

BOOK REVIEW

A Review of *Code Paroda: A Life in Service of Agricultural Science*

Code Paroda. Sanjay Kumar and Arun Tiwari. A memoir of Dr RS Paroda as narrated to the authors. 422 pages.

Code Paroda, narrated by Dr Rajendra Singh Paroda to authors Sanjay Kumar and Arun Tiwari, is at once a personal memoir, an institutional history, and a sustained meditation on the purpose and practice of public agricultural science in India. Organised in four parts — “Making of the Man,” At the Helm, “Ascend,” and “Legacy” — the book covers, across 422 pages, a professional life that began in the agrarian landscape of Rajasthan in 1942 and has engaged with nearly every significant institution and policy development in Indian agricultural research across seven decades. It is a book that will reward readers at multiple levels: agricultural scientists and students will find in it both a career model and a map of the research ecosystem; historians of science and policy scholars will find rich primary material on institutional decision-making across a formative period; and general readers with an interest in India's development trajectory will find it an

illuminating account of how a postcolonial nation built, tested, and gradually transformed its scientific infrastructure for food and agriculture.

The book's great strength is its density of concrete detail. Names, dates, projects, partnerships, and policy moments are woven together with the authority of first-person recollection, offering an account of institutional life that no external history could fully reconstruct. The narrative is candid about personal adversity, generous toward collaborators, honest about institutional limitation, and consistently grounded in a conviction that science in the service of farmers and rural communities is both a moral vocation and a technical one. The result is a text that reads, at different moments, as biography, administrative memoir, and professional testament — a combination that is unusual in Indian scientific literature and valuable for precisely that reason.

PART I — MAKING OF THE MAN: FORMATION, EDUCATION, AND EARLY RESEARCH

Dr Paroda was born on 28 August 1942 into a moderately well-off farming family in Ajmer, Rajasthan. The opening section of the book traces the formation of a scientific temperament through a social and educational environment that valued curiosity, discipline, and ethical conduct. His primary school teachers created an environment in which learning was a source of genuine joy, and cultivated in their students honesty, respect, responsibility, and perseverance, as well as the capacity to cooperate, empathise, acknowledge differences, and resolve conflict constructively. Rajasthan's cultural landscape, saturated with Bhakti and Sufi traditions, reinforced values of humility and service that recur throughout the professional life the book describes.

By Class 10, he had resolved to study agriculture. His father's counsel at this juncture was important: rather than directing his son toward the nearest agricultural institution, he encouraged him to aspire more widely,

citing the Agricultural College, Pune, as a worthy destination. Dr Paroda ultimately enrolled in B.Sc. (Agricultural Sciences) at Dayanand Anglo-Vedic (DAV) College, Ajmer — joining after the close of admissions, a detail the book offers as an early illustration of determination — and was elected President of the Agricultural Students Union. He subsequently pursued M.Sc. (Agriculture) at Rajasthan College of Agriculture, Udaipur, in 1962, shifting from agronomy to plant breeding and genetics, a disciplinary reorientation that would define his research contributions for decades. He topped his class and received a gold medal from Union Minister Morarji Desai in 1964.

He was selected for a PhD in Genetics at IARI, where Dr MS Swaminathan headed the division, and completed his doctoral work under the guidance of Dr A.B. Joshi on wheat genetics — at the precise historical moment when India's Green Revolution was gathering force. The intellectual climate at IARI during this period,

fostered by a remarkable concentration of scientific talent, is described as “a fertile ground for nurturing talent with ripple effects” whose consequences for Indian agricultural science can scarcely be overstated. His mother's encouragement, after the PhD, to go further rather than rest is among the book's more affecting passages. He was awarded a Commonwealth Scholarship in August 1968 and proceeded to the University of Wales under Prof Hugh Rees to work on barley, broadening his research experience and his understanding of international agricultural science.

