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One Farmer, One Digital Adviser: What Bharat-VISTAAR Means for the Future of Agricultural Extension in India

Raghuveer[1] and *Shubham Gaurav[2]

[1]M.Sc. Research Scholar, School of Social Sciences, Central Agricultural University, Imphal, India

[2] Ph.D. Research Scholar, Department of Agricultural Extension Education, Bihar Agricultural University, Sabour, Bihar-813210, India.

***Corresponding Author's email: shubhamgaurav048@gmail.com**

How an AI-based, multilingual advisory platform is testing a new architecture for reaching India's 86% smallholder and marginal farmers and why the answers about its impact are still being written.

Farmer standing at the edge of a field early in the morning. Overnight, something has started eating into the leaves of the crop. Rain looks likely by evening, but nobody is sure. The mandi price from last week may or may not hold this week. There is a government scheme the farmer has heard about but never quite understood how to apply for. And there is a decision to make today about what to spray, what to sell and what to wait on. In most parts of rural India, answering these questions means going to different people, different offices, and different apps: the local extension worker if one is available, a neighbour who "knows about these things," a WhatsApp forward of uncertain origin, or simply guesswork.

What if one digital interface could connect these questions?

This is the premise behind Bharat-VISTAAR, an AI-based, multilingual farmer advisory platform launched by the Government of India in Phase I on 17 February 2026 (Agrawal, 2026; Roy et al., 2026). The scenario above is illustrative not a documented case but it captures the everyday fragmentation that Bharat-VISTAAR is designed to address. This article is not a claim that Bharat-VISTAAR has already transformed Indian agriculture. It is too new for that. Instead, it is an attempt to understand what the platform is designed to do, what earlier digital extension efforts suggest about how such systems succeed or fail, and what questions still need answering.

What Exactly Is Bharat-VISTAAR?

Bharat-VISTAAR stands for **Virtually Integrated System to Access Agricultural Resources**. It is an AI-based, multilingual advisory platform that brings together crop advisory, government schemes, weather information, market prices and grievance support, accessible through phone, a voice-based AI chatbot, a web portal and a mobile application (Agrawal, 2026; Roy et al., 2026). The inclusion of voice access is not incidental. India's farming population is predominantly smallholder, and smartphone penetration, literacy, and comfort with digital text vary widely across regions (Agrawal, 2026). A system that only works through typed text on a smartphone screen would exclude a large share of the very farmers it is meant to serve. Voice-based access, in local languages, is one attempt to close that gap. It is worth being precise about what this platform represents. It is not simply "another agricultural app." It is an attempt to build a single, natural-language interface across services that were previously scattered across different departments and platforms (Roy et al., 2026).

From Many Information Sources to One Digital Adviser

Consider the range of things a farmer might need to know in a single season: weather forecasts, mandi (market) prices, eligibility for government schemes, pest alerts, soil health information, and crop management advice. Traditionally, each of these has lived in a different place a different office, a different scheme portal, a different informal network. Bharat-VISTAAR's architecture is federated and multi-layered, combining data and advisory services, content services, and community-linked applications, all reachable through one natural-language interface (Roy et al., 2026). In Phase I, it integrates ten major central government schemes, with plans to expand language coverage over time (Agrawal, 2026). A simple way to think about this: instead of asking six offices six separate questions, the aim is to give the farmer one digital doorway into multiple agricultural services. Whether this doorway works smoothly and reliably in practice, across India's diversity of languages, connectivity, and farming conditions, is precisely what remains to be seen and measured.

The Invisible Foundation: AgriStack

Underneath Bharat-VISTAAR sits a less visible but arguably more consequential layer: AgriStack, a nationwide digital public infrastructure built to answer three deceptively simple questions, **who is the farmer? Where is the land? What crop is being grown?** (Roy et al., 2026). AgriStack does this through a Farmers' Registry with unique digital IDs, geo-referenced village maps, and a real-time Crop Sown Registry (Roy et al., 2026). In principle, this farmer-specific data is what allows an advisory to move from generic ("here is this week's weather for your district") toward something more contextual ("here is what this weather pattern might mean for the specific crop registered on your specific plot"). This is both the opportunity and the caution. Better, verified data could make advisories more relevant to an individual farmer's actual situation. But more data about farmers also raises the stakes on accuracy, on who has access to that data, and on how responsibly it is governed. The available source material does not detail specific privacy safeguards or regulatory mechanisms, so this article does not claim more certainty here than exists.

