Agricultural Extension in South Asia

FACE-TO-FACE

"We are a solution-driven country, not a problem-solving country. We often ask, 'I have a solution. What is the problem?' We try to push solutions without clearly identifying which problem we are trying to solve or whose problem it is."

Dr G V Ramanjaneyulu

HIGH-TECH, LOW TOUCH: THE GROWING GAP BETWEEN AGRI-STARTUPS AND FARMERS

Dr G V Ramanjaneyulu is the Executive Director at the Centre for Sustainable Agriculture (CSA), leading large-scale agroecology and natural farming programs that improve farmer livelihoods, restore soil health, and boost rural economies. With over 20 years of experience, he focuses on translating research into farmer-led, community-owned solutions that are scalable, resilient, and transformative for food systems. He also serves as the Expert Director of Sahaja Aharam Producer Company Ltd. (SAPCO), which connects farmers with consumers, builds entrepreneurial skills, and links producer institutions to markets across Andhra Pradesh, Telangana, and Maharashtra. SAPCO manages a network of 66 cooperatives, one consumer cooperative, and two federations.

Thirumalai Nambi and Abhinavya T interacted with Dr Ramanjaneyulu at his office in Hyderabad. Dr Ramanjaneyulu discussed the systemic disconnect between Agri-startups and the ground realities of Indian farming, emphasising the urgent need for a "problem-solving" approach that prioritises rural livelihoods and ecological sustainability.

India claims to have an extensive startup ecosystem in the agriculture sector. How do you look at the performance of this ecosystem? Are they really serving farmers? Who do you think startups are being designed for?

What we call start-ups today are often ventures focused less on building sustainable businesses and more on demonstrating "disruption" to attract venture capital and enable a future exit. Success is measured by the speed of valuation, stock sales, and exit, rather than by long-term ownership or by actually running the business.

Market linkage models in agricultural procurement, distribution, and supply chains are often celebrated as major successes. **In practice, many simply replace the traditional middleman with a digitally enabled, white-collar intermediary, adding yet another layer to the system.** Agriculture already operates on extremely thin margins, generating little net surplus. Support-service providers attempt to remain viable not by creating new value, but by extracting it from the weakest link—the farmer. Such models survive only as long as external capital is available and are likely to collapse once that funding dries up.

Despite having opportunities to rethink and redesign their business models, most do not. History shows that even large corporations fail when they stop responding to changing realities. In platform-based businesses such as Uber, Zomato, and Swiggy, the actual clients are the drivers and delivery partners—yet they are the ones under the most significant strain. By building businesses through exploitation, these platforms prioritise value creation for venture capitalists over meaningful value for end users.

Which critical agricultural problems remain unaddressed by Agri-startups?

First is rural livelihoods. Incomes in rural areas remain inadequate, raising a fundamental question: how can we create better, more reliable incomes for people? This requires rethinking the support systems around rural work. There is real space for start-ups here—not just as technology providers, but also as economic advisors, labour aggregators, service providers, collection and customisation hubs, or even providers of services such as irrigation-on-demand.

The second area is natural resources. Soil, water, and other natural resources are degrading rapidly, and many are degrading irreversibly. Since these resources cannot be easily renewed, the critical challenge is how to use and manage them to ensure long-term sustainability.

The third area is food. The entire food system rests on agriculture, which supplies all its raw materials. The key challenge is producing and delivering food that meets acceptable standards of cost, quality, safety, and nutrition. Food must be affordable, safe, and healthy. India currently produces around 350 million tonnes of food, yet malnutrition remains widespread. This makes it clear that production is no longer the primary constraint; distribution is. Affordability and dietary diversity are the real challenges. Our diets remain heavily skewed toward cereals, far beyond what is nutritionally required, while protein consumption remains critically low. Cereal dominance continues in production even as protein deficiency rises—this mismatch lies at the heart of the problem.

Why do many startup innovations fail to address these real problems?

In today's context, many start-ups are essentially replicating what established enterprises have already done. Genuine innovation is limited.

At a deeper level, we function as a solution-driven country rather than a problem-solving one. We often borrow solutions from other contexts and apply them wholesale, without first asking whether they are relevant to our conditions. Our education system reinforces this habit. We begin by saying, "I have a solution—what is the problem?" Solutions are pushed without clearly defining the problem, understanding its roots, or even identifying whose problem it is. The result is a troubling question: are we actually solving problems, or merely circulating solutions?

