## ICAR-ATARI, Zone-I, Ludhiana

## Significant Advancements, Technologies Developed and Commercialized

SI. No.	Technology/ Concept/Model/ Methodology/ Process	Description	Certificate
1.	Model for Scientific Crop Residue Management and Environmental Stewardship  Tech. ID/ Regn. No.: ICAR-AEXT-ATARILDH- Model-2024-041  Lead Developer: Rajbir Singh  Associate Developers: Arvind Kumar, Ashish Santosh Murai, Rajesh K Rana, Preeti Mamgai, Parvender Sheoran, Ashok K Singh, Ranjay K. Singh and U.S. Gautam	The model was designed to support the CRM project "Promotion of Agricultural Mechanization for <i>in-situ</i> Management of Crop Residue" in Punjab, Haryana, Uttar Pradesh, and Delhi. The objective was to curb paddy straw burning, a major contributor to air pollution, soil degradation, and human health hazards. A location-specific extension model was developed, integrating mass awareness campaigns, farmer-scientist interactions, and capacity-building initiatives. Training on Happy Seeder technology reached 79,645 farmers through 503 training sessions, while 873 harvest field days engaged 48,738 farmers in sustainable wheat sowing practices. The campaign extended beyond farmers by involving 37,568 students from 258 educational institutions, religious leaders, and government and non-government stakeholders. By promoting zero-burn alternatives, the model successfully increased the adoption of residue management technologies, leading to a measurable reduction in straw burning incidents.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that  Rajbir Singh (Lead Developer)  Associate Developers  Arvind Kumar, Ashish Santosh Mural, Rajesh Kumar Rana Preetil Manngal, Parvender Sheoran, Ashok Kumar Singh Ranjay Kumar Singh, Udham Singh Gautam  of  ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-I, PAU Campus, Ludhiana  has developed the technology  Model for scientific agriculture residue management and environmental stewardship  Sin July 2004 New Delts  When Delts  (Majaniah Bay Burman) (Rijaniah Bay Burman)  Austrati Otector Greenel (A)  Deputy Ornecter Greenel (A)

SI. No.	Technology/ Concept/Model/	Description	Certificate
	Methodology/ Process		
2	Methodological Framework for Developing Climate Smart Villages  Tech. ID/ Regn. No.: ICAR-AEXT-ATARILDH-Model-2024-090  Lead Developer: Ashish Santosh Murai  Associate Developers: Rajbir Singh, Keshava, Pragya Bhadauria, Arvind Kumar, Rajesh K Rana, Preeti Mamgai, Parvender Sheoran, Ashok K Singh, Ranjay K. Singh and U.S. Gautam	The framework was implemented to transform villages into climate-smart ecosystems by integrating risk management, adaptation strategies, and resilience-building measures. It focused on food security, climate adaptation, mitigation, and farm income enhancement through targeted interventions. Key climatic stresses addressed included drought, heat waves, hailstorms, cold waves, and water scarcity. Agricultural vulnerabilities such as crop residue burning, irrigation inefficiencies, and high input costs were tackled using strategic solutions like: Village Climate Risk Management Committees (VCRMCs-13), Custom Hiring Centers (CHCs-13), Self-Help Groups (SHGs-21), Farmer Interest Groups (FIGs-16), Seed and Fodder Banks (13 each) and institutional convergence with state departments and government schemes. Technological interventions were classified into knowledge-smart, inputsmart, carbon-smart, energy-smart, labor-smart, and community-smart approaches. Notably, four villages in Punjab were declared residue-burning free, highlighting the success of these strategies. By involving local government bodies, financial institutions, cooperatives, and NGOs, this model ensured long-term sustainability and resilience in agricultural practices.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that  Ashish Santosh Murai (Lead Developer)  Associate Developers  Rajbir Singh, Keshaw, Praysu Bhadauria  Arvind Kumar, Rajesh Kumar Rana, Preeti Mamgal  Parvender Shearon, Ashok Kumar Singh  Ranjay Kumar Singh, Udham Singh Gautam  of  ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-I, PAU Campus, Ludhiana, Punjab  has developed the technology  Methodological framework for  developing climate smart villages  160n Ada, 2024  Hone Delini  Charanton Garant (At)  Charanton Garant (At)  Charanton Garant (At)  Charanton Garant (At)