Returning to India, he joined Haryana Agricultural University (HAU) in January 1971 as an Associate Professor, leading a team of twelve scientists. At HAU, he identified a systemic consequence of the Green Revolution that had received insufficient attention: the widespread adoption of high-yielding varieties had reduced fodder availability, as inedible stalks replaced traditional straw and pasture lands contracted. His group responded by developing more than ten varieties and hybrids of forage crops over seven years — an illustration of systems-level thinking that would characterise his approach to research problems throughout his career. In 1977, he was appointed Project Coordinator (Forage Crops) at ICAR Headquarters, Krishi Bhawan, at the initiative of Dr Bhumbla, DDG (Natural Resource Management), and was subsequently selected as Head, Division of Plant Studies, CAZRI, Jodhpur.

The death of his first wife, leaving two young daughters, is narrated with characteristic restraint. To cope with this tragedy, he moved to HAU as Head of the Department of Plant Breeding, where he cultivated a vibrant academic culture: recruiting beyond established networks, publishing actively, securing research funding, and extending technology transfer to resource-poor areas. He founded the Indian Society of Forage Research in 1979, married Dr Shashi Tomar in 1979, and was blessed with a son on 30 July 1980. His retrospective reflection — that those years were defined not only by scientific work but by perseverance as a form of professional and personal discipline — runs as an animating thread through the rest of the book.

The section pays generous tribute to Dr Harbhajan Singh, Head of the Plant Introduction Division, IARI and described here as the “Vavilov of India,” whose example inspired Dr Paroda's long commitment to building genetic resource infrastructure. After his appointment as Director, NBPGR, Dr Paroda approached Dr Randhawa, DG of ICAR, for institutional support; receiving assurance of backing except for land and funds, he pursued an international partnership. The

outcome was the Indo-USAID Plant Genetic Resources Project, valued at \$21.66 million, through which 100 NBPGR staff received advanced training in the United States — a capacity-building initiative whose scale set a benchmark for international collaboration in Indian agricultural science.

As DDG (Crop Science) from 1987, Dr Paroda's capacity to translate scientific insight into policy found clear expression in the New Seed Development Policy of 1988. Grounded in self-reliance and marking the transition beyond Green Revolution-era variety dependency, the policy bore tangible results within five years: India produced its first hybrid rice after China, its first single-cross maize hybrid, and the first hybrids of safflower, castor, and pigeonpea. The National Research Centre for Plant Biotechnology (NRCPB), created in 1985 under Dr V.L. Chopra, had meanwhile begun advancing molecular biology and biotechnological research. The Technology Mission on Oilseeds (TMO), launched in 1986, provided a critical institutional bridge between biotechnology, breeding, and policy. As head of TMO from 1988 to 1994, Dr Paroda oversaw a transformation from importing approximately 60 per cent of edible oils to near self-sufficiency. Contributions through an expert committee under the Planning Commission increased pulses production by 4 million tonnes, significantly reducing imports. Along with Dr MS Swaminathan and Dr NS Randhawa, he was a founding member of the National Academy of Agricultural Sciences (NAAS) in 1990.

This period overlapped with the macro-policy disruptions of the early 1990s. Liberalisation under Prime Minister PV Narasimha Rao and Finance Minister Manmohan Singh, while consolidating food grain self-sufficiency, exposed agriculture to new market pressures through the removal of export barriers and subsidy rationalisation. Balram Jakhar served as Union Agricultural Minister through this transition. It was a context that demanded of scientific institutions both ideological flexibility and structural coherence. When the ICAR Director Generalship was awarded to Dr VL Chopra — the book acknowledges this openly — Dr Paroda accepted an invitation from Dr RB Singh to join FAO in Bangkok as Regional Plant Production and Protection Officer. His observations of Southeast Asian agricultural systems — their integration of rice, water management, and horticultural production within frameworks of moderation and self-sufficiency — enriched a perspective hitherto anchored mainly in South Asian priorities. APAARI, established in 1990, became an important institutional home: Dr RB Singh served as its first Executive Secretary; Dr Paroda

followed as the next. Encounters during these years with Dr Wang Lianzheng (China), Dr Zafar Altaf (Pakistan), and Dr William Dar (Philippines) — the last distinguished by his advocacy of participatory and

servant-leader approaches to science management — broadened his conception of what agricultural leadership could look like across diverse political and cultural settings.

