institutional credit to agriculture rose exponentially from ₹86,000 crore in 2000-01 to over ₹18 lakh crore by 2022-23 (RBI, 2023) its accessibility remained uneven. According to NABARD's All-India Rural Financial Inclusion Survey (NAFIS, 2021), only about 30% of marginal and 42% of small farmers accessed formal credit sources. This has left a significant portion of the rural population dependent on informal channels such as moneylenders, especially in underdeveloped regions.

The introduction of the Kisan Credit Card (KCC) in 1998 was a milestone in easing credit access, yet its penetration varies significantly by state. In regions with robust banking networks such as Punjab, Maharashtra, and Tamil Nadu credit uptake has been relatively higher. In contrast, eastern India, including Bihar and Odisha, continues to suffer from low institutional penetration. Banking reforms emphasizing profitability have further alienated marginal farmers, as banks increasingly prefer lending to agri-businesses and large landholders over risk-prone small farmers.

Reform-era market liberalization has also reinforced regional and sectoral inequalities. While states like Gujarat, Maharashtra, and Andhra Pradesh experienced diversification into horticulture, cotton, and agri-processing, the eastern and rainfed belt remained locked into low-productivity cereal cultivation. As noted in the Economic Survey (2021-22), structural impediments such as fragmented landholdings, poor irrigation coverage, and lack of storage and market linkages continue to hamper inclusive growth.

In terms of sectoral transformation, the post-reform period witnessed modest diversification toward high-value crops, livestock, and fisheries. The allied sector, particularly dairy and poultry, emerged as a robust contributor to agricultural GDP. Yet, the underlying employment pattern remains stagnant, with over 45% of the workforce still engaged in agriculture raising concerns about disguised unemployment and underemployment in rural India.

Overall, while economic reforms injected new dynamism into segments of Indian agriculture particularly exports and input industries they also exposed long-standing structural weaknesses. Persistent gaps in investment, uneven credit access, ecological stress, and regional inequality point to the need for a more inclusive, sustainable, and regionally differentiated agricultural policy.

While the overall volume of institutional agricultural credit has shown significant growth since 2014, access remains uneven across regions and farmer categories. Table 2 provides an overview of the annual agricultural credit targets and actual disbursements during the reform era.

Table 2: Institutional Agricultural Credit Flow in India (₹ Crore)

Year	Target Credit Flow	Actual Credit Disbursed
2014-15	8,00,000	8,45,328
2016-17	9,00,000	10,66,473
2018-19	11,00,000	11,68,502
2020-21	15,00,000	15,75,398
2021-22	16,50,000	18,34,546
2022-23	18,50,000	20,47,780

Source: Reserve Bank of India. *Handbook of Statistics on the Indian Economy 2022-23*; NABARD Annual Reports.

The data highlights an encouraging trend in disbursements exceeding targets in recent years, yet it also underscores the limitations of this growth particularly the disproportionate share flowing to larger landholders and agribusinesses.

6. Trade Liberalization and Global Integration of Indian Agriculture

The liberalization of India's external trade regime in the 1990s, following the adoption of the New Economic Policy, had significant implications for the country's agricultural sector. Although agriculture was traditionally protected through quantitative restrictions, state-controlled marketing, and high import duties, the signing of the Agreement on Agriculture (AoA) under the World Trade Organization (WTO) framework marked a new phase in India's engagement with global agricultural markets. This integration opened new export opportunities for certain high-value commodities but also exposed the domestic sector to international price volatility and subsidized imports, particularly in sensitive segments like edible oils and pulses.

6.1 WTO commitments and domestic policy adjustments

India became a founding member of the WTO in 1995 and agreed to a set of commitments under the AoA in three primary areas: market access, domestic support, and export subsidies. As part of market access obligations, India converted non-tariff barriers such as import quotas and bans into tariffs a process known as "tariffication". Bound tariff rates were set at high levels (up to 100% for cereals, 150% for processed foods, and 300% for edible oils) to allow sufficient policy space. However, the actual applied tariffs were generally lower, allowing selective imports to manage domestic supply and inflation (DGFT, Annual Report 2020-21).