SI. No.	Technology/ Concept/Model/ Methodology/	Description	Certificate
3	Extension Delivery Model for Adapting Ecological and	Considering the declining water table and soil degradation in Punjab, shifting	YEAR ASSY ASSAUCH Assault 2024 642
	Climatic Stresses in Paddy  Tech. ID/ Regn. No.: ICAR-AEXT-ATARILDH- Model-2024-042  Lead Developer: Ashish Santosh Murai  Associate Developers: Rajbir Singh, Arvind Kumar, Rajesh K Rana, Preeti Mamgai, Parvender Sheoran, Ashok K Singh, Ranjay K. Singh and U.S. Gautam	farmers away from paddy cultivation remains a challenge. This model was designed to help farmers adapt to ecological and climatic stresses in paddy cultivation by promoting resource conservation and climate-resilient practices. Key technologies emphasized: Direct Seeded Rice (DSR), short-duration paddy varieties, alternate wetting and drying, residue incorporation and mulching and laser leveling and delayed first irrigation (21 days after sowing). Experiential learning approaches, such as modifying Happy Seeder for DSR drilling, reduced technology costs, making adoption more feasible. During the COVID-19 pandemic in 2020, when labor shortages disrupted transplanting, this model enabled farmers to expand DSR cultivation from 23,300 ha (2019) to	INDIAN COUNCIL OF AGRICULTURAL RESEARCH Certified that Ashish Santosh Murai (Lead Developer) Associate Developers Rajbir Singh, Arvind Kumar, Rajesh Kumar Rana Preeti Mamgal, Parveder Sheoran, Ashok Kumar Singh Ranjay Kumar Singh, Udham Singh Gautam of ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-I, PAU Campus, Ludhiana has developed the technology Extension delivery model for adapting ecological and climatic stresses in paddy  Sinh Johy 2024 New Dethi Oliquinsh litry Bremen (Quignish litry Bremen) (Quignish litry Bremen) Quignish litry Bremen Quignish litry Bremen (Quignish litry Bremen) Characteristic General (At)
4	Developing nutri-smart village through community nutritional literacy and security: A functional model for mitigating malnutrition  Tech. ID/ Regn. No.: ICAR-AEXT-ATARILDH-MODEL-2024-069  Lead Developer: Preeti Mamgai  Associate Developers: Rajbir Singh, Parvender Sheoran, Rajesh K Rana, Ashish Santosh Murai, U.S. Gautam and R.K. Singh	554,270 ha (2020), proving its effectiveness in contingent scenarios.  This model entails the concept of community mobilization and creation of knowledge network through social institutions among farm women and other stakeholders for active collaborations and resource sharing and increasing resilience towards nutritional challenges.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that  Preeti Mamgai (Lead Developer)  Associate Developers  Rajbir Singh, Parvender Sheoran Rajbesh Kumar Rana, Ashish S. Murai U.S. Gautam, R.R. Singh  of  ICAR-Agricultural Technology Application Research Institute (ATAR), Zone-I, PAU Campus, Ludhiana has developed the technology  Developing nutri-smart village through community nutritional literacy and security: A functional model for mitigating mainutrition  16th My 2014  Ten Developing nutri-smart village through community nutritional literacy and security: A functional model for mitigating mainutrition  16th My 2014  Ten Developers  (IL & Gaussen)  Associate Develop General (AL)