PART II — AT THE HELM: THE ICAR DIRECTOR GENERALSHIP (1992–1998)

Part II is the book's most analytically substantial section, and the one of greatest relevance to readers interested in the governance and direction of national agricultural research systems. It opens with an epigraph that sets its register: "When the sower becomes the steward, the harvest is not only of grain but of the futures — nurtured through vision, tested by fire and made abundant by science." Dr Paroda assumed charge as Director General of ICAR in 1992 and served until 1998, years coinciding with India's economic liberalisation and a fundamental reorientation of its agricultural ambitions.

His first act on taking charge was to listen rather than direct — extensive consultation with colleagues and seniors about institutional priorities. The philosophy he articulates is explicit and instructive: the circle of concern is wide, but proactive leadership must concentrate on the circle of influence; responsibilities must be communicated honestly and boundaries respected. Vision 2020 for ICAR was developed not as a headquarters prescription but through genuine collaboration with all SAUs and ICAR institutions across a 25-year planning horizon. Consultation drew in Dr Uma Lele (economist), Dr YK Alagh (VC, JNU), Dr KL Chadha, Dr EA Siddique, and past DGs of ICAR, reflecting a commitment to management by consultation that defined the tenure.

The institutional infrastructure created during these seven years was substantial. New ICAR establishments included specialised bureaus for animal, fish, microbial, and insect genetic resources; a National Gene Bank; a National Agricultural Research Centre; National Agricultural Science Complex (NASC) complex; and regional offices of CGIAR centres in India. The 2nd International Crop Science Congress was co-organised alongside Dr MS Swaminathan in 1996. The Asia and Pacific Seed Association (APSA) was initiated in 1994. Research outcomes of note included Dr Siddique's leadership in developing Pusa RH-10 (Sugandhit Dhan, a fragrant rice hybrid), and the contributions of Dr Vasal and Dr NN Singh to Quality Protein Maize — work the book uses to illuminate the genetic mechanism of heterosis, whereby hybrids

activate hundreds of genes silent in either parent, increasing both the diversity and quantity of active gene expression.

A significant policy decision of this period was the opening of ICAR's public seed lines to private sector collaboration: parental lines were shared with domestic companies, and foreign companies were permitted to form joint ventures. This represented a considered response to the growing role of private investment in vegetable and fruit hybrid development, and it was calibrated to maintain public-interest breeding alongside private sector dynamism. Krishi Anusandhan Bhawan-II was planned as a centrally air-conditioned facility. The National Phytotron Facility (NPF) at IARI was established to enable controlled-environment research. India's accession to the WTO in 1995 created new imperatives for export-oriented agricultural development to which the research system was required to respond.

Administrative innovations during this tenure deserve equal attention. A transparent, merit-based incentive system was established to recognise research, teaching, and extension — an alignment of individual incentives with institutional mission that remains a benchmark in public research management. Structured, regular consultation was instituted among CSIR, DRDO, DBT, and ICAR to foster collaboration and reduce duplication. He chaired the Global Forum on Agricultural Research (1998–2002) within FAO and Executive Secretary, Asia Pacific Association of Agricultural Research Institutions (APAARI), 1993–2014. The National Agricultural Technology Project (NATP) was launched in 1998, and the Padma Bhushan was conferred in the same year. The book's observation on institutional quality is direct and bears quoting:

"Institutions are fundamental to a country's development and stability; however, if institutions become corrupt, outdated, or weak, they may hinder progress and lead to instability."

Coming from a scientist who spent a career within these structures, this is not an observation of abstract pessimism but of clear-eyed, reformist conviction.

ADVERSITY AND PROFESSIONAL CONDUCT: A STOIC INTERLUDE

In 2001, despite a record of sustained achievement, Dr Paroda was placed “on compulsory wait till further orders” on the basis of what he characterises as unfounded allegations of irregularities in computer procurement. The Central Joint Staff Council (CJSC), the Agricultural Research Scientists Forum (ARSSF), and large sections of the agricultural fraternity criticised the government's decision. He was ultimately vindicated, with all allegations found to be without merit. The Agricultural Minister requested him to continue as DG, ICAR. He declined and sought voluntary retirement with two years of service remaining.

