

Translated Research: **Flood and Drought Resilient Agriculture in Bihar, India**

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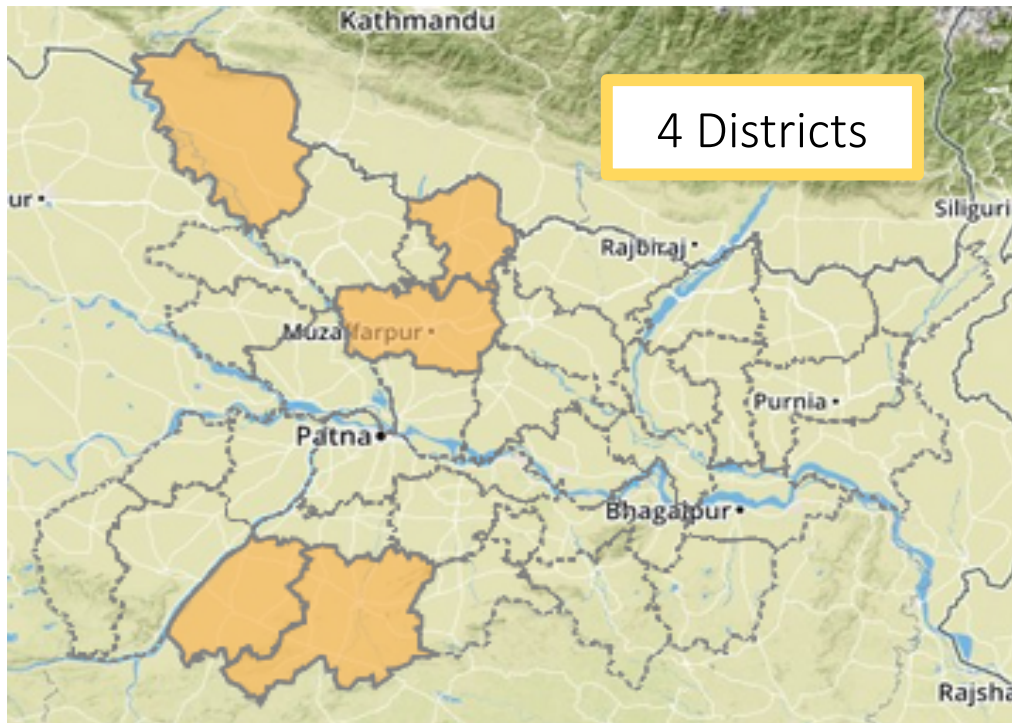


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Improved Rainfed Rice-Based Agricultural Systems (IRRAS)



- Flood-prone and drought-prone areas
- Smallholders (< 0.5 ha) w/rainfed land
- Two phases
 - 2012-2016: Adaptive research pipeline and knowledge exchange
 - 2016-2019: Disseminating and scaling technologies and practices
- Carried out by CRS, IRRI, local research institutions and implementing partners with BMGF funding (first phase)

Phase 1 Objectives

1. Develop and refine agricultural technologies and practices for smallholder farmers in stress-prone, rainfed rice based systems using an ***adaptive research pipeline***
2. Foster a ***knowledge exchange platform*** to share and disseminate technologies and practices developed through the research pipeline