SI. No.	Technology/ Concept/Model/	Description	Certificate
NO.	Methodology/ Process		
5	Linking farmers to the market and direct marketing of fruits and vegetables in Punjab  Tech. ID/ Regn. No.: ICAR-AEXT-ATARIL-Policy Paper-2023-025  Lead Developer: Rajesh K Rana  Associate Developers: Rajbir Singh, A.K. Singh	Direct marketing was an innovative policy initiative during end of twentieth century for saving farmers from the exploitation of middlemen, especially the commission agents. However, the success of this model remained limited and now the policy makers need to ensure better prices for small farmers. This document is largely based on a comprehensive review of secondary data and experiences; however, it is also partly based on the national consultation meeting of experts organised online by the ICAR-ATARI, Ludhiana on 21 June 2021. A critical commentary of extent, nature and improvements needed in the existing measures targeted to ensure remunerative prices to small farmers, with special reference to Punjab, has been presented. The higher producer's share in the consumer's price as the undisputable standard of farmers' welfare is an outdated concept as farmers are getting higher net price by selling their produce in export and distant markets.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that  Dr. Rajesh K. Rana (Lead Developer)  Associate Developers Dr. Rajbr Singh Of ICAR-Agricultural Technology Application Research Institute (ATARI), Luchinan, Punjab has developed the technology Policy paper on "Linking farmers to the market and direct marketing of Fruits and vegetables in Punjab"  16th July 2023 New Deni  Chapter School Brown Warrel Brown Austral Devetor General (AD)  Deputy Director General (AD)
6	Rural Agriprenurship Incubation Centre (AIC) model for youth  Tech. ID/ Regn. No.: ICAR-AEXT-ATARIPAT- MODEL-2024-035  Lead Developer: U.S Gautam, A.K Singh, R.K Singh, R.R Burman, V.P Chahal Randhir Singh  Associate Developers: Parvender Sheoran, Rajbir Singh, Rajesh K Rana, J.P Mishra, M.S. Meena, S.K Dubey, S.K Singh, Sadhna Pandey	This model provides the benefit gainful employment, as it is a youth-centric strategy aimed at halting the migration of rural youth. With this, the youngsters from rural regions are given opportunities to improve their entrepreneurial skills and start small-scale businesses in agriculture and allied sectors. This model attracted and empowered the rural youth to take up various agriculture allied and service sector enterprises for sustainable livelihood and helped in partnership building and to develop functional linkage with different institutions or stakeholders for convergence of opportunities available in accordance with government schemes/program.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH Certified that U.S. Gautam, A.K. Singh, Ranjay K. Singh Rajarshi Roy Burman, V.P. Chahal, Randhir Singh (Lead Developers)  Associate Developers Parvender Shoezan, Rajbir Singh, Rajesh K. Rana J.P. Mishra, M.S. Meena, S.K. Dubey, S.K. Singh Sadhan Pandey, Anjani Kumaz, Amrendra Kumar Pragus Bhadauria, Pradje Dey, R.P. Pal Kadrivel Govindasamy, Bagjish Kumaz, A.K. Mohanty R. Bordolo, S.K. Roy, Rajesh T. SKK Singh A.A. Raut, Shalik N. Meera, A. Bhaskaran V. Venkatsubramanlan, Thimspipa of ICAR-Agricultural Technology Application Research Institute Zone-IV, Patna have developed the technology Rural Agripreurship Incubation Centre (AIC) model for youth Sen July, 2024 New Delbi  Ownard (Rejerial Ray Bermai) Research (AI) Ceputy Director General (AI) Ceputy Director General (AI)

SI.	Technology/	Description	Certificate
No.	Concept/Model/	Description	Certificate
NO.	Methodology/		
	Process		
	Anjani Kumar, P.P. Pal,		
	Amrendra Kumar, Pradip		
	Dey, Pragya Bhadauria,		
	Bagish Kumar,		
	Govindasamy,		
	A.K. Mohanty, S.K. Roy, R.		