India also agreed to limit trade-distorting domestic support (the "amber box" subsidies) to 10% of the total value of agricultural production. Nevertheless, most of the country's agricultural subsidies, such as those under Minimum Support Price (MSP) and input subsidy programs, were categorized under "green box" (non-trade distorting) or "development box" exemptions applicable to developing countries. This strategic classification enabled India to retain core food security schemes such as the Public Distribution System (PDS) and fertilizer subsidies, despite global scrutiny.

In practice, India's agricultural exports remained relatively protected, but domestic reforms like the liberalization of rice exports in 1994, the removal of export bans on select crops, and incentives for agri-export zones signaled a new orientation. India's agricultural exports, which stood at Rs. 6,548 crore in 1991-92, surged to over Rs. 2.7 lakh crore by 2021-22 (APEDA, 2023). Key export items include basmati rice, marine products, spices, tea, coffee, cotton, and fresh fruits.

6.2 Opportunities and Vulnerabilities in Agri-Trade

The opening of markets and easing of trade barriers brought significant opportunities, particularly for commercial and high-value crops. India became one of the world's largest exporters of basmati rice, tea, and spices. The horticulture sector, supported by better cold chain infrastructure and APEDA facilitation, witnessed steady growth in export volumes. Marine exports, especially shrimp, found strong markets in the U.S., EU, and Southeast Asia.

However, the post-reform global integration also introduced vulnerabilities. The most prominent was the surge in edible oil imports after the liberalization of the sector in the mid-1990s. India reduced import duties sharply to address domestic price inflation, but the move led to a flood of cheap palm oil imports from Indonesia and Malaysia, undermining the competitiveness of domestic oilseed producers. As a result, India today imports over 60% of its edible oil requirements, making it one of the largest importers globally (Ministry of Consumer Affairs, 2022).

Similarly, trade liberalization exposed farmers to price fluctuations in international markets. In commodities like cotton and pulses, where global prices are highly volatile, Indian producers often find themselves squeezed between rising input costs and falling market prices. The absence of adequate risk mitigation tools such as universal crop insurance or strong forward markets has limited farmers' capacity to benefit from trade gains.

India's export competitiveness is also affected by non-tariff barriers such as sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT). For example, stringent pesticide residue norms in the European Union have led to periodic rejections of Indian fruit and spice consignments. The Codex Aliment Arius standards, though voluntary, often serve as a benchmark in global trade, and Indian exporters struggle to meet these due to gaps in food safety infrastructure and lack of awareness at the farm level.

The adoption of quality protocols like Hazard Analysis and Critical Control Points (HACCP) and Good Agricultural Practices (GAP) has gained momentum, particularly among exporters. However, small and marginal farmers remain excluded from such certifications due to cost and technical constraints, reducing their participation in export supply chains.

6.3 Policy Responses and Agri-Export Promotion

Recognizing both the opportunities and risks of global integration, the Government of India launched several initiatives to boost export competitiveness. The creation of Agri-Export Zones (AEZs), the Agricultural and Processed Food Products Export Development Authority (APEDA), and the Transport and Marketing Assistance (TMA) scheme for agri-exports are key institutional efforts. The Foreign Trade Policy (2015-2020) emphasized doubling agricultural exports and enhancing value-added processing.

More recently, the Agricultural Export Policy (AEP) 2018 aimed to boost agri-exports to $60 billion by 2022. While this target remains unrealized, the policy has improved coordination between central and state governments, encouraged product-specific clusters (e.g., mango in Maharashtra, turmeric in Telangana), and promoted branding of Indian agri-produce in international markets.

In response to WTO pressures and the need for food security, India has also pushed for a permanent solution on public stockholding of food grains at multilateral forums. The G-33 coalition, led by India, has advocated for flexibility in implementing food support programs without breaching WTO subsidy limits.

Despite policy advances, challenges remain. India's agri-exports are still dominated by a few primary commodities with limited value addition. The lack of modern processing infrastructure, weak logistics, and fragmented supply chains prevent full realization of India's comparative advantage. Moreover, the post-COVID trade landscape and increasing protectionism in developed countries have complicated India's export strategies.