Why Indian Agricultural Extension Needs a New Model

To understand why a platform like Bharat-VISTAAR exists at all, it helps to look at the condition of India's public extension system. India's farmer-to-extension-worker ratio is roughly 1:1000, against an FAO-recommended benchmark of 1:400 (Joshi et al., 2026; Nedumaran & Ravi, 2019). Some estimates place the ratio in a range of 1:750 to 1:1000 (Joshi et al., 2026; Nedumaran & Ravi, 2019). The system is further constrained by fragmented governance, financial instability, and a workforce that is frequently diverted toward administrative work particularly subsidy distribution rather than core advisory activity (Joshi et al., 2026; Nedumaran & Ravi, 2019). Investment tells a similar story. India allocates just 0.7% of agricultural GDP to research, education, extension, and training, well below the World Bank's recommended 2% (Nedumaran & Ravi, 2019). And yet, despite this under-resourcing, ICAR data show that every rupee invested in agricultural extension yields Rs. 7.40 in returns the second-highest return of any agricultural investment category after research itself (Kokate, 2025). That combination, high returns on extension investment, but chronic under-investment and understaffing is the structural gap that digital advisory platforms are being asked to help fill. At the same time, the policy goal itself has shifted. It is no longer only "how do we raise yield," but increasingly "how does the farmer navigate price realization, aggregation, storage, processing, and market linkage" functions that traditional, production-focused extension was never really built to deliver (Agrawal, 2026).

From Technology Transfer to Decision Intelligence

There is a meaningful difference between **information** and **decision support**.

Traditional advisory tends to state a fact: *this pest is present in your crop.* Decision-oriented advisory tries to go a step further: *given the crop, location, weather conditions, and pest risk, what should you consider doing next?* Bharat-VISTAAR's stated ambition is to move in this

second direction toward what its designers describe as **"decision-grade intelligence"**: actionable digital insight meant to support better farmer decisions, while functioning as public infrastructure that other private and public services can build upon (Roy et al., 2026). That is the design intent. Whether farmers experience this as genuinely more useful decision support, rather than simply more information delivered faster, is an empirical question that has not yet been answered.

Is This Really the End of the Extension Worker?

It is tempting to frame this as AI versus the extension worker. That framing is too simple, and it is not how the platform is described in the source material. Bharat-VISTAAR is explicitly positioned not as a substitute for extension personnel, but as an enabling layer meant to expand the reach, continuity, and responsiveness of public advisory (Agrawal, 2026). A more useful framing is **AI + Extension Worker + Farmer**, with a rough division of what each brings:

- **AI can potentially help with:** rapid information access, routine queries, weather-linked updates, scheme discovery, basic advisory, continuous availability, and connecting multiple information sources into one place.
- **Human extension professionals remain essential for:** field diagnosis, trust-building, contextual interpretation, demonstrations, behaviour change, social learning, handling complex or unusual farm situations, conflict resolution, follow-up, and coordination with local institutions.
- This is the **digital-plus-human extension model**: digital advice linked with field verification, local institutions, and follow-up support, rather than digital advice replacing human extension altogether (Agrawal, 2026).

Several state-level efforts already run parallel to this idea. Maharashtra has developed Maha-VISTAAR, with Marathi-first advisories and traceability for high-value crops. Uttar Pradesh has launched UPONA in partnership with Google Cloud, aimed at water-scarce smallholders. Karnataka and Telangana are scaling their own AI-driven advisory platforms, with reported yield and income impacts in pilot programmes (Roy et al., 2026).

What Earlier Digital Extension Initiatives Teach Us

Before treating any new digital advisory system as a straightforward success story, it is worth looking at what came before it. A study of smallholder vegetable farmers in Odisha, using the Farmex platform (formerly known as Blooom), found that personalized digital advisory was positively and significantly associated with input intensity, production diversity, vegetable productivity, and vegetable income (Rajkhowa & Qaim, 2021). But there is an important caveat buried in that same study. Because of low education and digital illiteracy among the farmers involved, they largely did not use the platform directly on their own phones. Instead, an FPO (farmer producer organisation) head operated the application on their behalf, functioning as a kind of digitally equipped human intermediary (Rajkhowa & Qaim, 2021).