	Bordoloi,		
	Rajesh T, SRK Singh,		
	A.A. Raut, Shaik N Meera,		
	A. Bhaskaran,		
	Venkatasubramanian,		
	Thimappa		
7	Impactful model for Farmer	The Farmer FIRST Programme	ICAR ADXT NAARM Model-2024-083
	FIRST Programme	(FFP) implementation model	Wasa///
	Implementation	represents a transformative	
	L. 1911.	•	appedi ICAR
	Tech. ID/ Regn. No.:	approach to participatory agricultural	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that
	ICAR-AEXT-NAARM-	development. This impactful model	Ashok Kumar Singh (Lead Developer)
	MODEL-2024-083	emphasizes farmer-centric	Associate Developers  Udham Singh Gautam, Ved Parkash Chahal, Rajarshi Roy Burman P. Venkatesan, N Sivaramane, Ch. Srinivasa Rao, Rajbir Singh, S.K. Singh
	WOBEL 2021 000	research, integration of local	S.S. Singh, Y.G. Prasad, M.J. Chandre Gowda, Lakhan Singh Anupam Mishra, A.K. Tripathi, B.C. Deka, Venkatasubramanian
	Lead Developer:	knowledge, and on-ground	Anjani Kumar, J.P. Mishra, Shantanu Kumar Dubey, S.R.K. Singh S.K. Roy, Shalk N. Meera, K. Govindaswamy, Parvender Sheoran Amulya Kumar Mohanty, Pradip Kumar Dey, Shir Kumar, Mukesh Kumar
	Ashok K Singh	innovations to enhance livelihood	Mitali Ghosh Ray, Bommu Kalyani, Arvind Kumar, P.P. Rohilla, A.R. Reddy K.S. Das, Arun Kumar Singha, Pragya Bhadauria D.V. Kolekar, Rajesh T, Harish M.N., Bagish Kumar
	Ashor it olligh	security and agricultural	of ICAR-National Academy of Agricultural Research Management
	Associate Developers: US	sustainability. By fostering strong	(NAARM), Rajendranagar, Hyderabad has developed the technology
	Gautam, VP Chahal, RR	, ,	Impactful model for farmer FIRST programme implementation
	Barman, P Venkatesan, N	research-extension-farmer linkages,	16th July, 2024 New Delhi (Rajarshi Roy Burman) (U.S. Gautam)
	Sivaramane, Ch. Srinivasa	the model has empowered farming	Assistant Director General (AE) Deputy Director General (AE)
	*	communities through need-based	
	Rao, Rajbir Singh, SK	interventions, capacity-building, and	
	Singh, SS Singh, YG	technology assimilation. The	
	Prasad, MJ Chandre	collective efforts of associate	
	Gowda, Lakhan Singh,	developers across disciplines have	
	Anupam Mishra, AK	enabled adaptive solutions	
	Tripathi, BC	addressing region-specific	
	Deka,Venketasubramanian,		
	Anjani Kumar, JP Mishra,	challenges. The FFP model stands	
	SK Dubey, SRK Singh, SK	out as a replicable, inclusive, and	
	Roy, Shaik N Meera, AK	scalable strategy for strengthening	
	Mohanty, PK Dey, K	India's agricultural innovation	
	Govindaswamy, Parvender	ecosystem.	