7. Social and Economic consequences of agricultural reforms

While the liberalization of the Indian economy brought a wave of modernization and integration into the global marketplace, its effects on the rural agrarian landscape were mixed and complex. The agricultural reforms introduced in the post-1991 era had unintended consequences on social equity, rural livelihoods, income security, and farmer well-being. These socio-economic outcomes were shaped not only by macroeconomic changes but also by longstanding structural disparities within Indian agriculture.

7.1 Rising Agrarian Distress and Farmer Suicides

One of the most visible manifestations of post-reform agrarian stress has been the rise in farmer suicides, particularly in states heavily reliant on commercial crops such as Maharashtra, Andhra Pradesh, Karnataka, and Telangana. The National Crime Records Bureau (NCRB) data shows that more than 300,000 farmers died by suicide between 1995 and 2022, with peaks observed in years marked by droughts, price crashes, or crop failures.

Several factors contributed to this distress. The withdrawal of state support in the form of subsidies and regulated prices, combined with exposure to volatile markets, increased the financial risk for farmers. Input costs particularly for seeds, fertilizers, pesticides, and irrigation rose sharply due to partial deregulation and dependence on private suppliers. At the same time, output prices did not always keep pace, particularly for non-MSP crops. This imbalance eroded farm profitability and pushed many smallholders into a cycle of debt and dependence on informal credit.

The reduction in public investment in rural infrastructure also played a role. With fewer investments in irrigation, rural roads, and market linkages, many farmers remained vulnerable to weather shocks and market failures. The absence of robust institutional safety nets such as universal crop insurance, accessible rural health care, or affordable legal aid further exacerbated the vulnerabilities of the farming community.

7.2 Income Disparities and Employment Stagnation

Post-reform agriculture also witnessed a widening income gap between rural and urban areas, as well as within the farming sector itself. According to the NITI Aayog's "Strategy for New India @ 75" report, the monthly income of an average agricultural household in 2015-16 stood at ₹8,931, while their monthly consumption expenditure was ₹6,646 indicating low disposable income and limited capacity for savings or investment. Meanwhile, income growth in urban areas, particularly in the services and manufacturing sectors, significantly outpaced rural earnings, contributing to increased rural-to-urban migration.

Within the agricultural sector, inequality grew between irrigated and rainfed areas, and between large landholders and marginal farmers. High-value commercial crops such as fruits, cotton, and sugarcane yielded higher returns but were geographically and socially concentrated. On the other hand, rainfed regions and tribal districts continued to rely on low-yield foodgrains with minimal support infrastructure.

Employment stagnation compounded the economic distress. Despite a decline in agriculture's share of GDP, the proportion of the workforce dependent on agriculture has remained above 45% a reflection of limited non-farm employment opportunities. According to the Periodic Labour Force Survey (PLFS) 2022, rural underemployment and disguised employment remain widespread, especially among women and youth.

7.3 Food security, nutrition and market access

A major concern following trade liberalization was the perceived threat to food security. However, India maintained its commitment to food distribution through the Public Distribution System (PDS), which was further strengthened by the enactment of the National Food Security Act (NFSA), 2013. Under the Act, over 800 million people receive subsidized grains, ensuring minimum caloric intake even during market disruptions.

Nonetheless, food security at the national level has not translated into improved nutrition outcomes at the household level. According to the National Family Health Survey (NFHS-5), India continues to face high levels of child malnutrition, with 35.5% of children under five being stunted and 32.1% underweight. The lack of dietary diversity due to limited affordability and poor market access to fruits, vegetables, pulses, and animal proteins remains a challenge, especially in agrarian regions ironically responsible for food production.

Access to remunerative markets is another structural limitation. The dominance of intermediaries, fragmented supply chains, and underdeveloped rural infrastructure prevent farmers from realizing fair prices for their produce. Although reforms like the electronic National Agriculture Market (eNAM) and Model APMC Act were introduced to improve market integration, their adoption has been slow and uneven across states.

7.4 Gender and marginalized communities in agriculture

The economic reforms and their aftermath have had differential impacts across socio-economic groups. Women in agriculture, who constitute nearly 33% of the agricultural labor force and up to 85% in certain states (according to the FAO and MoAFW), remain under-recognized in policy and practice. Their access to land, credit, training, and decision-making remains limited. Post-reform commercialization and mechanization of agriculture have further side-lined women, particularly in areas where traditional manual labor roles are being replaced.