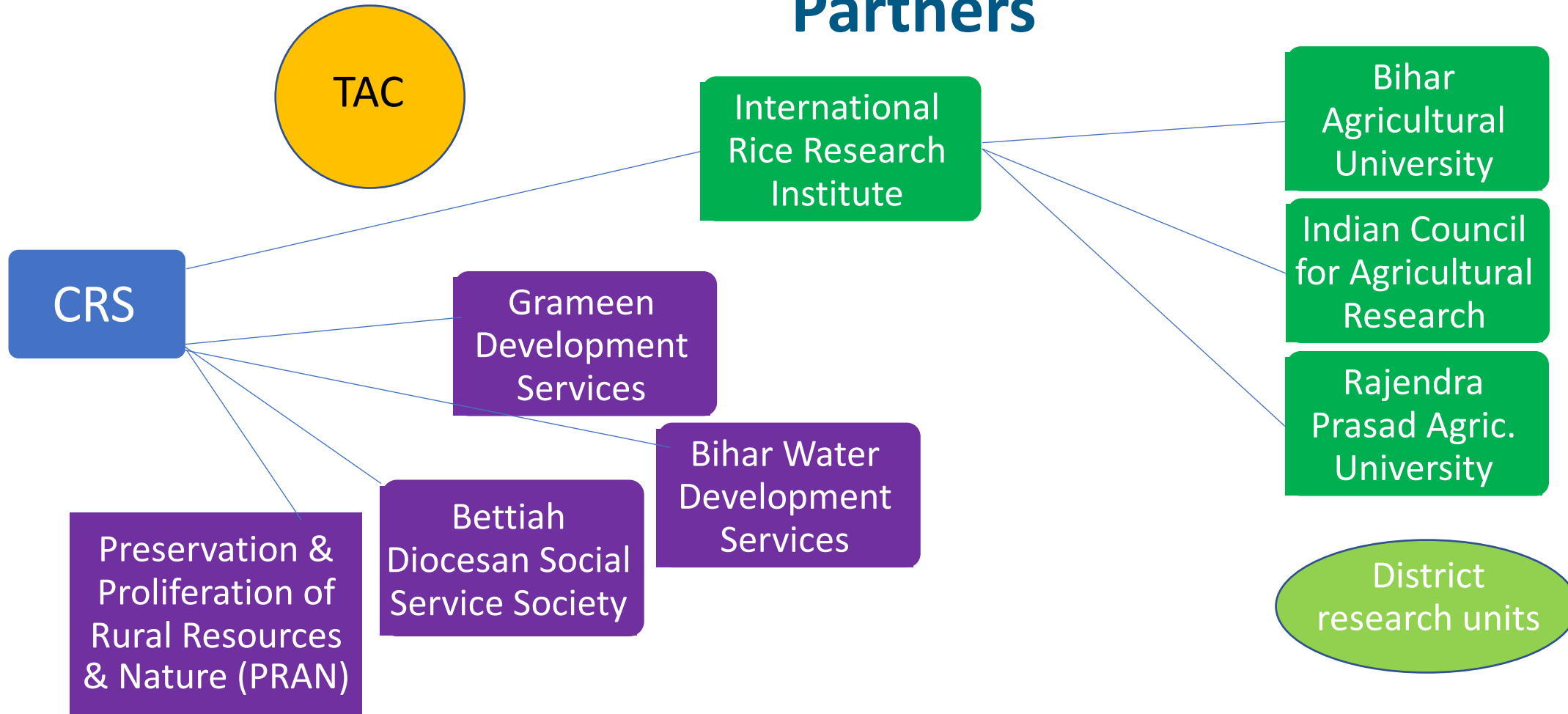


Phase 2 Objectives

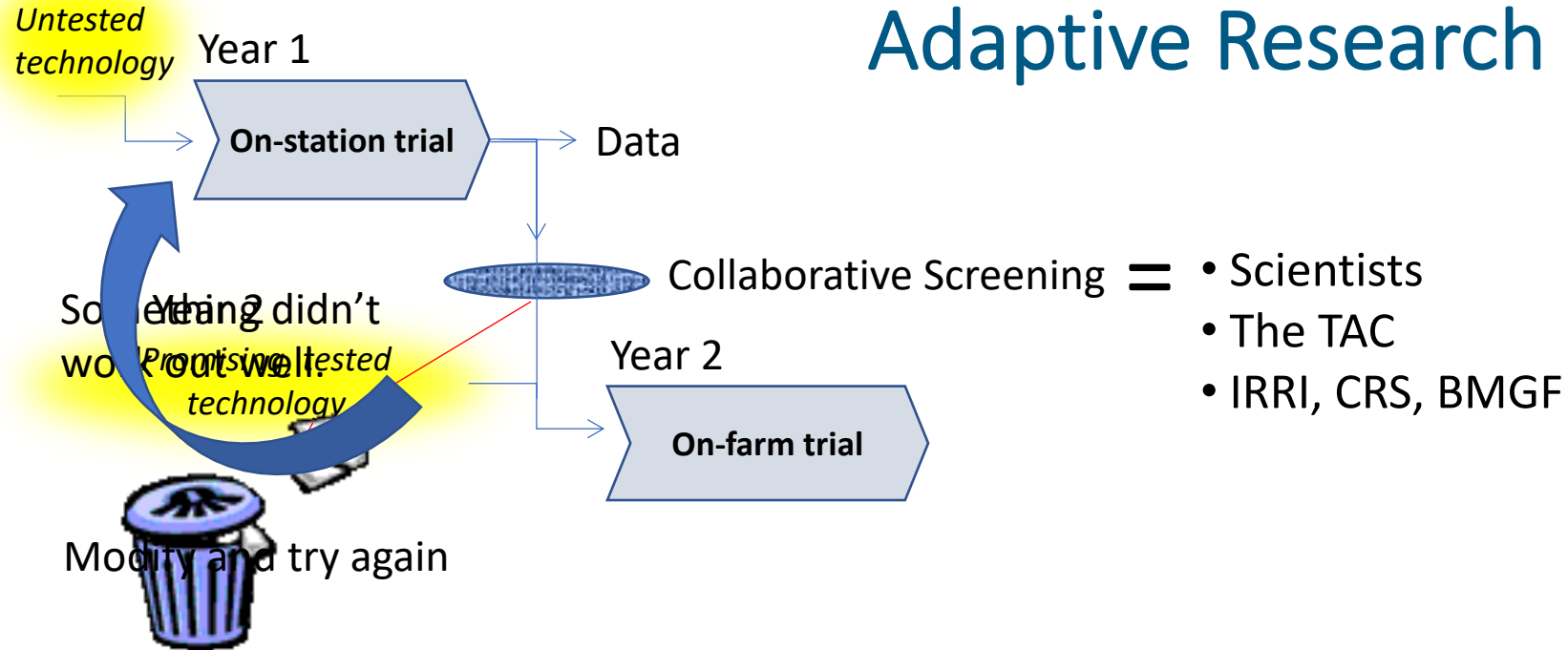
1. Strengthen and expand **dissemination mechanisms** for specific IRRAS technologies and practices
2. Enhance productivity of smallholder farmers in stress prone areas through **widescale adoption** of IRRAS technologies and practices



