

Mission YUVA

In a rapidly changing world, the role of youth in shaping national discourse has never been more critical. Recognizing this, the Government of India launched Mission YUVA (Young, United, Vibrant, and Aspirational), a visionary initiative aimed at engaging the nation's youth in discussions about history, culture, and contemporary socio-political issues. At its core, Mission YUVA seeks to create a generation that is not only aware of India's rich heritage but also capable of participating meaningfully in nation-building.

The initiative primarily targets students and young professionals between the ages of 15 and 29, encouraging them to delve into India's historical and cultural legacy through workshops, mentorship programmes, and writing competitions. By doing so, it nurtures critical thinking, analytical abilities, and effective communication skills-qualities essential for the leaders of tomorrow. Importantly, Mission YUVA is not confined to classroom learning; it is an experiential platform where youth can interact with scholars, historians, and policymakers to gain a nuanced understanding of India's past and present.

One of the standout features of the programme is its emphasis on written expression. By encouraging participants to write essays, opinion pieces, and research articles, Mission YUVA provides a platform for young voices to articulate their perspectives on topics ranging from history and governance to social reforms and contemporary challenges. This process not only improves literacy and articulation skills but also cultivates a sense of civic responsibility. Moreover, the initiative embodies the vision of a digitally connected and informed youth community. With webinars, online workshops, and interactive sessions, Mission YUVA leverages technology to reach students in even the most remote corners of the country. In doing so, it ensures inclusivity and equal opportunity for participation, reinforcing the democratic ethos of knowledge sharing.

Mission YUVA also aligns with India's broader goal of building a knowledge-driven society, where young citizens are equipped to think critically, challenge misconceptions, and contribute to policy discourse with informed perspectives. By linking historical awareness with contemporary relevance, the initiative bridges the gap between academic learning and real-world application.

Mission YUVA is more than a government programme-it is a movement that empowers India's youth to become responsible, informed, and articulate citizens. It is a platform where history, culture, and contemporary issues converge, inspiring the next generation to take active roles in shaping the nation's future. As India marches ahead in the 21st century, initiatives like Mission YUVA are crucial to ensuring that its youth are not only beneficiaries of development but also active contributors to the country's progress and prosperity.

From Paper Files to Predictive Care: The Digital Transformation of Indian Hospitals

■ DIVYAVASU SHARMA

For decades, Indian hospitals relied on paper-driven processes handwritten prescriptions, manually prepared discharge summaries, and physical files that moved slowly across departments. While clinical expertise remained strong, administrative inefficiencies were common. That model is now steadily giving way to digitised, integrated systems that are reshaping how hospitals function.

At the centre of this transformation is the Hospital Management Information System (HMIS), which has evolved from a billing utility into the operational backbone of modern medical institutions.

From Records to Real-Time Systems

Early hospital software focused largely on registration and billing. Today's HMIS platforms integrate clinical workflows, pharmacy, laboratory and radiology reporting, insurance processing, inventory, and analytics within a unified digital framework. This shift aligns with broader efforts such as the Ayushman Bharat Digital Mission, which seeks to build interoperable digital health infrastructure.

But the push towards digitisation is not policy-driven alone. Rising patient loads, expanding insurance coverage, regulatory compliance requirements, and expectations of transparency have made fragmented systems unsustainable. Hospitals increasingly require centralised digital platforms that enable coordination and accountability.

Changing Attitudes in Clinical Practice

Digitisation was once met with hesitation among clinicians, who feared increased documentation burdens and disruption to patient interaction. That perception is changing. Automated prescription systems ensure clarity and reduce medication errors. Integrated alerts flag



potential drug interactions and dosage inconsistencies. Longitudinal access to laboratory and imaging records enables doctors to assess trends rather than isolated data points. Structured electronic records also facilitate quicker follow-ups, automated reminders for chronic patients, and consolidated case histories.

These systems do not replace clinical judgement; they strengthen it. By reducing clerical workload and improving access to information, HMIS platforms allow doctors to focus more on decision-making and patient engagement.

Efficiency Across the Care Continuum

The expansion of e-consultations and remote workflows has further accelerated digital adoption. Electronic discharge summaries, online report access, digital billing, and remote consultations reduce repeat hospital visits and administrative delays. For patients, this means shorter waiting times and greater convenience.

For hospitals, it improves bed turnover, documentation accuracy, and audit readiness. Even incremental efficiency gains become significant in high-volume set-

tings. Digitisation, therefore, enhances both patient experience and institutional productivity.

