ICAR-ATARI, Zone-I, Ludhiana

Significant Advancements, Technologies Developed and Commercialized

Sl. 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 *in-situ* 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.	

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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, input-smart, 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.	

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3	Extension Delivery Model for Adapting Ecological and 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	Considering the declining water table and soil degradation in Punjab, shifting 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 554,270 ha (2020), proving its effectiveness in contingent scenarios.	
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	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.	

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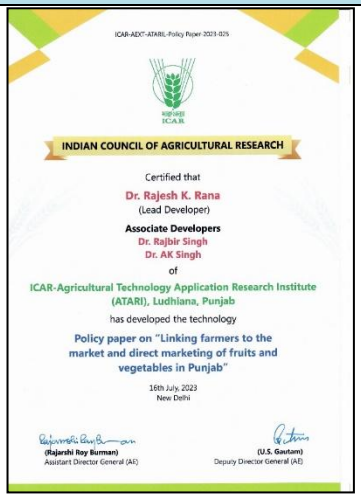
5	Linking farmers to the market and direct marketing of fruits and vegetables in Punjab Tech. ID/ Regn. No.: ICAR-AEXT-ATARIL-Policy Paper-2023-025 Lead Developer: Rajesh K Rana Associate Developers: Rajbir Singh, A.K. Singh	Direct marketing was an innovative policy initiative during end of twentieth 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.	
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.	

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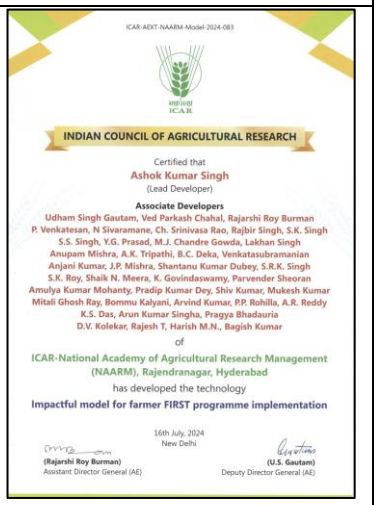
	Anjani Kumar, P.P. Pal, Amrendra Kumar, Pradip Dey, Pragya Bhadauria, Bagish Kumar, Govindasamy, A.K. Mohanty, S.K. Roy, R. Bordoloi, Rajesh T, SRK Singh, A.A. Raut, Shaik N Meera, A. Bhaskaran, Venkatasubramanian, Thimappa		
7	Impactful model for Farmer FIRST Programme Implementation Tech. ID/ Regn. No.: ICAR-AEXT-NAARM-MODEL-2024-083 Lead Developer: Ashok K Singh Associate Developers: US Gautam, VP Chahal, RR Barman, P Venkatesan, N Sivaramane, Ch. Srinivasa Rao, Rajbir Singh, SK Singh, SS Singh, YG Prasad, MJ Chandre Gowda, Lakhan Singh, Anupam Mishra, AK Tripathi, BC Deka,Venketasubramanian, Anjani Kumar, JP Mishra, SK Dubey, SRK Singh, SK Roy, Shaik N Meera, AK Mohanty, PK Dey, K Govindaswamy, Parvender 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	The Farmer FIRST Programme (FFP) implementation model represents a transformative approach to participatory agricultural development. This impactful model emphasizes farmer-centric research, integration of local knowledge, and on-ground innovations to enhance livelihood security and agricultural sustainability. By fostering strong research-extension-farmer linkages, the model has empowered farming communities through need-based interventions, capacity-building, and technology assimilation. The collective efforts of associate developers across disciplines have enabled adaptive solutions addressing region-specific challenges. The FFP model stands out as a replicable, inclusive, and scalable strategy for strengthening India's agricultural innovation ecosystem.	

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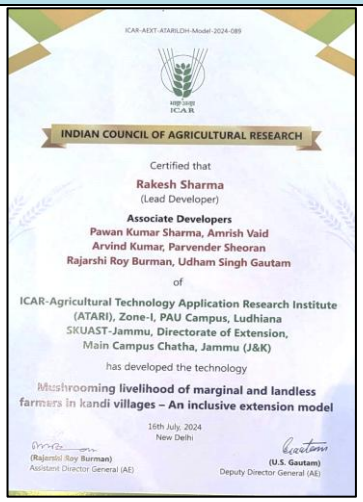
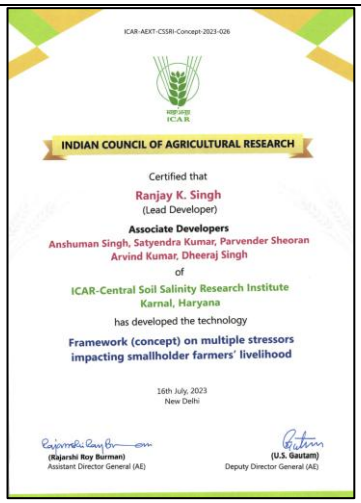
8.	Mushrooming livelihood of marginal and landless farmers in kandi villages – An Inclusive Extension Model Tech. ID/ Regn. No.: ICAR-AEXT-ATARILDH-2024-089 Lead Developer: Rakesh Sharma Associate Developers: Pawan Kumar Sharma, Amrish Vaid, Arvind Kumar, Parvender Sheoran, RR Burman and US Gautam	An 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.	
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 multi-stakeholders 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.	

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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.