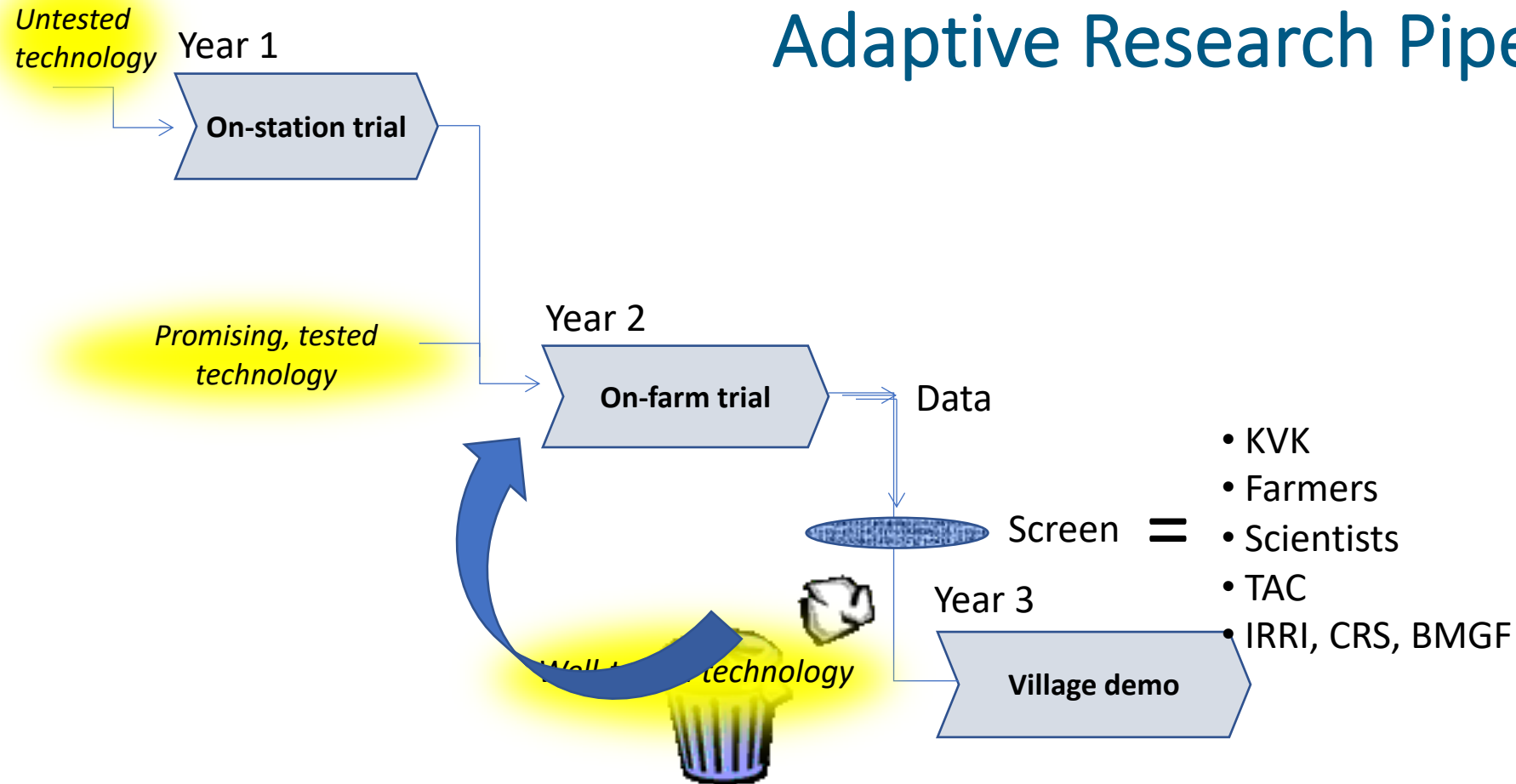
Partners



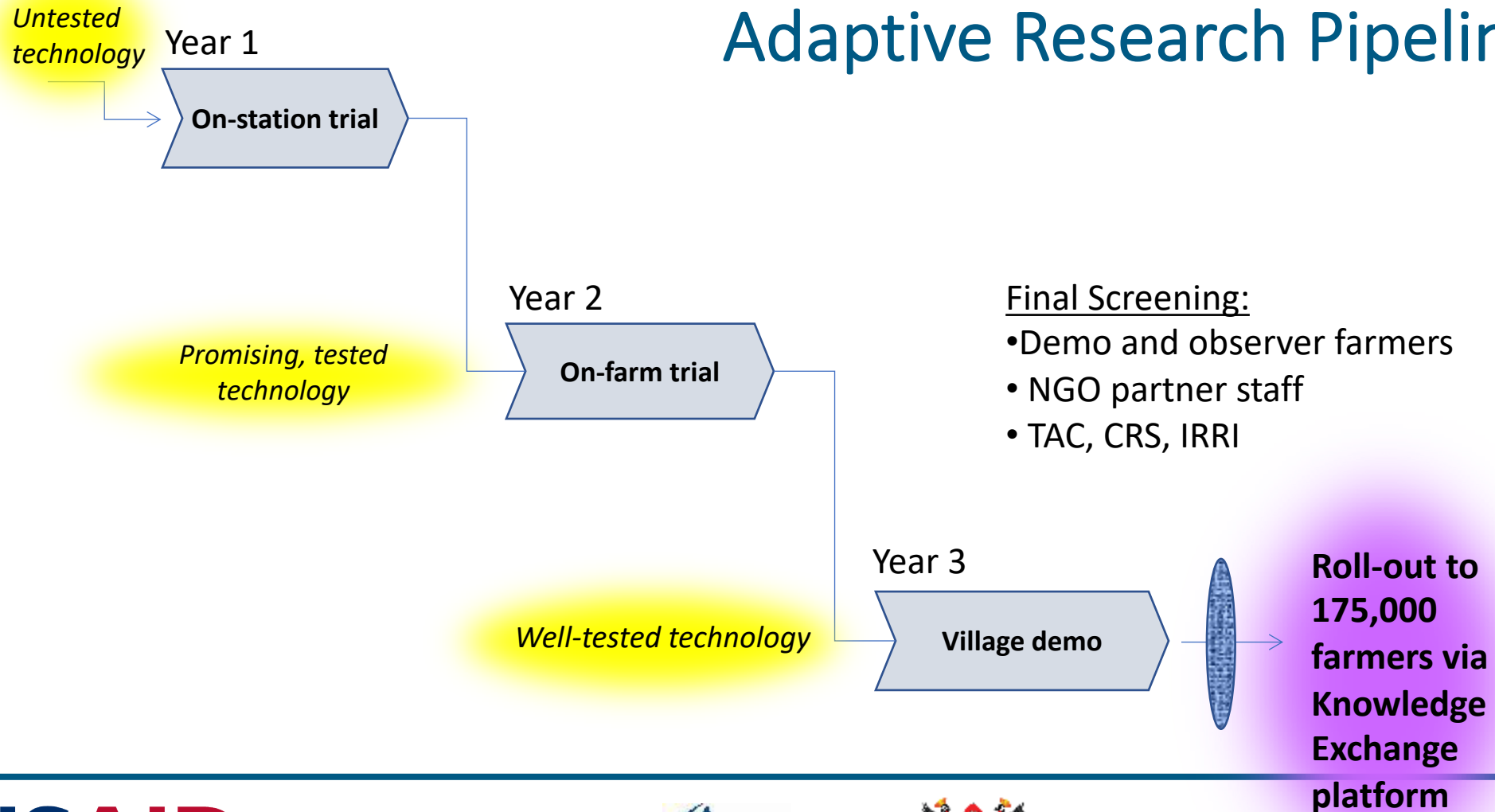