AI-Based Clinical Decision Support

The most consequential development is the integration of AI-enabled Clinical Decision Support Systems (CDSS) within HMIS platforms. When patient data are digitised and structured, they generate insights beyond routine record-keeping. AI extensions can highlight abnormal lab trends, flag early warning indicators in critical care, suggest evidence-based treatment pathways, and identify high-risk cases requiring closer monitoring. In resource-constrained environments, such support systems can help standardise aspects of care and reduce preventable errors. Importantly, these tools function as clinical aids rather than substitutes. They provide timely prompts and structured analysis, enabling physicians to make more informed decisions under time pressure. The shift from documentation to predictive analytics marks a structural change in hospital practice.

Alignment

Simultaneously, the rapid growth of health insurance in India has increased documentation complexity. Multiple insurers and government schemes operate with varying requirements. A dynamic HMIS helps standardise coding, streamline pre-authorisations, and reduce claim rejections. For patients, smoother insurance processing reduces discharge delays and financial uncertainty. For hospitals, it strengthens revenue cycle management and compliance. In this context, digitisation directly influences both care delivery and financial sustainability.

A Foundational Shift

An effective HMIS today supports not only daily operations but strategic oversight. Real-time dashboards enable hospital leadership to monitor utilisation rates, infection trends, and performance indicators. Decisions increasingly rely on data rather than retrospective assessments. Challenges remain including data privacy safeguards, interoperability standards, and training of personnel. Yet the direction of change is clear. The movement from paper files to predictive care reflects more than technological adoption. It represents a reorganisation of hospital management around integration, intelligence, and responsiveness. Institutions that effectively combine robust HMIS platforms with AI-based clinical decision support are likely to set new benchmarks in efficiency, safety, and quality of care. The transformation is no longer optional. It is foundational to the future of healthcare delivery in India.

(The writer is a Software Engineer with more than seven years of experience in the field of healthcare automation and AI)

The Economy Through a New Lens: Understanding India's GDP Base Revision

■ SH. SAURABH GARG



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Gross Domestic Product or GDP, is a way to measure the size and health of a country's economy, more like a report card for a nation, it tells us how much the country is producing in terms of goods and services. When GDP is growing, it usually means businesses are producing more goods and services, more people are getting jobs, and incomes are rising. GDP also matters on the global stage. India currently ranks among the world's top five economies and is projected to become the third largest by 2030.

GDP, as an instrument to measure the economy, needs regular calibration to capture the economy's accurate pulse and this is achieved through updating the base year of GDP at regular intervals to keep pace with a changing economy. As the economy reshapes itself, new industries emerge, consumption patterns change and new data sources evolve, revisions help the official data catch up with the realities and make the estimates more accurate and robust.

Availability of new data sources since the last base revision have helped us view the sectoral and regional contributions to GDP more clearly and adopt better methods, for instance, to estimate the value added by the unincorporated sector broadly covering the informal sector also.

In the intervening period since the last base revision, among others, some new data sets like Management & Administration related data (MGT-7/7A) for companies have become available that pro-

vides information on the number of business activities undertaken by the enterprise, description of business activity as per NIC 2008 and percentage turnover from each business activity (industry) for each year. So, while rebasing, for multi-activity enterprises, value added is now allocated across activities based on newly available MGT-7 data rather than entirely to the major activity as was done earlier. This change allows us to capture sectoral contributions more accurately, providing a clearer view of how each business activity drives the economy.

Just as new company-level data helps us measure sectoral contributions more accurately, enhanced use of GST data in the new series allows for a finer, more precise view of regional contributions of GDP by inter alia, improving regional allocation pertaining to private corporate sector and through better compila-

tion of expenditure-side estimates at state level. Availability of annual data from surveys like ASUSE and PLFS that wasn't available earlier has also allowed us to adopt a better methodology for estimating value added by unincorporated sector annually, instead of inferring its contribution to GDP indirectly from other indicators, as was done before. This matters because this sector, comprising of millions of household businesses, small shops, and self-employed workers, forms a huge part of the economy and plays a vital role in jobs and livelihoods.