The book's account of this episode is one of its most instructive passages. Turning to Stoic philosophy, Dr Paroda articulates a discipline of response that refuses to convert temporary adversity into permanent bitterness: to avoid consequential decisions under duress, to wait with patience for clarity, and to redirect energy toward constructive purpose. His wife's characterisation — that small minds fixate on petty

allegations — captures the disposition the book advocates throughout: proceed, build, contribute. It is a model of professional conduct under institutional pressure that scientists and administrators at any career stage will find worth considering.

Even through this period, substantive work continued. The 88th Indian Science Congress, held at IARI from 3 to 6 January 2001 and attended by some 5,000 scientists, produced a Vision 2020 statement drafted collectively by the presidents of all academic societies: “By 2020, India will be free of poverty, hunger, and malnutrition and become environmentally safe.” Dr APJ Abdul Kalam, chief guest, articulated national targets of 9–11 per cent economic growth, negligible poverty, and a rise to the world's fourth-largest economy. Simultaneously, Dr Paroda was pursuing consensus on the draft Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA). On 7 January 2001, the idea of the Trust for Advancement of Agricultural Sciences (TAAS) crystallised — an initiative that would become, in the years that followed, one of his most enduring contributions.

PART III — ASCEND: INTERNATIONAL ENGAGEMENTS AND POST-ICAR CONTRIBUTIONS

Part III, subtitled “Knowledge ripens through struggle,” documents what is better described as a second career than a post-retirement chapter. Its philosophical preoccupation — the value of acting with integrity rather than assertion, of navigating complexity with humility — gives coherence to a set of activities that span institutional development, international research collaboration, science-policy engagement, and the cultivation of young talent.

TAAS took shape as what the book calls “a slow, almost organic synthesis — shaped by dialogue, reflection, and shared conviction.” Dr Nagarajan, then Director of IARI, provided land; Dr NN Singh became founding secretary. TAAS instituted the Dr MS Swaminathan Award for Leadership in Agriculture in 2004, followed by the Dr SK Vasal Award for Excellence in Crop Hybrid Research and the Dr Norman E Borlaug Innovative Farmer Award. Sustained support from Dr SM Sehgal, Dr BR Barwale, NSAI, APAARI, select SAUs, and CGIAR Centres provided the institutional base for these activities.

Dr Paroda led a World Bank-funded ecoregional programme for sustainable agricultural development in Central Asia and the Caucasus under ICARDA (2001–

2007). The programme's principal components — no-till practices in wheat-fallow monocultures, the CERES-Wheat simulation model (Crop Estimation through Resource and Environment Synthesis), and the Kazakhstan–Siberia Network for Spring Wheat Improvement (KASIB) — contributed measurably to the development of climate-resilient varieties with improved yield, quality, and disease resistance. His approach throughout these engagements was consistent: work alongside local scientists and institutions, build bridges for scientific collaboration rather than transplant solutions. The Global Forum for Agricultural Research (GFAR), established and governed by a steering committee rather than a single chairperson, institutionalised this collaborative logic at the global level. Contributions to the rice–wheat consortium network spanning Bangladesh, India, Pakistan, and Nepal extended it across South Asian agro-ecologies with significant documented impact.

On biotechnology, the book is analytically careful and politically candid. Dr Paroda commends the foundational contributions of Dr Manju Sharma and Dr Gargi Vachaknavi to India's biotechnology institutions and regulatory frameworks. He argues that if genetic

modification could rescue a fibre crop from systemic collapse, it could equally address India's long-standing vulnerability in food oils and protein. His observation that a technology developed in Indian laboratories was adopted in Bangladesh while denied to Indian farmers encapsulates a regulatory and policy paradox whose resolution remains a live debate. His position is clearly stated: regulation should be the intelligent enabler of progress — transparent, fair, and timely — rather than its chronic inhibitor. He calls for an evidence-based, proactive approach to GM technologies: examine, test, adapt, and implement responsibly. The structural disconnect between scientific progress and systemic response, and the consequent need for honest communication between research and policy communities, are themes whose relevance extends well beyond the biotechnology debate.