Digital access does not automatically mean meaningful digital use.

The broader evidence base reinforces this caution. A global scoping review of 54 studies on technology in agricultural extension found that impacts were mostly mixed, with only educational-technology types showing statistically significant effects (Xu et al., 2023). A separate review of digital agro-advisory services across the Global South found that effects on farmers' actual decision-making were often weak frequently because these services lacked feedback mechanisms, were mismatched with what farmers actually needed to know, or were discontinued once initial funding ran out (Steinke et al., 2020). The consistent lesson: digital tools alone are not enough without user-centred design, genuine two-way communication, and durable institutional support (Steinke et al., 2020).

The Biggest Question: Will Farmers Actually Use It?

Building a platform is not the same as farmers adopting it. Adoption depends on a cluster of practical factors: digital literacy, language comfort, voice access, trust, perceived usefulness,

ease of use, connectivity, local relevance, and critically whether a farmer can actually act on what the system recommends. None of this is a claim that Bharat-VISTAAR has failed or succeeded on these fronts. It is simply too early to know. These are the implementation questions the platform will need to answer over time, not conclusions that can be drawn from a Phase I launch.

AI Can Scale Advice -But Can It Scale Trust?

Agricultural advice is not like ordinary information. When a farmer acts on advice, real money, real crops, and real livelihoods are on the line, often under real weather uncertainty. So, the central question is not simply *"can AI answer a farmer's question?"* It is: **can a farmer trust the answer, understand it, verify it, and act on it?** This raises a distinct set of concerns: the accuracy of AI-generated advice, the risk of outdated or subtly wrong information, the danger of commercially biased recommendations disguised as neutral advice, whether local agricultural context is genuinely captured, how explainable the advice is, and whether there is a human able to verify it when needed. The source material is direct about one part of this risk: extension workers themselves will need capacity-building to become technically sound, digitally fluent, and institutionally trusted, particularly because fake and commercially motivated digital content is an emerging risk to farmers (Agrawal, 2026). That risk does not disappear simply because the information now arrives through an official government platform if anything, it makes accuracy and trustworthiness more important, not less.

The Last-Mile Problem Does Not Disappear Because AI Arrives

India's farming population is overwhelmingly smallholder and marginal — some 86% of farmers fall into this category (Roy et al., 2026; Venkattakumar et al., 2024; Ferroni & Zhou, 2012). These are, historically, the farmers who have had the least access to extension services in the first place. AI does not automatically solve limited digital literacy, patchy connectivity, language barriers, basic device limitations, or the difficulty of interpreting a complex recommendation and then actually implementing it. These constraints predate Bharat-VISTAAR, and they will not vanish simply because the advisory channel has become more sophisticated. Put simply: **the digital divide can become a decision divide if access to Bharat-VISTAAR, and the ability to act on what it says, are not distributed equally.**

KVKs and Extension Workers: The Human Infrastructure Behind Digital Agriculture

None of this makes the human extension network less relevant arguably, it makes it more relevant. Decentralized field structures ATMA, Block Technology Managers, and Assistant Technology Managers continue to matter, and the KVK (Krishi Vigyan Kendra) network of 731 farm science centres remains a grassroots institution for capacity building and technology transfer across the country (Agrawal, 2026; Kokate, 2025). These institutions are positioned to become something specific in a digital-plus-human model: **the human verification and implementation layer of AI-enabled extension**-the people who can confirm a diagnosis in the field, and build the trust that a chatbot alone cannot.

The Future Extension Worker Will Need a New Skill Set

If digital advisory becomes a permanent layer of Indian agriculture, the role of the extension worker is likely to change rather than disappear. Future extension professionals may increasingly need to combine agricultural expertise with digital interpretation, some fluency in working alongside AI tools, and strong behaviour-change skills functioning less as a sole source of information and more as a trusted local interpreter and verifier of it. Relevant future competencies could include AI and data literacy, digital communication, fact verification, local-language communication, behavioural understanding, farmer-centric design thinking, awareness of data ethics, the ability to interpret AI-generated recommendations critically, and the skill of linking digital advice back to concrete field demonstrations. These are presented here as plausible future needs not as requirements that are already formally in place.