Adaptive Research Pipeline



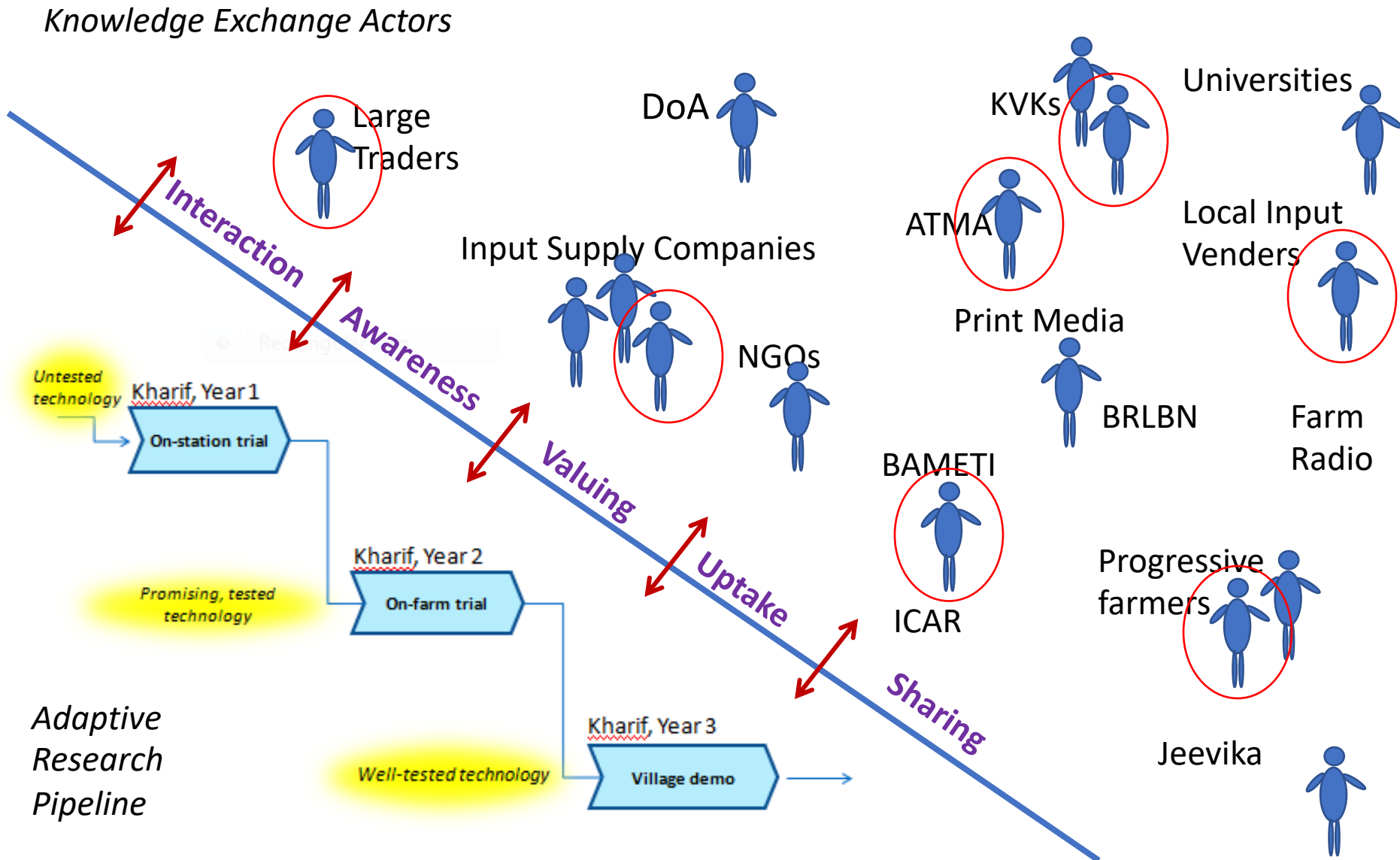