Scheduled Castes (SCs), Scheduled Tribes (STs), and Other Backward Classes (OBCs) who make up a large proportion of small and marginal farmers have similarly experienced uneven benefits. These groups tend to be concentrated in less developed regions, have less access to institutional support, and are more reliant on public schemes. Without targeted affirmative action in the agricultural sector, the reforms have tended to reproduce existing social hierarchies and exclusions.

8. Policy Responses and innovations in the post-reform era

The structural and socio-economic challenges that emerged in Indian agriculture after the 1991 economic reforms prompted a series of policy responses from both the central and state governments. While the initial reform period was characterized by a relative neglect of agriculture, the growing visibility of rural distress, regional disparities, and farmer mobilizations led to a renewed policy focus on agricultural revitalization. Over the past two decades, India has launched numerous schemes and institutional reforms aimed at improving agricultural productivity, ensuring farmer welfare, enhancing market access, and promoting sustainable practices.

8.1 Income Support and Risk Mitigation Schemes

Recognizing the limitations of price-based interventions like the Minimum Support Price (MSP) in covering all farmers and crops, the government introduced direct income support as a complementary approach. The Pradhan Mantri Kisan Samman Nidhi (PM-KISAN), launched in 2019, provides ₹6,000 annually to eligible farmer families through Direct Benefit Transfer (DBT). By March 2024, over 11 crore farmers had benefitted from this program, according to the Ministry of Agriculture & Farmers' Welfare (MoAFW Annual Report, 2023-24).

To address production risks associated with weather, pests, and market fluctuations, the Pradhan Mantri Fasal Bima Yojana (PMFBY) was introduced in 2016. It aimed to provide affordable crop insurance with uniform premiums of 2% for Kharif, 1.5% for Rabi, and 5% for horticulture crops. However, issues such as delayed claim settlements, low awareness, and private insurer exit have raised concerns about its effectiveness. Several states have either modified or opted out of the scheme, calling for a more accountable and transparent implementation framework.

In addition to insurance and income support, the Kisan

Credit Card (KCC) scheme, originally launched in 1998, has been reinvigorated to extend concessional credit to animal husbandry and fisheries sectors. As per NABARD (2022), over 7 crore KCCs have been issued, although many small and marginal farmers still remain outside formal credit systems.

8.2 Market and Infrastructure Reforms

Efforts to reform agricultural markets have accelerated in the post-reform period, particularly in the last decade. One of the most significant initiatives is the electronic National Agriculture Market (eNAM), launched in 2016. This digital platform aims to integrate Agricultural Produce Market Committees (APMCs) across the country, offering farmers better price discovery and access to a larger pool of buyers. As of 2023, over 1,260 APMC mandis across 22 states and union territories were integrated into eNAM, and more than 1.7 crore farmers were registered (eNAM Dashboard, 2023). However, its success has been uneven due to state-level regulatory variations and infrastructural constraints at the mandi level.

The Agriculture Infrastructure Fund (AIF), with an allocation of ₹1 lakh crore, was launched in 2020 to support agri-entrepreneurs, cooperatives, and Farmer Producer Organizations (FPOs) in building cold chains, warehouses, processing units, and other post-harvest infrastructure. The Fund represents a shift from subsidies toward capital-linked investments to improve supply chain efficiency and reduce post-harvest losses, which are estimated at 5-10% for cereals and over 20% for fruits and vegetables (ICAR, 2022).

While reform attempts peaked with the introduction of the three farm laws in 2020, intended to liberalize agricultural marketing, contract farming, and stockholding, the laws were met with massive protests from farmers, particularly in Punjab, Haryana, and western Uttar Pradesh. The laws were eventually repealed in 2021, underscoring the importance of consultative policymaking and trust-building among stakeholders before undertaking major structural changes.

8.3 Technological and Sustainability Initiatives

India's post-reform agricultural policy has also emphasized the adoption of modern technologies to enhance productivity and sustainability. The National Mission on Sustainable Agriculture (NMSA) promotes soil health management, water-use efficiency, and organic farming. Under the Soil Health Card Scheme, launched in 2015, over 22 crore soil cards have been distributed, aiming to guide farmers in balanced fertilizer use based on scientific soil testing.