Bharat-VISTAAR Could Change the Role of Time

Traditional extension has always been constrained by a basic arithmetic problem: limited personnel, limited time, and real geographic distance between an extension worker and the farms they serve. Digital advisory offers a different kind of arithmetic the possibility of round-the-clock access, more scalable information delivery, and faster response times. But continuous availability is not the same thing as correct or actionable advice. A system that answers instantly, but answers wrongly, has not solved the underlying problem it has simply made the problem faster.

From "One-Size-Fits-All" to Context-Specific Advisory

The theoretical promise of combining farmer identity, location, crop, weather, soil information, and market data is a move away from generic, one-size-fits-all advisory toward something more contextual:

Farmer + Location + Crop + Weather + Market + AI = Potentially More Contextual Decision Support

This is a potential capability made possible by the architecture described in the source material not a demonstrated outcome of Bharat-VISTAAR specifically. Whether farmers in practice experience noticeably more relevant, localized advice is one of the central things future evaluations needs to establish.

What Could Go Wrong? The AI Farmer Adviser Is Powerful and That Is Exactly Why Governance Matters

A system with this much reach carries real risks alongside its potential, and a responsible account of Bharat-VISTAAR has to hold both at once.

- **Wrong advice.** A technically incorrect recommendation, delivered at scale, could translate directly into financial loss for farmers who trust and act on it.
- **Digital exclusion.** Farmers without adequate connectivity, suitable devices, or digital confidence risk being left further behind rather than brought along.
- **Language is more than translation.** Local agricultural vocabulary, idiom, and cultural context carry meaning that a literal translation can miss.
- **Data governance.** Farmer-specific data, built on infrastructure like AgriStack, requires responsible handling — though the specific safeguards in place are not detailed in the available source material.
- **Commercial influence.** There is a risk that advisory content could tilt toward disguised marketing rather than neutral guidance if not carefully governed.
- **Overdependence on automation.** Farmers should not lose meaningful access to human expertise simply because a digital option now exists.
- **Accountability.** There needs to be clarity about who is responsible when digital advice leads to harm a question this article raises rather than resolves.

These are framed here as analytical risks and open questions inherent to any large-scale AI advisory system not as documented failures of Bharat-VISTAAR itself.

Conclusion: AI Should Expand the Reach of Extension, Not Shrink Its Human Heart

Bharat-VISTAAR's greatest significance may not be that every farmer gets access to an AI chatbot. Its deeper significance, if it succeeds, could be the creation of a new architecture for agricultural extension one where digital intelligence expands the reach of human expertise rather than substituting for it. The future being tested here should not be framed as AI instead of extension. It should be AI for scale, extension professionals for trust, and farmers for the decisions that are ultimately theirs to make.

The future of Indian agricultural extension may not be about choosing between humans and machines. It may be about building a system where every farmer has access to both.

Key Takeaways

- Bharat-VISTAAR is an AI-based, multilingual advisory platform, launched in Phase I on 17 February 2026, integrating crop advisory, government schemes, weather, market prices, and grievance support through phone, voice AI, web, and mobile channels (Agrawal, 2026; Roy et al., 2026).
- It builds on AgriStack, which establishes farmer identity, land location, and crop data through a Farmers' Registry, geo-referenced maps, and a Crop Sown Registry (Roy et al., 2026).
- India's extension system is severely under-resourced a roughly 1:1000 farmer-to-worker ratio and just 0.7% of agricultural GDP spent on extension, despite a documented Rs. 7.40 return per rupee invested (Joshi et al., 2026; Nedumaran & Ravi, 2019; Kokate, 2025).
- Earlier digital extension platforms, like Farmex/Blooom in Odisha, show real promise but also reveal that digital access does not equal meaningful digital use without human intermediaries (Rajkhowa & Qaim, 2021).
- Global evidence on digital agro-advisory is mixed at best, with many services undermined by weak feedback loops and short-lived funding (Xu et al., 2023; Steinke et al., 2020).
- Bharat-VISTAAR is explicitly framed as a "digital-plus-human" model, not a replacement for KVKs, ATMA, BTMs, or extension workers (Agrawal, 2026).

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