Adaptive Research Pipeline



Adaptive Research Pipeline



Knowledge Exchange Platform



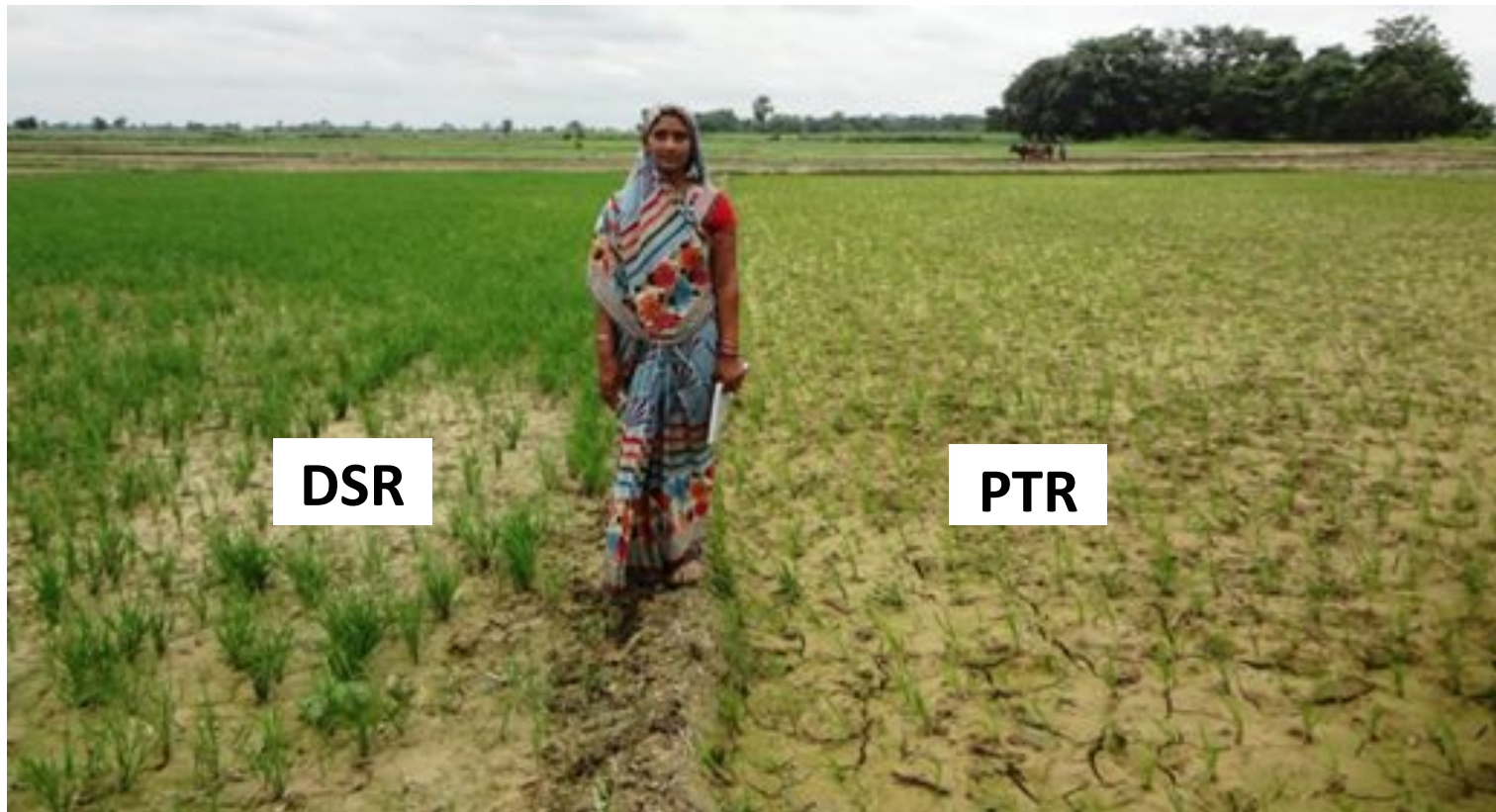
Technologies and Practices Developed/Refined