A problem-solving approach would begin with careful problem definition and then explore multiple possible responses. Instead, we become attached to particular solutions. Over time, these solutions stop addressing the original problem, yet continue to be used out of habit. The rationale for their introduction is forgotten, and the solution itself becomes a ritual.

We crossed the threshold of production long ago, yet our policy and practice remain fixated on increasing production. When nutrients were once deficient, chemical fertilisers offered a solution. But when excessive fertiliser use became a problem, their application should have been reduced or rationalised. Instead, the approach remained unchanged. Even as soil fertility declines, fertilisers are still treated as "essential." Pesticides remain "important" despite poisoning risks. Diesel remains

“important” despite environmental damage. Antibiotics remain “important” even as resistance grows. This is the hallmark of a system that clings to solutions rather than responding to evolving problems.

Compounding this is the poor use of available data. India has at least 20–30 national datasets, ranging from the National Sample Survey and the agricultural census to soil health cards, nutrition surveys, and family-level data. When combined, these datasets offer a reasonably comprehensive picture of agriculture, livelihoods, and nutrition. If decisions were genuinely data-driven, many choices would have been different. The reality is that these data are rarely integrated into decision-making.

Another frequently cited constraint is limited engagement with farmers. The absolute failure lies in our inability to understand farmers’ contexts and tailor solutions accordingly. Rather than acknowledging this gap, responsibility is often shifted onto farmers—labelled as uneducated, small-scale, or incapable of adopting technology. This points to a deeper issue: solutions are designed without a sufficient understanding of farmers’ realities. As a result, technologies are developed, subsidised, and promoted without clear evidence of need or relevance, and subsidies are extended for products that people may neither require nor want.

Can you provide an example where this constraint of limited farmer engagement is explicitly observed?

Farm mechanisation! Although mechanisation is frequently described as inadequate, the real issue lies in its skewed nature. Mechanisation has been equated largely with tractor ownership. A closer look reveals that tractors are used more for transportation than for field operations. Many remain underutilised or misused because they are poorly suited to local farming conditions and are not integrated into coherent production systems.

A similar mismatch is evident with harvesters. In many regions, machines are oversized relative to farm holdings and are required for only a brief period each year. To recover costs, owners move them across regions as service units. Rather than addressing these structural issues or promoting smaller, context-appropriate equipment, policy and markets continue to push unsuitable technologies.

Drip irrigation systems illustrate the same pattern. Drip pipes are often repurposed for non-irrigation uses because high water salinity reduces their effectiveness, and the lack of local servicing and maintenance discourages continued operation. Technologies are introduced without ensuring that they are suitable, durable, or serviceable under local conditions.

This raises a fundamental question of ownership. Should every farmer own machinery, or should mechanisation function primarily as a service? If decisions were guided by functionality, machines would be owned more logically by skilled agricultural labourers or service providers who operate them, rather than by individual farmers. Access, not ownership, should be the priority—but this perspective is rarely considered.

Custom hiring and mechanisation models have also fallen short because they overlook the central role of skilled labour. Machine operation demands technical competence, yet little effort has gone into building a trained agricultural workforce or organised service systems. The emphasis has remained on distributing equipment rather than developing human capacity.

These gaps point to missed opportunities. **The core problem is not a lack of technology, but a failure to understand local contexts, to customise solutions, to build skills, and to design systems that align with real agricultural conditions and farmers’ needs.**

The expectation of rapid growth and high returns typically drives agri-startups backed by investors. Is this investment logic compatible with low-input and sustainable agriculture that you usually advocate?

Why not? If this approach were impossible, carbon credits would not have grown into a significant business. Consider how mutual funds operate: they clearly differentiate between high-risk, high-return; medium-risk, medium-return; and low-risk, low-return investments. There is no reason investments cannot be similarly classified across broader dimensions.

Returns need not be limited to financial gains alone. Investments can also generate environmental and social value, and when they do, they should be explicitly recognised and categorised as such. This opens up significant possibilities for social enterprises, impact investments, and even venture capital. Platforms like *Rang De*, a peer-to-peer lending initiative that provides timely, affordable credit to unbanked communities, demonstrate that such models are viable.