The base revision is more than just use of new data sources, it is also about improvements in methodology as well, and in this regard, the new GDP series has seen a number of methodological improvements. Earlier, double deflation, a detailed method to adjust the GDP for changing prices was applied only to agricul-

ture sector. In the new 2022-23 series, double deflation has been expanded to manufacturing sector where sufficient data is now available and single extrapolation/volume extrapolation is used in all other sectors. This approach makes the best use of the data at hand, keeping the estimates as accurate and reliable. Double deflation is very data-intensive, as it requires detailed information on prices for both outputs and inputs. As more of this data becomes available over time, we will be able to expand its use to more sectors.

A notable methodological improvement is the alignment of estimates of the economy based on what is produced (production side) and what people and businesses spend (expenditure side). The two often don't match perfectly, a common occurrence in countries around the world, especially in quarterly GDP. To address this issue, in the new series, the framework of 'Supply &

Use Tables' is being used to ensure that discrepancies are limited in the early estimates and finally eliminated when full set of data becomes available at the time of final estimates.

The updated GDP is like looking at the economy through a sharper lens. Every economic activity, big or small, comes into clear focus, accurately revealing its contribution to the nation's growth. By using better data, refining methods, and aligning with international best practices, the Ministry has brought the economy into sharper view. For citizens, this means that policies and public services are guided by an accurate understanding of how the economy works, making growth something that is felt in everyday life, not just on paper.

(The Author is Secretary, Ministry of Statistics and Programme Implementation. Views are personal)

Soil Health Enhancement in Horticultural Ecosystems Using PGPR

Innovations in Microbial Interventions for Productivity, Nutrient Cycling, and Stress Management

■ PROF. (DR.) PARSHANT BAKSHI

Horticulture has emerged as one of the most dynamic and growth-oriented sectors of Indian agriculture. It contributes substantially to nutritional security, diversification of farm incomes, employment generation, and export earnings. However, the long-term sustainability of horticultural production systems is increasingly threatened by declining soil health, nutrient imbalance, excessive reliance on chemical inputs, and heightened vulnerability to climate-induced stresses. Plant Growth-Promoting Rhizobacteria (PGPR) have emerged as an eco-friendly, scientifically validated technology capable of restoring soil microbial balance and improving overall horticultural productivity to overcome these challenges. PGPR-based interventions align closely with the principles of sustainable and climate-smart agriculture. PGPR serve as natural bio-fertilizers, bio-stimulants, and bio-control agents, making them an integral component of climate-smart and sustainable horticulture. Recognizing this potential, the Division of Fruit Science at Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu (SKUAST-J) has been actively integrating PGPR research with field-level horticultural practices and farmer outreach programmes. This work spans a range of crops including strawberry, litchi, dragon fruit, citrus, and cape gooseberry, demonstrating the practical relevance of microbial technologies under diverse agro-climatic conditions.

Understanding PGPR and Their Functional Role

Plant Growth-Promoting Rhizobacteria are a diverse group of beneficial microorganisms that colonise the rhizosphere-the narrow zone of soil influenced by plant roots. Their significance lies in their ability to enhance plant growth through a combination of direct and indirect mechanisms that improve nutrient availability, root devel-

opment, disease suppression, and stress tolerance.

Nutrient Mobilisation and Cycling

One of the most critical contributions of PGPR is their role in improving nutrient dynamics in soil. Certain bacterial species such as Azotobacter and Azospirillum possess the ability to fix atmospheric nitrogen and convert it into plant-available forms, thereby supplementing nitrogen nutrition in horticultural crops. This biological nitrogen fixation reduces dependence on synthetic nitrogen fertilisers, which are both costly and environmentally damaging.

Phosphorus, another key nutrient, often exists in soils in insoluble forms that are inaccessible to plants. Phosphate-solubilising PGPR release organic acids such as gluconic, citric, and lactic acids, which mobilise fixed phosphorus and enhance its availability in the root zone. In addition, PGPR facilitate the mobilisation of micronutrients such as iron, zinc, and potassium through mechanisms like siderophore production and chelation, addressing widespread micronutrient deficiencies observed in intensive horticultural systems.

Regulation of Plant Growth and Root Architecture

PGPR are known to synthesise a range of phytohormones that directly influence plant growth and development. Auxins promote root elongation and lateral root formation, leading to greater soil exploration and nutrient uptake. Gibberellins stimulate stem elongation and overall vegetative growth, while cytokinins enhance cell division and delay leaf senescence. Collectively, these hormonal effects result in stronger root systems, improved nutrient-use efficiency, and better crop vigour-attributes that are particularly important in perennial fruit crops.