Twenty-two universities conferred honorary doctorates upon him — recognitions he regards not as personal accolades but as affirmations of a mode of practice: standing by farmers, by evidence, and by the long-term arc of scientific accountability. In May 2024, Dr SK Vasal delivered a special lecture at TAAS illustrating that important agricultural traits — nutrition, stress tolerance, yield — rarely travel alone, being governed by many genes in complex interaction. He reminded the audience that scientific leadership must give equal priority to building infrastructure and to cultivating ideas. Agricultural science is characterized by scientists who choose the long, uncertain path of discovery as “quiet warriors of light” — working without spectacle, often without assurance of recognition, yet persisting in illuminating natural processes so that society moves incrementally toward greater food security.

SCIENCE–POLICY INTERFACE: DIALOGUES, DECLARATIONS, AND INSTITUTIONAL ADVOCACY

The years from 2001 reveal a sustained pattern of structured scientific advocacy: convening multidisciplinary groups around specific policy challenges, producing evidence-based outputs, and pursuing their incorporation into government policy and programmes. In 2005, TAAS held a two-day brainstorming session on the role of science and society in plant genetic resources management. In 2009, a workshop on emerging challenges in Indian agriculture was held in association with IFPRI; a subsequent workshop on farm animal genetic resources conservation culminated in the Ranchi Declaration, hosted at Birsa Agricultural University. In 2010, a national dialogue on building leadership in agricultural

research management was organised with NAARM. In 2015, deliberations on soil health and nutrition management fed directly into the Government of India's Soil Health Card Scheme, launched in 2015–16. In 2016, the International Agrobiodiversity Congress, co-chaired by Dr Paroda and Dr MS Swaminathan, produced the Delhi Declaration on Agrobiodiversity Management. In 2023, a workshop on climate change, soil quality, and food security — chaired by Dr MS Swaminathan at the NASC Complex — reached a collective conclusion that without conservation agriculture, climate-resilient varieties, and efficient water and nutrient management, food security itself would be placed at risk. The book records in some detail the substantive conversations among participants at each of these events, providing a valuable record of science–policy interface in practice.

The Global Conference on Agricultural Research and Development at Montpellier in 2010, where Dr Paroda chaired the Technical Programme Committee and ensured participation of youth and women from over 100 countries, gave rise to YPARD (Youth Platform for Agricultural Research and Development). His subsequent work as chair of the Haryana Farmers Commission (2010–14) reinforced a conclusion the book states with directness: agricultural curricula regularly fail to keep pace with technological change, evolving markets, and the skills demanded by contemporary farming and food systems. Agriculture must be repositioned, he argues, not as a single occupation but as an ecosystem of opportunity — one capable of producing a generation of agripreneurs. The observation that young people do not reject agriculture but reject stagnation is one of the book's most incisive and actionable insights.

Regional platforms — APCoAB, APARIS, GFAR, APAARI — are cited as essential architecture for translating scientific knowledge across agro-ecologies and political boundaries. At the domestic level, Krishi Vigyan Kendras (KVKs) should function not as peripheral outposts of research institutions but as genuine nerve centres of rural knowledge systems: hubs of innovation, skill development, and rural enterprise, organically connected to village realities. The concept of bio-digital resource centres — integrating genetic data, breeding programmes, and farmer networks — is proposed as the appropriate institutional form for the next generation of agricultural science.

On the political economy of Indian agriculture, the book is frank. Citing former World Bank Vice President Ismail Serageldin, Dr Paroda warns that without serious

attention to structural inequality, India risks bifurcating into “half California and half sub-Saharan Africa.” Food security without rural prosperity is fragile; rural prosperity without sustainable food systems is short-lived. On farm policy, he argues that the shift from subsidies to incentives must be accompanied by genuine and sustained engagement with farmers' voices. Strengthening public-sector research is essential not to displace private investment but to

ensure that science in the public interest — including socioeconomic assessment, long-term adoption studies, and farmer surveys — remains central to the national agricultural system. In unfavourable environments, he notes, progress depends not only on technological innovation but on institutional support and policies that recognise risk as a structural companion of resource-poor farming.