Parallel efforts in promoting climate-resilient agriculture have gained traction under the National Innovations on Climate Resilient Agriculture (NICRA), led by the Indian Council of Agricultural Research (ICAR). The initiative has piloted adaptive cropping patterns, drought-resistant seeds, and improved water management practices in climate-vulnerable districts.

The push for digital agriculture has also intensified, with the creation of digital registries of land records, farmer databases, and online portals for agri-inputs and subsidies. Startups in agri-tech using AI, IoT, and Blockchain are increasingly being promoted through schemes like Startup India and Agri India Hackathon.

8.4 Institutional Support and Farmer Producer Organizations (FPOs)

To enhance scale, bargaining power, and market access for small and marginal farmers, the government has promoted the formation of Farmer Producer Organizations (FPOs). Under the Central Sector Scheme launched in 2020, the government plans to create and support 10,000 new FPOs with a budget of ₹6,865 crore. FPOs are expected to function as cooperatives, enabling aggregation of produce, collective bargaining for inputs, access to storage and processing units, and higher returns from market linkage.

Despite promising potential, FPOs face challenges in terms of managerial capacity, capital access, and professional governance. A NABARD assessment (2022) noted that fewer than 20% of registered FPOs are financially self-sustaining, highlighting the need for handholding support, mentorship, and enabling legal frameworks

9. Conclusion

Indian agriculture, deeply intertwined with the nation's socio-economic fabric, has undergone significant transformation in the wake of economic policy reforms introduced in 1991. These reforms, while initially focused on addressing macroeconomic imbalances in industry and trade, had profound spill over effects on the agricultural sector. Over the past three decades, Indian agriculture has been increasingly shaped by market-oriented policies, trade liberalization, and a gradual withdrawal of state control. This transition has yielded both gains and challenges improving export competitiveness and diversification in some regions, while intensifying vulnerability, inequality, and distress in others.

The reform period saw the integration of Indian agriculture into the global trade architecture, opening up new opportunities for export growth, particularly in high-value crops like basmati rice, horticultural products, and marine commodities. The adoption of WTO commitments brought greater discipline to subsidy regimes and increased awareness of food safety and quality standards. However, the benefits of globalization have remained unequally distributed. Sectors such as oilseeds and pulses struggled under the pressure of cheap imports, while smallholder farmers often lacked the institutional support and infrastructure to participate meaningfully in global value chains.

At the domestic level, the reforms triggered a reduction in public investment, particularly in irrigation, extension services, and rural infrastructure factors critical to long-term agricultural growth. Although private investment rose, it remained geographically and sectorally skewed, exacerbating regional disparities. Input subsidy regimes, despite their political indispensability, contributed to ecological stress and inefficiencies, especially in fertilizer use and groundwater exploitation.

The socio-economic consequences of these reforms have been particularly significant. Rising input costs, market volatility, indebtedness, and declining profitability have contributed to a growing agrarian crisis, reflected starkly in the continuing incidence of farmer suicides and deepening rural inequality. Employment stagnation in agriculture has forced many to migrate, while women and marginalized communities remain underrepresented in agricultural policy and benefits. Although the National Food Security Act and welfare programs have cushioned some of these impacts, nutrition indicators and rural incomes reveal persistent vulnerability.

Policy responses in the post-reform era have grown more nuanced, focusing on income support, insurance, digital innovation, and institutional strengthening. Schemes like PM-KISAN, PMFBY, eNAM, and FPO promotion represent an effort to realign agriculture with a more inclusive and market-responsive development strategy. However, fragmented implementation, weak state capacity, and inadequate stakeholder engagement continue to limit the effectiveness of these initiatives.

Going forward, the future of Indian agriculture must rest on a multi-dimensional strategy that harmonizes economic growth with social equity and environmental sustainability. This includes increasing public investment in climate-resilient infrastructure, expanding institutional credit to underserved regions, improving transparency in market operations, and ensuring that policy frameworks actively include smallholders, women, and indigenous communities. More importantly, agricultural reforms must be grounded in consensus-building, scientific data, and long-term planning rather than short-term political expediency.

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