



SUMMARY REPORT

Challenges identified during Subject Matter Expert Round Table

on

***"Agriculture & Livestock Innovations for India:
Identifying Challenges & Opportunities for Impact"***

Date, Time and Venue:

Friday | 31 July 2026 | 3:00 to 5.00 PM IST | Online via Zoom



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Challenges raised across the session, consolidated by type rather than by original topic domain. Please see Appendix 1 for subject matter experts who participated and gave inputs.

Following is the summary of inputs recategorized by challenge type (Detection & Diagnostics, Treatment & Disease Management, Crop & Forage Improvement, Nutrition & Feed Quality, Data/Genomics & Prediction, Implementation & Last-Mile Adoption, and Policy/Regulatory & Market Barriers), to help identify where the gaps exist and opportunities sit:

1. Detection & Diagnostics

- Lack of rapid, field-level detection methods for crop toxins and mycotoxins (aflatoxin, DDGS-linked contamination), risking food and feed safety
- Limited availability of affordable, pen-side diagnostic kits for antimicrobial resistance (AMR) and mastitis detection in livestock
- Weak early-detection systems for major livestock diseases — FMD, LSD, and protozoal infections
- Absence of standardized, field-adapted sensors and biomarkers suited to Indian rural conditions for AI-based health monitoring
- Inadequate diagnostic and treatment protocols for Mycoplasma and coccidiosis in poultry

2. Treatment & Disease Management

- Continued reliance on antibiotic growth promoters (AGPs), with limited proven, scalable alternatives
- Absence of next-generation, thermostable vaccines suited to rural cold-chain limitations
- No foolproof treatment solution currently exists for mastitis
- Underexplored potential of microbiome-based metabolites, precision probiotics, and oral vaccine delivery systems for animal health and reducing antibiotic reliance
- Emerging zoonotic disease risk without matching vaccine-readiness infrastructure
- Neglected calf nutrition management, despite its long-term productivity impact
- Persistent, unresolved dairy fertility and reproductive health issues

3. Crop & Forage Improvement (Breeding)

- Limited availability of climate-resilient (drought, heat, salinity-tolerant) hybrid seed varieties across key staple and forage crops
- Genome-edited traits developed so far don't yet address the specific stress-tolerance and yield traits farmers need
- Low productivity of small millets, requiring hybridization and yield-focused breeding
- Underinvestment in forage/fodder crop breeding, land race conservation, and fodder tree development
- Molecular basis of superior digestibility traits (e.g. Brown Rib Pearl Millet) not yet understood or extended to other forage crops
- Minor legumes and orphan/storage crops remain underdeveloped despite their nutritional and resilience potential
- Anti-nutrient content in minor legumes and feed crops limits their nutritional value
- Crop protection gaps remain against fungicides and evolving pathogens
- Underdeveloped genome editing and clonal propagation technology in perennial/plantation crops such as tea

4. Nutrition & Feed Quality

- Storage-stable fortification and premix technology for nutrient-dense staples remains unresolved
- No nationwide database exists on agro-residue and feed-ingredient nutritional quality
- Weak regulation of feed byproducts such as DDGS, raising microbial load and mycotoxin risk
- Forage digestibility and bioavailable nutrition security remain limited, especially for smallholder-accessible forage crops
- Feed formulations that could reduce methane emissions from livestock remain underdeveloped
- Precision nutrition approaches are not yet widely available or affordable at farm level
- Dynamic, locally-adapted nutrient formulations responsive to regional feed/soil conditions are largely absent

5. Data, Genomics & Prediction

- Genomic and phenotypic data exist but remain fragmented and unpooled into a shared national reference population
- No standardized statistical model exists for national-scale breeding-value estimation
- Limited SNP-based tools for parentage identification and indigenous breed composition analysis
- AI-guided multi-parent and predictive breeding tools remain early-stage and not widely deployed
- No livestock-side data foundation comparable to crop-side digital infrastructure (e.g. AgStack)
- Feedback loops connecting prediction/advisory outputs to actual farmer decisions and actions are largely missing

6. Implementation & Last-Mile Adoption

- 85%+ of India's livestock is held by smallholders with limited resources, making new-technology adoption difficult without integrated support
- Organized seed systems are largely absent in dryland regions, limiting farmer access to improved seed
- Fodder value chains lack the closed-loop structure that dairy/milk supply chains already have
- Low farmer awareness of quality fodder, quality seed, and improved agronomic practices persists
- Cross-breeding and other new technologies often face initial resistance due to disruption of traditional practices
- No centralized knowledge/technology access point connecting farmers directly with domain experts
- Traditional farming knowledge is not effectively transferring to the next generation
- Extension and farmer-facing delivery of new agri-technology remains a persistent gap
- Farmer-to-consumer linkages for nutrient-dense produce remain weak, limiting market pull for healthier crops