PART IV — LEGACY: PHILOSOPHY, PEDAGOGY, AND THE CODE PARODA

The book's final section offers two contributions of distinct character. The chapter “For Whom the Bell Tolls” distils personal philosophy from seven decades of practice. Drawing on the *Bhagavad Gita*, Dr Paroda identifies three governing principles: the duty to perform one's own prescribed role faithfully, however imperfectly, rather than another's; the discipline of performing that duty without attachment to reward or recognition; and the commitment to act with courage in the face of uncertainty and opposition. These are not novel formulations, but they carry weight commensurate with the life that has enacted them consistently.

The Code Paroda — ten codes covering Climate, Science, Markets, Commons, Nutrition, Women, Youth, Digital Irrigation, Collectives, and Public Science Deeds — is offered as a framework for the next generation of agricultural scientists, policymakers, and practitioners. Its treatment in the book is necessarily summary, but as a declaration of priorities it is a substantive contribution to discussions currently underway about the direction of Indian agricultural research, extension, and policy. The emphasis on digital agriculture, collective action, and the meaningful inclusion of women and youth reflects the institutional learning of an unusually wide career and points toward the kinds of governance and participation that a transformed agricultural system will require.

“Any contribution I made lies in helping to create an environment in which scientists felt supported, connected, and valued within a broader scientific community.”

This self-assessment — measured, free of self-aggrandisement — is characteristic of the book's tone throughout and points to what the reviewer takes to be its principal implicit argument: that the quality of scientific leadership is constituted less by individual brilliance than by the capacity to build environments in which others can do excellent work. Strong institutions,

the book consistently argues, are shaped by individuals who combine scholarship with courage, and national commitment with global values.

ASSESSMENT

Code Paroda makes a significant contribution to the literature on Indian agricultural science, its institutional history, and its science-policy interface. Its most important quality is evidentiary: through first-person narration, it provides a detailed and authoritative account of how scientific decisions were made, how institutions were built, and how research knowledge was — and in certain important cases was not — translated into policy across a period of decisive significance for Indian agriculture. No external account of this period can substitute for the granular institutional detail this book provides, and no serious student of India's agricultural research system should overlook it.

The book's analytical engagement with biotechnology regulation is among its more consequential contributions. The argument that India's regulatory architecture has been excessively cautious in ways that have disadvantaged Indian farmers relative to those in neighbouring countries is stated with evidence and restrained force. It deserves engagement from policymakers, regulators, and researchers. Similarly, the book's sustained argument for a strengthened public-sector research mandate — not as a constraint on private investment but as its necessary complement — addresses a structural question that no credible agricultural policy framework can avoid.

The book's treatment of institution-building — NAAS, APSA, TAAS, GFAR, APAARI, and the thematic dialogues that fed into national schemes such as the Soil Health Card — provides what is effectively a practitioner's guide to translating scientific knowledge into durable institutional form and public policy. The lesson drawn is consistent: genuine consultation, long-term commitment, and the willingness to work through

established and new partnerships are more productive than hierarchical directive or individual initiative alone.

For agricultural scientists and students at every career stage, the book offers something genuinely uncommon in Indian scientific literature: a full account of how technical competence, institutional leadership, and ethical conviction can be sustained across a long and varied career. For researchers in science policy, agricultural economics, and development studies, it provides rich primary material on a period — roughly 1965 to the present — that transformed India's relationship with its own agricultural potential. And for policymakers and practitioners, it offers both a record of what has been achieved through sustained scientific investment and a framework, in the Code Paroda itself, for the work that remains.

The final injunction — to serve without condition, to persist without spectacle, and to trust that sincere

effort, anchored in ethical responsibility, finds its own direction — is the distillate of a career rather than a rhetorical conclusion. It is, in this sense, the most credible kind of advice: advice that has been lived before it has been written.

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