

**Address by Dr PK Mishra, Principal Secretary to Prime Minister at the Foundation Day Programme of Agro-Economic Research Centre (AERC), Sardar Patel University, Vallabh Vidyanagar, Gujarat**

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## **Transformation of Gujarat Agriculture during the last 25 Years\***

### **Introduction**

I am delighted to be here amongst all of you today at the Agro-Economic Research Centre (AERC), which has **immensely contributed**, for more than six decades, to **study, research and policy analysis** relating to agricultural economy in the country. Its work has improved our understanding of agriculture and rural economy, particularly of the States of Gujarat and Rajasthan.

It was Shri HM Patel, a distinguished civil servant and policy maker who envisioned the setting up of the Institute, and also guided and supported its development. Dr VS Vyas, who was the first Director of AERC, established rich traditions of research and analytical work. Dr. Mahesh Pathak was associated with the AERC for more than 35 years as Director and subsequently as honorary Advisor.

I had visited the AERC in the early 1990s. Dr. Mahesh Pathak and his team were generous to provide farm-level data for my research work. Thus, I also owe a great deal to the AERC.

I had an earlier association with Dr. Mahesh Pathak. He was the Chairman of the first-ever Agriculture Commission of Gujarat during 1988-90. I was very closely associated with the deliberations of the Commission as Joint Secretary to Government of Gujarat in the Department of Agriculture. In fact, after knowing that I would be coming here, Dr. Mahesh Pathak sent three email messages to me. It was nice to hear from him after several years. I thank him for his kind words.

### **The Book to be Released**

Today's programme also includes release of a book "**Future Agriculture – Viksit Bharat**", edited by Dr. Kirit Shelat, Dr. AR Pathak, Prof. Srikanth Kalamkar and Dr. Odemari Mbuya. This book is a compilation of articles focusing on important aspects of agriculture: **achievements, issues and challenges**.

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\* I am thankful to Shri Atish Chandra and Smt. Reshma Raghunathan Nair, for compiling the details included in this lecture. The usual disclaimer applies.

Prime Minister Shri Narendra Modi has given a clarion call for a **Viksit Bharat**, a developed India by 2047. In a **Viksit Bharat** agriculture also would be transformed. In this context, the book highlights several initiatives taken by Government of India under the leadership of Prime Minister Narendra Modi, to accelerate transformation in agriculture sector. The objective is to **empower our farmers** and **improve their income and living standards**. The writers have suggested strategies to make agriculture more sustainable, productive and remunerative.

I congratulate the editors and writers of various chapters of the book. It is my privilege to release this book.

The presence of Shri PK Laheri, former Chief Secretary, Gujarat, is indeed of significance. I know Shri Laheri right from my early days in Gujarat. I still recall his in-depth knowledge of **revenue administration, laws, and manuals**. His vast knowledge in **diverse subjects and disciplines** is really commendable.

## **Transformation after 2000**

As I am at the AERC, it would be worthwhile for me to focus on a few important aspects of how the agriculture sector in Gujarat has been transformed during the last quarter of a century, especially after 2000.

When we talk about **Transformation of Gujarat Agriculture**, it relates to the shift in the sector's **organization, productivity and role** within the broader economy. Gujarat has seen significant changes in **land use, crop patterns, irrigation methods, technology adoption, market dynamics** and rural socio-economic structures. Over the last 25 years Gujarat has emerged as a leader in **agricultural innovation, resilience and growth** with profound impacts on its economy and society.

## **Earlier Years**

To understand the structural transformation of agriculture in Gujarat, it is essential to first reflect on its **historical context**. Gujarat's agriculture in the early days after its formation was characterized by **semi-arid conditions**, dependence on **rain-fed agriculture**, and a dominance of **traditional crop patterns** such as coarse grains, cotton, and groundnut.

In those days, there was **limited access to irrigation and technology**. The sector's growth was stunted by **frequent droughts**, low productivity, and **inadequate infrastructure**. However, in the past two and a half decades there has been a remarkable shift in these dynamics, driven by both policy initiatives and grassroots innovation.

In a chapter on agriculture in the book “**Recalibrate: Changing Paradigms**”, co-authored by me, I had put forward, in the national context, some ideas:

**First**, agricultural growth and development depend as much on the efforts that are put into agriculture sector as on sectors **other than agriculture**, and even on the efforts being invested in activities that are **not directly related to agriculture**.

**Second**, although it is known that any agricultural activity is **riskier** than other economic activities, the problem of risk has not been addressed effectively and adequately.

**Third**, role of **rural non-farm sector**, though recognized by policy experts, needs to be integrated with our agricultural policy and practice.