The real challenge is innovation: how do we design business models that fairly distribute value across the entire supply chain? For instance, investing in agriculture through farmer cooperatives or producer companies can support a transition toward sustainable production—where natural resources are conserved, higher-quality food is produced, and products are sold at stable prices without premium pricing. Even under these conditions, costs can be covered through an integrated business model.

Farmers can sell directly and earn income by operating their own retail outlets. Inputs can be produced locally rather than sourced externally. Enterprises can be created to manufacture and supply these inputs within the region, generating employment and retaining value locally. In such systems, the surplus is shared among the people who contribute to it.

These models can generate returns. Even if the financial return is modest—say five per cent instead of twenty—the remaining value can be realised through environmental regeneration and social well-being. When these ecological and social gains are accounted for alongside economic returns, they form a credible alternative investment framework. The real question, then, is not whether such models are possible, but why we are not investing in them this way already.

Where do existing startup support systems fail to align with real-world needs?

Entrepreneurship is a complex and critical domain that demands deep contextual understanding. At present, however, such understanding is largely absent. **What passes for "startups" today is often reduced to the pursuit of venture capital and strategies for extracting financial returns from it.** This reflects a narrow and distorted view of entrepreneurship. The problem is not limited to startups; it extends to the agencies and institutions that support them.

Organisations implementing schemes such as RKVY–RAFTAAR frequently fail to engage with ground realities or the actual problems facing agriculture. Nearly a decade ago, a farmer-to-consumer retail model was proposed to increase farmers' share of the final price from the typical 20–30 per cent to around 50–60 per cent. Despite its focus on farmer empowerment and value redistribution, the model was dismissed as "not innovative." The absence of an app was cited as a weakness, even though the model was operationally sound using basic management tools. Eligibility, instead, was judged mainly on the ability to attract venture capital. Because cooperative structures do not fit venture capital models, such initiatives were excluded from support. Meanwhile, private-sector ventures performing similar functions were recognised as startups and funded, mainly due to their corporate form and digital framing. Over time, many cooperative-based models proved sustainable, while several venture-

funded counterparts failed to endure. If agencies themselves do not understand the problem, how can they effectively mentor startups? That responsibility lies squarely with them.

Private venture capital funds operate on clear commercial logic, which is entirely legitimate. Government seed funding, however, through programs such as RKVY–RAFTAAR, serves a fundamentally different purpose. It exists precisely to support enterprises and innovations that private capital may consider unviable, but which are socially, environmentally, or economically essential. This makes it imperative to examine the environmental and social awareness of those managing incubation centres and public venture mechanisms. If these actors were assessed on an innovation index, many would score poorly because they rarely innovate. This raises a fundamental question: how can institutions that do not practice innovation identify, nurture, and support it in others?

The root of this problem lies in the education system. Consider agri-startups: how many are led by agriculture graduates, and how many of their solutions genuinely emerge from their training? In most cases, startup ideas bear little connection to formal agricultural education, revealing a deep disconnect between education and practice. **In extension systems, we speak endlessly about innovation, communication, change, management, and leadership—yet we rarely embody these qualities ourselves.** We talk about innovation without innovating, communication without communicating, change without changing, management without managing, and leadership without leading.

Thirumalai Nambi and Abhinavya T with Dr Ramanjaneyulu during their visit to the Centre for Sustainable Agriculture, Hyderabad

The failure begins at the foundational level of education, where critical thinking and problem-solving are not adequately cultivated. The same system then produces researchers, experts, policymakers,

and entrepreneurs ill-equipped to address real-world challenges. What follows is an attempt to use a failed system to solve the very problems it has created, without first acknowledging its failure.

Innovation is not a designation or a profession to be conferred; it is a fundamental human capacity rooted in curiosity, critical thinking, and the ability to question and solve problems. Without nurturing these qualities from the ground up, no amount of funding, policy, or regulation can genuinely foster innovation.

You talked about failing agri startups? What is its impact on farmers who are clients of these startups?