	Sheoran, Shiv Kumar,		
	Mukesh Kumar, MG Ray, B		
	Kalyani, PP Rohilla, AR		
	Reddy, KS Das, AK Singha,		
	P Bhadauria, DV Kolekar,		
	Rajest T, Harish MN and		
	Bagish Kumar		

SI. No.	Technology/ Concept/Model/ Methodology/ Process	Description	Certificate
8.	Mushrooming livelihood of marginal and landless farmers in kandi villages – An Inclusive Extension Model  Tech. ID/ Regn. No.: ICAR-AEXT-ATARILDH-2024-089  Lead Developer: Rakesh Sharma  Associate Developers: Pawan Kumar Sharma, Amrish Vaid, Arvind Kumar, Parvender Sheoran, RR Burman and US Gautam	An extension delivery model has been devised and validated for 3 years engaging more than 70 farmers spread across 12 rainfed villages in district Samba of Jammu and Kashmir so as to create sustainable income and employment opportunities among small and marginal farmers and landless labourers through introduction of new enterprise (mushroom production) with an innovative approach considering the limitations and strengths of the target group. The implementation of model resulted in enhanced farmers' income through consolidating individual farmers into group formation for exploring economies of scale in mushroom production, gainful employment and improved market linkage.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that Rakesh Sharma (Lead Developer)  Associate Developers  Pawan Kumar Sharma, Amrish Vaid  Arvind Kumar, Parvender Sheoran  Rajarshi Roy Burman, Udham Singh Gautam  of  ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-L, PAU Campus, Ludhiana  SKUAST-Jammu, Directorate of Extension, Main Campus Chatha, Jammu (J&K)  has developed the technology  Altsthrooming livelihood of marginal and landless farmers in kandi villages – An inclusive extension model  10th July 2024  New Dehi  (Raienel Rey Burman)  Alsstand Discotor General (AS)  Depuly Derctor General (AS)
9.	Framework (concept) on multiple stressors impacting smallholder farmers' livelihood  Tech. ID/ Regn. No.: ICAR-AEXT-CSSRI-Methodoly-2024-024  Lead Developer: Ranjay K. Singh  Associate Developers: Anshuman Singh, Satyendra Kumar, Parvender Sheoran, Arvind Kumar and Dheeraj Singh	This novel framework (concept) encompasses how socio-economic and ecological perspectives are integrated with participatory approaches for better adaptation to climate change and associated risks. This framework provided understanding different knowledge systems and role of multistakeholders in devising adaptive and coping-up strategies wherein not only the farmers' capacity is strengthened with blended knowledge (formal and informal), but also the developmental and policy institutions get useful insights with ground reality of climate change and sustainable adaptive strategies. This concept has been theoretically developed and validated with empirical model using Indian data-set, but it has the potential indicators and efficiency to generate conclusive results elsewhere.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that  Ranjay K. Singh (Lead Developer)  Associate Developers  Anshuman Singh, Sayperdra Kumar, Parvender Sheoran Arvind Kumar, Dheeraj Singh  of  ICAR-Central Soil Salinity Research Institute Karnal, Haryana has developed the technology  Framework (concept) on multiple stressors impacting smallholder farmers' livelihood  26th July 2023  New Drift  Capture Lang B.  Chipmel Lang B.  Chipmel Lang B.  (U.S. Beutum)  Captury Director General (M)  Deputy Director General (M)

SI. No.	Technology/ Concept/Model/ Methodology/ Process	Description	Certificate
10.	Salinity Expert: Mobile Enabled Decision Support System for Sodic Agroecosystems  Tech. ID/ Regn. No.: ICAR-AEXT-CSSRI- Product-2024-077  Lead Developer: Parvender Sheoran  Associate Developers: Ranjay K. Singh, R.K. Yadav, Satyendra Kumar, S.K. Sanwal, Arvind Kumar, A. Barman, R. Raju, K. Ponnuswamy, Sohanvir Singh, Anshuman Singh, and P.C. Sharma	Salinity Expert' is an ICT-based initiative towards 'Digital India' with aim to fast track the dissemination of doable salinity management technologies to the farmers while bridging the barriers of time and space. The entire information is available in Hindi language for ease of better understanding to the beneficiary farmers. Total 1890+ downloads and 4.7 App Rating. Enhanced farmer-scientist interface and need based content mobilization compatible with farmer's needs and resources in the field of salinity management will help in bridging the existing technological and extension gaps.	INDIAN COUNCIL OF AGRICULTURAL RESEARCH  Certified that  Parvender Sheoran (Lead Developer)  Associate Developers  Ranjay K. Singh, R. Yadav, Satyendra Kumar 5.K. Sanwal, Arvind Kumar, Arjit Barman R. Raju, K. Ponouswamy, Sohanivri Singh Anshuman Singh, P.C. Sharma  of  ICAR-Central Soil Salinity Research Institute (CSSRI), Karnal has developed the technology  Salinity expert: mobile enabled decision support system for sodic agroecosystems  16th July 2024 New Dehl  Company Deputy Onector General (AE)  (Rajanhal hay barman) (Rajanhal hay barman) Asistant Director General (AE)  Opputy Onector General (AE)