**Fourth**, non-agriculture sectors, particularly industry have failed to play a significant role in absorbing the agriculture work force to keep pace with changes in their respective shares of the GDP.

The four aspects listed above are vital for transforming our agricultural ecosystem. In that chapter I have highlighted several initiatives taken by Government of India during the last decade.

## **Trends in Agricultural Growth**

I would like to hypothesize that the transformation of Gujarat agriculture is because there was more emphasis on the four aspects, I enumerated above, during the last 25 years.

A paper by Tushaar Shah, Ashok Gulati and others published in the Economic and Political Weekly (26 December 2009) says:

*Against this gloomy backdrop Gulati et al (2009) found that in the new millennium, Gujarat’s agriculture has not only bucked its own past trend but also the national trend. They reported that “agriculture in Gujarat after 2000 seems to have picked up dramatically, recording average annual growth rate of 9.6 percent during 2000-01 to 2006-07.”... .. the main sources of Gujarat’s agricultural growth post-2000 have been the massive boom in cotton production, the growth in the high value sector comprising livestock and fruits and vegetables, and the rise in wheat production.*

Another paper by Ashok Gulati, Ranjana Roy and Siraj Hussain, published in 2021 says:

*Gujarat is one of the few States which achieved high growth in this (Agriculture) sector; during the period from 2001-02 to 2014-15, Gujarat's agriculture grew at 8.6 percent per annum. During the same period, the all-India agricultural growth rate was only 3.2 percent per annum.*

The growth rate of agriculture and allied activities was 3.01 percent, -0.84 percent and 4.44 percent respectively during 1970s, 1980s and 1990s. During 2000-2010, 2010-2020 and 2013-2023 it was respectively 7.65 percent, 4.57 percent and 3.96 percent. (Prof. Ramesh Chand)

A vision document *Viksit Gujarat @ 2047: Gujarat's Roadmap towards Viksit Bharat at 2047* brought out in January 2024 has a chapter on Agriculture, Irrigation and Rural Development. It indicates in the last decade (2011-2021) Gujarat's agriculture and allied sector has grown at a rate of 9.7 percent CAGR compared to 5.7 percent India's average, primarily driven by allied sectors.

The above paragraphs indicate some variation in the growth rates of Gujarat agriculture during the two decades following 2000-01. This is because the base years and the period for which the growth rates are estimated vary. Overall, the agriculture sector of Gujarat has grown at a rate ranging from 8 to 10 per cent during this period.

In the year 2000, Government of Gujarat prepared **Gujarat Agrovision 2010: Action Plan**. It was released in January 2001. At that time there was intense debate on what should be the projected rate of growth. It ranged from 4 percent to as high as 8 percent. Finally, it projected a growth rate of 6.8 percent for the decade. That time it appeared to be ambitious. Interestingly, a higher rate of growth could be achieved during the decade. The Agrovision contained also an Action Plan for agriculture development.

Another landmark was **Agro Industrial Policy 2000** which aimed at making Gujarat a **destination of choice** for investors and processors, both global and domestic. It envisaged several incentives for agro-industrial units, agri-infrastructure projects and marketing support.

Agricultural growth can fluctuate due to weather conditions. There are factors such as **weather, climate and geopolitical shocks**. A very useful indicator to assess instability is the **standard deviation** in annual rate of changes of economic parameters in a given period.

It is remarkable that Gujarat has brought down instability in growth rates of agriculture sector from 50 percent during 1980s to about 12 percent during 2011-21. Of course, for the country also it has come down from 5.45 percent to 2.72 percent. It may be noted that for the country as a whole with its diverse agro-climatic situations the instability can be relatively less than for a state like Gujarat.

Gujarat is called the **growth engine** of India. It is among the top industrial States in the country. This could be possible because of all round development of the State and an impressive performance of **manufacturing, services and agriculture**.

For agriculture sector, per worker productivity in Gujarat is 28 percent higher than all India average, while it is 25 percent higher in the non-agricultural sector.

Despite a high level of industrialization, agriculture continues to play a very significant role in growth and development of the State. Agriculture contributes to 1/6<sup>th</sup> of the GSVA (Gross State Value Added) of the State, but it provides **employment to 42 percent** of the work force in Gujarat.

Growth in **manufacturing** sector in Gujarat is strongly linked to the **growth of agriculture** sector, because production of cash crops dominated the cropping pattern of the State. Gujarat contributes 25 percent of **cotton**, 44 percent **groundnut**, 87 percent **castor** and 7.5 percent of **milk** produced in the country. These commodities serve as raw materials for **textile industry, oilseed processing industry and dairy processing industries**.

Analytical studies show that Gujarat's agriculture sector has been transformed because of several **policy interventions** and **infrastructure development** initiated during the last two and a half decades.