When an Agri-startup fails, the damage to farmers is rarely "neutral." Farmers absorb a disproportionate share of the downside because they operate with thin margins, high seasonality, and limited risk-bearing capacity. The impacts typically show up in six ways:

Income shocks from market disruption:
If the startup was buying produce, aggregating, or enabling "better prices," failure can abruptly remove a market channel. Farmers may be forced into distress sales, accept lower prices, or pay higher commissions to regain access to traders/mandis. Timing matters: a collapse at harvest can be brutal.

Credit and cash-flow stress:
Many platforms extend input credit, advance payments, or "buy-now-pay-later" models. When the firm shuts down, credit lines vanish mid-season, lenders and partners may still demand repayments, and farmers are left juggling debt without the expected working capital bridge.

Stranded investments and sunk costs:
Farmers often make farm-level changes based on startup advice: specific seed varieties, input packages, irrigation equipment, certifications, packaging, grading, or crop shifts. If the offtake, advisory, or service network disappears, those investments don't yield returns. In mechanisation models, it can mean paying for assets or subscriptions that become useless.

Service gaps during critical windows:
Startups that provide services—custom hiring, irrigation-as-a-service, spraying, diagnostics—are most valuable when timing is tight. Failure means missed operations, delayed interventions, yield loss, and quality downgrade. Unlike many sectors, "service downtime" in agriculture can permanently reduce that season's output.

Data extraction without durable benefit:
Farmers may share land records, crop details, transaction history, geolocation, and sometimes even Aadhaar-linked information. When the startup fails, farmers may lose access to records, advisory history, or promised services, while their data may remain with vendors, lenders, or third parties through unclear agreements.

Trust erosion and "innovation fatigue":
Repeated failures create scepticism toward new models, cooperatives, extension messages, and even genuinely helpful technologies. Farmers become less willing to experiment, which slows the adoption of promising innovations later. The reputational spillover hurts the entire ecosystem.

The hardest to get hit by failures of Agri startups are smallholders, who have the least buffer against shocks; farmers growing perishable commodities where price collapses quickly; farmers tied into

exclusive arrangements with a single buyer; those who changed practices/crops based on startup promises; and farmers in remote areas where alternatives are limited.

What determines whether failure becomes a "farmer crisis"?

Whether a failure turns into a farmer crisis depends on several interconnected factors that can be understood through a simple risk lens. These include the switching costs farmers face—how difficult it is to return to traditional channels if the startup fails. Risk is higher when the startup replaces a core function, such as marketing or access to credit, rather than providing a supplementary service.

Timing also matters. Failures during critical periods, such as sowing or harvest, are far more damaging than those occurring in the off-season. Contract design also plays a key role, as it determines who ultimately bears the risk, whether the farmer or the firm. Finally, the presence (or absence) of redress mechanisms, such as grievance systems, escrow arrangements, insurance coverage, or fallback buyers, can significantly cushion farmers against sudden breakdowns and prevent failure from escalating into crisis.

How can we make Agri-startups truly pro-farmer? In other words, what key changes are needed to make startups serve farmers?

A farmer safe startup model must be built with strong downside protection if farmers are to be treated as real clients rather than mere users, which includes fallback channels such as backup buyers, mandi linkages, and non-exclusive sourcing options; escrow or assured payment rails for procurement and service delivery; clear exit protocols covering notice periods, handover of records, and defined settlement timelines; local service continuity through trained technicians; availability of spare parts, and repair networks; transparent pricing and fair risk sharing contracts, and clearly defined data rights that ensure informed consent, portability, deletion, and full farmer access to their own data.

Agri-startups can truly be pro-farmer only by redesigning the system to treat farmers as clients with rights and bargaining power rather than just users feeding a growth story, which requires changing incentives, governance, and risk architecture. These include the following:

Start with problem definition, not product demos:
Instead of product demos, start with problem definition through mandatory problem diagnosis before pilots that clearly identify who has the problem, how big it is, and what the farmer's cost of failure will be. Measure the proper outcomes, such as net income, risk reduction, input efficiency, and time saved, rather than downloads, gross merchandise value, or farmers onboarded.

Make "farmer surplus" a non-negotiable KPI:
Make farmer surplus a non-negotiable key performance indicator where every intervention demonstrates a credible pathway to a higher realised price at the farmgate after costs, lower cost of cultivation without yield penalty, lower risk from weather, pests, or price with quantifiable variance reduction, or a higher share of value captured locally through farmer organisations and local enterprises. If unit economics depend on squeezing farmers, it is not a farmer's business but an extraction business.