Biocontrol of Soil-Borne Pathogens

Another major advantage of PGPR lies in their capacity to suppress soil-

borne diseases. Certain strains produce antibiotics such as phenazines, volatile compounds like hydrogen cyanide, and lytic enzymes including chitinases and glucanases that degrade the cell walls of pathogenic fungi and bacteria. Siderophore production further deprives pathogens of iron, limiting their proliferation. Through these mechanisms, PGPR reduce the incidence of root rot, wilt, and damping-off diseases, thereby lowering the need for chemical pesticides and contributing to safer food production.

Enhancement of Abiotic Stress Tolerance

In the face of climate variability, PGPR play a crucial role in enhancing plant resilience to abiotic stresses such as drought, salinity, nutrient deficiency, and temperature extremes. The production of ACC deaminase helps lower stress-induced ethylene levels in plants, while osmolytes and exopolysaccharides protect root cells and improve soil aggregation. These attributes make PGPR particularly valuable for horticulture in stress-prone environments.

PGPR in Horticultural Crops: Research Evidence

Extensive field and laboratory studies demonstrate PGPR effectiveness in various horticultural crops:

- a. Chili (Capsicum spp.)
 - o Inoculation with specific PGPR strains allowed a 25% nitrogen fertilizer reduction with no loss in yield.
 - o Improved fruit size, colour, and capsaicin content.
- b. Bell Pepper (Capsicum annum)
 - o PGPR consortia involving Paenibacillus, Bacillus, and Klebsiella enhanced overall plant vigour.
 - o Yield increased significantly with incremental PGPR application units.
- c. Vegetable Crops (Tomato, Cucumber, Brinjal)
 - o Enhanced nutrient-use efficiency.
 - o Higher fruit firmness, TSS, lycopene content in tomato.

Reduction in wilt and root rot diseases.

d. Fruit Crops (Guava, Mango, Strawberry, Citrus)

PGPR-treated plants showed improved nutrient content, antioxidant levels, and shelf life.

Significant reduction in post-harvest losses due to better skin resistance and firmness.

e. Polyhouse and High-Density Orchards

PGPR enhance root development in intensive systems, improving water-use efficiency and reducing fertigation load.

India's Soil Health Scenario: Challenges & Opportunities

37% of India's land faces degradation (ICAR).

Excessive chemical fertilizer use has reduced soil organic matter.

Declining microbial diversity leads to poor nutrient cycling.

Imbalanced fertilizer application causing micronutrient deficiencies.

Government Initiatives Supporting Soil Health

Soil Health Card Scheme
25 crore+ cards distributed
o 8,272 soil testing labs operational

o Soil maps created for 40 aspirational districts

Natural Farming Programs promoting microbial-based farming

Per Drop More Crop encourages fertigation and precision agriculture

PMKSY, HADP, MIDH, and other missions integrate soil conservation and efficiency.

These initiatives create a favourable ecosystem for promoting PGPR adoption nationwide.

How PGPR Helps to Achieve PM Modi's Vision for Sustainable Agriculture

a. Soil Health Improvement

PGPR restore microbial balance, enhance nutrient cycling, and improve soil structure.

They reduce soil compaction and increase organic carbon through microbial turnover.

b. Reduction in Chemical Fertiliser Dependency

With SHC already achieving 8-10% reduction in fertilizer use, PGPR can amplify this shift.

PGPR act as natural substitutes for NPK and micronutrient supplements.

c. Quality Enhancement of Horticultural Produce

Improved nutritional value (Fe, Zn, Ca, antioxidants).

Better aroma, firmness, TSS, colour development in fruits.

Lower pesticide and fertilizer residues make produce export-friendly.

d. Increased Farmer Income

Decreased input costs: biofertilizers are cheaper than chemical fertilizers.

Improved yield quantity and quality increases market value.

Better soil health reduces long-term crop failure risks.

e. Climate-Resilient Agriculture

PGPR help plants tolerate drought, salinity, and heat stress.

Crucial for horticulture under climate change scenarios.

Practical Implementation Strategies

a. Localised PGPR Strain Selection

Region- and crop-specific inoculants perform more reliably than generic strains.

b. Integration with SHC Data

Nutrient-deficient soils can be matched with targeted PGPR types (e.g., P-solubilizers for P-deficient soils).

c. Farmer Training & Awareness

Demonstrations and field schools to show benefits under real conditions.

Training on application timing (seedling, transplanting, fertigation, foliar).

d. Industry Regulation

Standardization of microbial load (cfu/ml)
Shelf-life monitoring
Certification for commercial prod-