## **Irrigation and Water Management**

A significant change in Gujarat's agriculture has been the expansion of irrigation infrastructure. The Sardar Sarovar Project has been instrumental in providing irrigation water to drought-prone areas.

The SAUNI (Saurashtra Narmada Avtaran Irrigation) Yojana aims to fill 115 major dams of Saurashtra region with transfer of water from Sardar Sarovar Dam. It is benefitting one million hectares of farm lands by ensuring stable water supply.

Gujarat is one of the pioneering states in India in **regulating water use**.

In 2005, the Government of Gujarat founded the **Gujarat Green Revolution Company Limited** to advance **micro-irrigation, streamlining the subsidy**

**process** and enhancing **farmer access** to these systems. This has resulted in significantly expanding the **micro-irrigation** coverage in the State to 19 lakh hectares. This has improved water use efficiency, cut water wastage and boost crop yields.

As a result of public investment in irrigation, a very large arid region of Gujarat is converted to a Green State. The area under irrigation in the State has increased from 33 percent in the year 2001-02 to 69 percent in 2021-22. The irrigation coverage in the State which was **much lower than** national average is **now higher than the national average** by 14 percentage points. This has enabled the State to increase cropping intensity during the same period from 111 percent to 155 percent.

### Reforms in use of electricity

The Jyoti Gram Yojana launched in 2003 ensured continuous high-quality power supply to rural areas. It also enabled supply of power to farmers residing in scattered farm houses through feeder lines with specially designed transformers facilitating irrigation and agricultural productivity. This reform contributed to increase in agricultural production within 5 years of its implementation.

I recall the days when the then Chief Minister Shri Narendra Modi gave the idea of having separate feeders for agriculture and other uses. The relevant departments thought it was an unrealistic idea that time. However, after a lot of persuasion it was accepted by them. The rest is history.

### Crop diversification and changing land use patterns

#### Shift from traditional to high-value crops

With strengthening of irrigation systems and assured power supply, there has been a shift in cropping pattern from traditional food crops such as cereals to high-value cash crops such as cotton, groundnut and horticultural crops including fruits, vegetables and medicinal and aromatic plants. More importantly, area under fruits and vegetables has increased almost four times since 2011-12. Spices area also has increased from 2.2 percent to 5.5 percent.

During the 10 years from 2011-12 the share in the cropped area of fruits and vegetables increased from 3.7 percent to 9.5 percent.

Gujarat has also witnessed, over the past decade, growth in its **floriculture**, becoming one of the **leading states in flower production** in India. Favourable climate, coupled with government initiatives has spurred the expansion of flower cultivation particularly in areas such as Surat, Anand and Vadodara.

## Empowering farmers through technology

Innovative approaches such as **Krishi Mahotsav** and Soil Health Card have resulted in impressive agriculture growth over the past decade. Gujarat became the first State in India to introduce soil health cards as part of its initiative to implement scientific measures for soil health management.

The **i-Khedut portal** provides farmers with timely access to agricultural inputs, the latest farming knowledge, welfare schemes, weather updates, and market prices ensuring comprehensive support directly to their doorsteps.

Gujarat **Krishi Mahotsav**, an annual month-long campaign serves as a unique agricultural extension model.

## High-yielding varieties and biotechnology

Gujarat has significantly advanced its agricultural sector through the **adoption of Bt Cotton**. Since its inception in the early 2020s, **Bt Cotton had led to higher yields and reduced pesticide use**, particularly benefiting the arid and semi-arid regions. This shift has not only boosted the productivity of cotton farming but also spurred broader agricultural innovation and biotechnological advances.

## Organic and natural farming

Gujarat has remained a pioneer State in adopting **organic farming**. Gujarat has some of the best promotional activities such as **seed festival, organic food festival** and **biennial conventions** of organic farmers. The Government of Gujarat has launched the Gujarat Organic Farming Policy in 2015 to promote organic farming.

In recent years, Gujarat has also adopted **natural farming** inspired by the Hon'ble Governor of Gujarat.

## Fisheries

Gujarat has immense potential for **fisheries development**. The State has the longest coastline in India of about 1600 km along the Arabian Sea. Fish production in Gujarat has increased in recent years.

The Vision **Viksit Gujarat @ 2047** is geared to harness **demand led market** opportunities in domestic and overseas market for **horticulture, dairy and fishery**.

Another noteworthy achievement of Gujarat is in the area of **forestry sector** which showed 18.6 percent annual growth during 2014-15 to 2022-23.