Flip the revenue model: earn from value created, not from selling inputs:
Agri-startups need to move away from the common anti farmer trap of earning margins from input sales combined with commissions and data monetization and instead adopt pro farmer alternatives such as success fee models that are directly linked to verified surplus with clear caps and transparent baselines; subscription models that are introduced only when service reliability is consistently high and remain cancellable at any time; procurement margins that are pre declared and independently

audited, and input neutral advisory systems where advisory services are clearly separated from sales to avoid conflicts of interest.

Redesign ownership and power: move from VC first to farmer first structures:
Prioritise farmer-producer organisations, cooperatives, and producer companies as core institutional vehicles, embedding equity and governance mechanisms such as farmer equity or profit-sharing arrangements, formal board representation for farmer representatives, and golden shares or veto rights in critical decisions related to pricing, data use, and exclusivity. When venture capital is involved, ensure that it follows patient capital principles with longer investment horizons, capped returns, revenue-based financing, or blended finance structures that align growth with farmer welfare rather than short-term exits.

Build exit-proof services:
Since farmers cannot afford startup churn, Agri startups must be designed with exit-proof services that include clear continuity plans defining who will serve farmers if the startup shuts down. Build strong interoperability so farmers can port their records, transaction history, and memberships across platforms. Ensure escrow or assured payment rails for procurement and service delivery, and non-exclusive contracts as the default, with exclusivity allowed only when backed by substantial compensation and credible safeguards.

Local service capacity beats fancy apps:
A truly pro farmer startup is often more about field engineering and logistics than software, requiring village-level technicians, accessible spare parts, and reliable maintenance networks, dependable last-mile aggregation and grading systems, and service level guarantees during critical agricultural windows such as sowing, spraying, and harvest because any model that fails without constant internet connectivity and perfect adoption is not ready for real farm conditions**.**

Pay farmers faster, and price transparently:
Committing to quicker and fairer payments through clearly defined timelines, such as T+1, T+3, with penalties for delays. These transparent price discovery systems openly disclose quality grades, deductions, weighing procedures, and moisture parameters. Provide grievance redress mechanisms with absolute authority, not just symbolic chatbot apologies.

Stop treating data as free raw material:
Agri startups must stop treating farmer data as free raw material by ensuring informed consent with explicit purpose limitation, guaranteeing farmer access to their own data, along with portability. Avoid Aadhaar or land record hoarding as a business moat and share value with farmers whenever data is monetised through activities such as credit scoring or advisory services.

Match technology to farm realities:
Technology in agriculture should be matched to farm realities by designing solutions suited to small plots, mixed cropping systems, variable water quality, and labour constraints. Promote smaller, modular equipment and service-based mechanisation rather than ownership, and validate technologies across multiple agroecologies before scaling them nationally.

Change incubation and public funding rules:
Incubation and public funding systems must be reoriented by adopting eligibility criteria that support cooperative and farmer-producer organisation models to prioritise farmer outcomes over venture capital readiness. They must also link funding to verified farmers' impact on income and risk. Introduce independent evaluations and farmer advisory panels into selection processes, and

encourage blended models that combine grants for public-good components with repayable capital for scalable services.

Use a farmer protection checklist before scaling:
Before scaling, an Agri startup should be required to clear a checklist by answering yes to whether the farmer earns more net income after accounting for all costs, whether the farmer can exit the service without penalty, whether there is a credible fallback if the startup fails, whether pricing and deductions are fully transparent, whether the service can be maintained locally, whether the model works without pushing unnecessary inputs, and whether data use is ethical, minimal, and clearly beneficial to farmers.

Build the missing middle organized farm services:
The most significant pro farmer opportunity lies in building the missing middle through professional rural service enterprises that combine custom hiring with trained operators and reliable maintenance; collection or packhouse facilities integrated with grading and cold chain linkages; soil and water testing coupled with nutrient planning and safe spraying services; local production of inputs such as bio inputs, seed, and compost, and aggregated marketing through farmer producer organization retail outlets or institutional sales channels. This creates jobs and keeps surplus in the village economy**.**

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