Agriculture Knowledge Information System (AKIS) for Increasing Knowledge of Farmers in Western Rajasthan

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AKIS is a network of organizations, individuals, and the interactions between them involved in the anticipation, creation, transformation, storage, retrieval, integration, diffusion, and utilization of agricultural knowledge and information. It systematically supports decision-making, problem-solving, and innovation in agriculture. An Agricultural Knowledge and Information System (AKIS) links rural people, researchers, educators, extension agents, and markets to generate, share, and apply agricultural technology and knowledge. In hyper-arid and arid regions like Western Rajasthan (encompassing districts such as Jaisalmer, Barmer, Bikaner, and Jodhpur), an optimized AKIS is vital for addressing severe environmental constraints—such as erratic rainfall, low soil organic carbon, high wind erosion, and limited groundwater.

Fig. 1: Field visit at an irrigation structure

Core Pillars of an AKIS Framework for Western Rajasthan

To effectively increase the knowledge and adaptive capacity of farmers in Western Rajasthan, an AKIS framework must integrate four primary components:

- **Knowledge Generation (Research):** Institutions like ICAR-CAZRI (Central Arid Zone Research Institute), SKRAU, and JAU focus on generating localized technologies—such as *Khadin* systems, *Diggi* water storage, drought-tolerant crop varieties (moth bean, cluster bean, pearl millet), and sand dune stabilization.
- **Knowledge Diffusion (Extension):** Bridging the gap between laboratories and marginal landholders via Krishi Vigyan Kendras (KVKs), state department functionaries, and pluralistic extension providers.
- **Education & Human Capital:** Training farmers and rural youth in dryland horticulture, protective cultivation, and precision livestock management (sheep, goats, and dairy).
- **Information Technology & Market Linkages:** Utilizing digital extension tools (ICTs, mobile advisories, automated weather stations, and Participatory Decision Support Systems) to connect farmers with real-time markets and weather forecasts.

Key Focus Areas to Elevate Farmer Knowledge

1. Water Harvesting and Moisture Conservation

- **Traditional & Modern Integration:** Educating farmers on optimizing indigenous systems like *Khadin* (runoff farming) and *Tankas*, alongside modern lining methods for *Diggis* to minimize seepage losses.

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- **Micro-Irrigation:** Promoting drip and sprinkler systems specifically tailored for widely-spaced arid horticultural crops (date palm, ber, pomegranate) and high-value vegetable cluster beans.

2. Climate-Resilient Cropping Systems

- **Intercropping & Contingency Planning:** Disseminating knowledge on resilient intercropping models (e.g., Pearl millet + Moth bean or Sesame) and contingency crop planning tailored to delayed monsoon onsets or mid-season dry spells.
- **Organic Arid Legumes:** Training farmers in low-input organic production systems for cluster beans (*guar*) and mung beans to capture premium export and niche market values.

3. Hyper-Arid Livestock Management

- Since livestock rearing forms the backbone of Western Rajasthan's rural economy, AKIS must integrate ethno-veterinary practices, seasonal feeding calendars for drought periods, and better healthcare management for indigenous sheep and goat breeds (e.g., Marwari, Chokla).

Strategies for Strengthening AKIS Implementation

- **Demand-Driven Participatory Approach:** Shift away from a top-down information flow. Involve farmers directly in identifying local constraints (e.g., soil crusting, saline groundwater pockets) so that research agendas match field realities.
- **Digital & Cyber Extension Integration:** Leverage localized mobile apps, WhatsApp advisory groups managed by KVK scientists, and voice-based SMS advisories to provide early warnings for pest attacks and weather aberrations.
- **Public-Private-Farmer Partnerships:** Combine the reach of public extension networks with private inputs, agro-processing initiatives, and farmer-producer organizations (FPOs) to ensure market-led production.

Key Elements

1. Agricultural Research
2. Agricultural Education
3. Organizations
4. Rural Farming Community
5. Mass Media

Models of AKIS

- **INTERPAKS Model (Swanson, 1985):** Focuses on policy and knowledge transfer.
- **Elliot's ATMS Model (1987):** Agricultural Technology Management System model emphasizing technology application.

Functions / Importance (Nigel, 1980)

1. Identify problems and knowledge needs at the procedural level.
2. Generate innovations.
3. Validate innovations under farmer conditions.
4. Operationalize innovations for practical use.
5. Disseminate knowledge.
6. Promote utilization.
7. Evaluate outcomes and experiences.