## Market reforms: APMC Reforms and Digital Marketplace

Gujarat was among the pioneers in implementing the **Model Agricultural Produce Market Committee Act**, allowing farmers to **sell produce outside regulated markets**. Gujarat Agricultural Produce Marketing Act was amended in 2007 with provisions for **contract farming, direct marketing, e-trading, private markets**, single point levy of market fee and establishment of farmer markets.

Gujarat **dairy sector** exemplified successful cooperative models that have added value to agricultural produce.

The State's strong **cooperative marketing** structure played a crucial role in development of the horticulture sector. There are about 42 cooperative marketing societies and 197 APMCs dealing with sale and purchase of horticulture products.

The **onion dehydration industry** in Gujarat is the highest in the country accounting for 80 percent of onion dehydrating units.

## Addressing Agricultural Risk

Several policy initiatives such as **water resource management, increasing area under irrigation and marketing reform** helped mitigate yield and price risk. More importantly, Gujarat farmers **accepted the crop insurance** programme introduced in 1985 by Government of India **much faster** than in many other States.

Indeed, I recall those days when there were **certain controversies** about assessment of crop yield and calculation of insurance claims by the relevant agencies.

## Socio-economic impact of agricultural transformation

### Income and employment generation

The agricultural transformation has led to substantial increase in rural incomes. According to NABARD, the average annual income of farming households in Gujarat increased from Rs.36000 in 2003 to over Rs. 1.2 lakhs in 2020. In Gujarat, more than 30000 food processing units are operating providing employment to over one million people, significantly contributing to rural employment and poverty reduction. (NABARD, 2020 & 2023-24)



## Women's empowerment and enhancing roles in agriculture

Women's participation in **agricultural cooperatives and self-help groups** has empowered them economically and socially. For example, self-help groups, village organisations, and cluster level federations have more than 15 lakh women members associated with agriculture related activities. These women have notable increase in income and improved decision-making power within their household.

## Rural infrastructure development

The improved agricultural practices and economic growth have spurred **rural infrastructure development**. The **Pradhan Mantri Gram Sadak Yojana** has constructed over 15000 km of rural roads in Gujarat, connecting villages to main roads, thereby enhancing market access and reducing transportation costs.

## Challenges and the Road Ahead

While Gujarat's agricultural sector has made significant strides, several challenges remain.

## Climate change and sustainability: Preparing for the Future

Gujarat faces significant risks due to climate change. There is a need for adopting measures and sustainable practices such as water conservation, soil health management, and climate resilient crop varieties, which are essential to mitigate these impacts.

## Market access and price volatility: Ensuring Stability

Strengthening market linkages, promoting farmer-producer organizations (FPOs) and enhancing digital platform roles to mitigate these issues.

## Water Management: Sustaining the Lifeline of Agriculture

Quality of groundwater is inferior along the coast, the **Rann** and in the low-lying **saline tracts** between **Saurashtra and main land Gujarat**. The deterioration of in groundwater quality in the coastal areas is mainly due to **over-drawls** causing sea-water ingress which needs to be arrested. **Promoting water efficient crops** and technologies and stricter regulations in water use are crucial for long term water security.

## Way Forward

Sustainable agricultural practices are crucial for long-term productivity and environmental health. Key strategies include soil testing, **conservation tillage**, and **sustainable farming**. The adoption of advanced technologies like **remote sensing, GPS, drones and AI can optimize** agricultural operations. Additionally, **renewable energy** use and **bioenergy** production from agricultural residues should be encouraged.

To mitigate climate risks, **climate-smart practices** that reduce greenhouse gas emissions and enhance resilience are essential, along with **timely weather advisories** for farmers. Investment in **agricultural research**, especially in **climate-resilient crops**, efficient water use, and novel fertilizers, is necessary. Public-Private Partnerships and **digitization of agriculture**, including IoT and AI, can improve resource management.

Strengthening market linkages, investing in **processing facilities**, and developing **traceability systems** are vital for robust value chains. To enhance food security and nutrition, promoting **biofortified crops**, nutrition education, and awareness about food waste is key.

As Gujarat's agriculture sector becomes demand driven and has access not only to domestic but also international market, the geopolitical tensions can affect exports. There is a need to have a mechanism to mitigate such risks.

## Conclusion

In conclusion, the structural transformation of agriculture in Gujarat over the last two and a half decades is a story of **resilience, innovation and growth**. From a subsistence-based economy to a diversified and market-oriented agricultural sector, Gujarat has set an example for other States in India.

However, as we celebrate these achievements, we must also recognize the challenges that lie ahead. With **climate change** and **geopolitical tension**, more uncertainties can arise. Sustainable practice, inclusive growth and adaptive strategies are essential to ensure that Gujarat's agricultural sector continues to thrive in the face of changing global and local dynamics.

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