- Stress tolerant crop varieties - flood and drought resilient rice varieties and improved varieties for rainfed dry season crops like wheat, lentils, chick peas
- Package of practices, e.g. zero tillage, line sowing, and direct seeding
- Customized chemical weed control
- Rice Wheat Crop Manager (RWCM) ICT application for site specific crop management recommendations (adapting IRRI application)
- Customized fertilizer application for drought and flood areas
- Seed treatment for rice, wheat and pulses
- Improved seed storage to reduce losses to pests and increase germination

Impacts of Technologies

IRRAS Technologies	Yield Increase	Increase in B:C Ratio
Stress Tolerant Rice Varieties (STRVs)	20-47%	5-22%
STRVs + Best Management Practices	30-103%	15-20%
Improved Varieties of Dry Season crops	17-19%	22-38%
Dry Season Varieties + Best Management Practices	17-67%	12-20%

Direct Seeded Rice



Translation Vehicles

- User-friendly materials for range of users – farmers, input dealers, PSPs, extension agents
- Trainings and curricula for PSPs, others
- Radio spots
- Community events (crop-cutting, observations, sharing)
- Cost and cost-benefit data
 - Technologies
 - PSP approach to scaling
 - Adaptive research pipeline

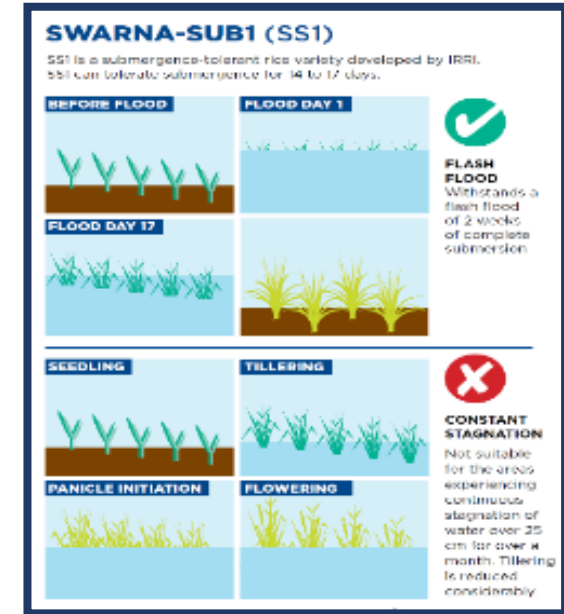
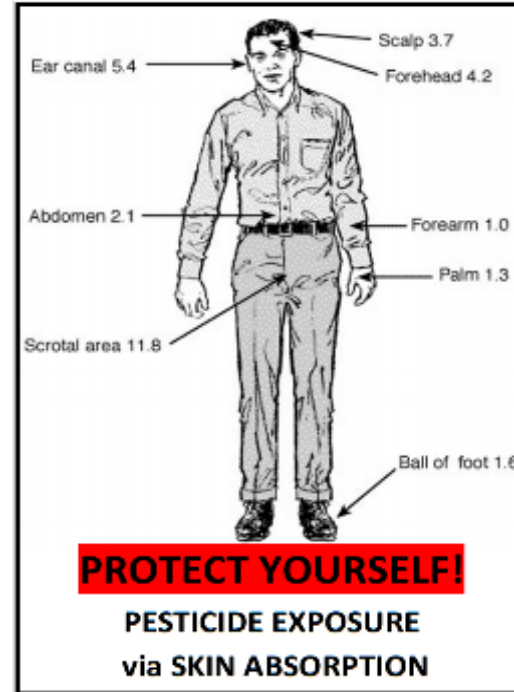
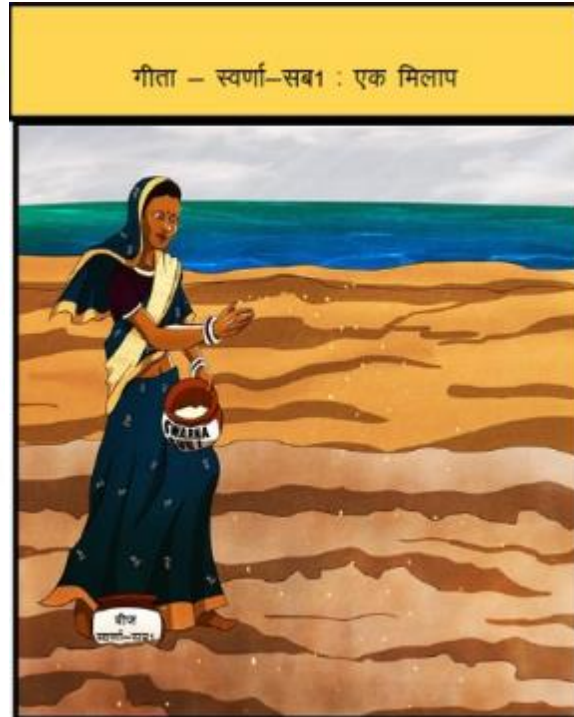
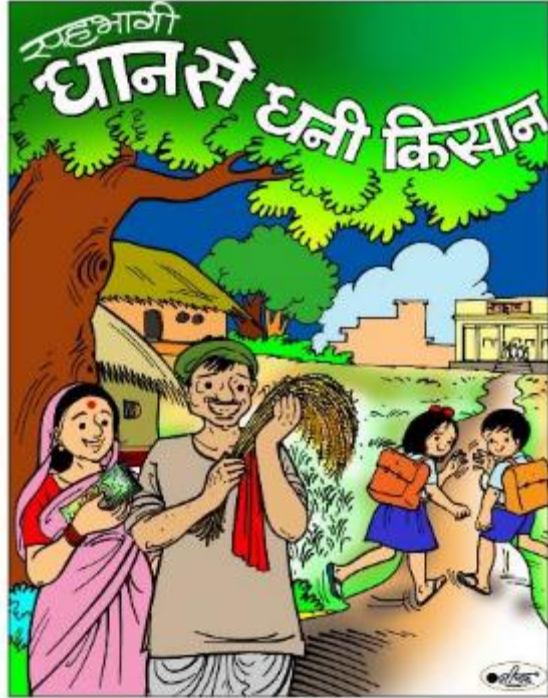


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Materials



FERTILIZER