7. Policy, Regulatory & Market Barriers

- Regulatory hurdles directly constrain farmer adoption of new agri-technologies
- Spurious/illegal seed cultivation (e.g. unauthorized herbicide-tolerant cotton) remains an unresolved enforcement gap
- High import dependency for cash crops such as cotton (~80% of national need)
- Insufficient cold storage and quality-testing infrastructure to support food-cluster and export-quality supply chains
- Livestock-linked environmental criticism (land degradation, methane emissions) lacks a coordinated policy response integrating environment and livestock development
- Nutritionally valuable crops (e.g. sorghum) are frequently diverted to industrial uses (ethanol) over food/feed use, reducing their nutrition impact

APPENDIX I

Attendees (in ascending order of first names)		
Name	Affiliation	Profile link
Dr Anjan Banerji	IISER Pune	https://www.iiserpune.ac.in/research/departm ent/biology/people/faculty/regular-faculty/anjan-banerjee/12
Dr Asha Kembhavi	Jinsei Bioscience	https://www.linkedin.com/in/asha-kembhavi-8b33aa1a/
Dr Ashok Giri	NCL	http://academic.ncl.res.in/ap.giri/profile
Dr Ashwin Kashikar	Ankur Seeds	https://www.linkedin.com/in/ashwin-kashikar-a431699/
Dr Avishek Dey	KRYSP-R / GENE2GO	https://www.linkedin.com/in/dr-avishek-dey/
Dr B R Mangurkar	Ex-BAIF	https://www.researchgate.net/profile/Br-Mangurkar
Dr BK Sarmah	Assam Agricultural University	https://www.aau.ac.in/faculty/profile/Dr-Bidyut-Kumar-Sarmah/12
Dr Chandrasekar	Kemin Animal Nutrition & Health (South Asia).	https://www.linkedin.com/in/drchandrasekars/
Dr Debashish Chattopadhyay	BRIC-National Institute of Plant Genome Research	https://nipgr.ac.in/nipgrv4/dr_dchattopadhyay/
Dr D P Tiwari	Retd GBPUAT	https://www.gbpuat.ac.in/colleges/COV/DI/dp_tiwari_profile.html
Dr Girish Sohani	Ex-BAIF	https://www.linkedin.com/in/girish-sohani-6093454/
Dr Marimuthu Swaminathan	International Livestock Consultant	https://www.linkedin.com/in/marimuthu-swaminathan-4910a632/

APPENDIX 1 (continued...)

Attendees (in ascending order of first names)		
Name	Affiliation	Profile link
Dr Narendra Kadoo	NCL	http://academic.ncl.res.in/profile/ny.kadoo
Dr Nidhi Jain	Gates Foundation	https://www.linkedin.com/in/nidhi-jain-2506/
Dr Pandurang Patil	Advanta Seeds	https://www.zoominfo.com/p/Pandurang-Patil/5313397378
Dr Prashant Pyati	Ajeet Seeds	https://www.linkedin.com/in/prashantpyati/
Mr Pramod Takawale	BAIF	https://baif.org.in/cop16/mr-pramodkumar-takawale/
Dr Ravi Gandham	NIAB	https://www.niab.res.in/peopleravigandham/
Dr Seetharam Annadana	Nuziveedu Seeds	https://www.linkedin.com/in/seetharamannadana/
Dr Sambuddha Ghosh	Abel Biosolutions	https://www.linkedin.com/in/sambuddha-ghosh-b768b522/
Mr Santosh Jadhav	BAIF	https://www.linkedin.com/in/santosh-kumar-jadhav-43234843/
Dr Sachin Joshi	BAIF	https://baif.org.in/dr-sachin-joshi/
Dr Santosh Vyas	Kemin Animal Nutrition & Health (South Asia).	https://www.linkedin.com/in/dr-santosh-vas-a1748621/
Dr Tarjan Kaliaperumal	Kemin Animal Nutrition & Health (South Asia).	https://www.linkedin.com/in/tarjan-kaliaperumal-61362a30/
Dr Vidya Gupta	Ex-NCL	https://www.linkedin.com/in/vidya-gupta-0977399/
Dr Vilas Tonapi	ADVANTA SEEDS	https://www.linkedin.com/in/vilas-tonapi-59363470/