Fertilizer recommendation is 90:40:20:20 N:P:K:Zn:PS:Mo, plus 20% N and K after flood recedes. The table shows the fertilizer requirements per hectare according to fertilizer types. Calculate and fill in the fertilizer doses per hectare.

When?	What?	How much kg/ha?	How much per hectare?	Conversion factor	kg/ha
At tillering 20-25 DAT	Urea	55kg	X	=	
	DAP	67kg	X	=	
	MoP	33kg	X	=	
	ZnPSMo	20kg	X	=	
At panicle initiation 65-70 DAT	Urea	43.5kg	X	=	
7 days after flood recedes	Urea	45.5kg	X	=	
	MoP	33kg	X	=	

For fertilizer doses tailored to your field, see <http://www.crisprice.com>

Dissemination Platforms

- Private service providers (PSPs) – farmers, laborers, entrepreneurs
- State government extension services
- State government disaster management authority (disaster risk reduction)
- National Bank for Agriculture and Rural Development
- Jeevika: State rural livelihoods mission
- Local partners, other NGOs, integration in other projects
- Communication campaigns – radio, materials, mobile units

A Few Lessons

- Involve government extension services early and throughout
- Local NGOs play important dual role – farmer feedback and ground-truthing, and supporting translation, implementation
- Costing data help translation and application
- Adaptive research and translation takes time, especially when need to wait for next season to refine technology
- Link to other initiatives – research and practice



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Thank You

