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Promotion of Research and Funding from Lab to Land: Opportunities and Challenges for Innovated Agriculture

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Abstract

Funding and promotion of "lab to land" research typically comes from government agencies focused on agriculture and technology transfer, including dedicated grants for applied research projects aimed at directly impacting farmers on the ground; this often involves collaborations between research institutions, extension services, and private sector partners to ensure the developed technologies are readily adopted by farmers. The paper describes the 'Lab to land approach, achievements and experiences, lessons learnt and major constraints with Value-added knowledge practices and innovations.

Keywords: Value-added knowledge practices and innovations lab, land

Introduction

Agriculture, the backbone of many developing economies like India, is undergoing a significant transformation in the 21st century. With growing population pressure, climate variability, land degradation, and the increasing demand for food security, traditional farming methods are no longer sufficient to meet emerging challenges. In this context, scientific research and technological innovation have become crucial tools for enhancing agricultural productivity, sustainability, and farmer incomes.

However, the journey from scientific discovery in laboratories to practical application in farmers' fields—commonly referred to as the "lab to land" approach—remains complex and often underutilized. Despite the wealth of research produced by agricultural universities, research institutions, and private companies, many innovations fail to reach the end users due to a lack of awareness, inadequate funding, institutional bottlenecks, and poor extension services.

This paper explores the significance of promoting agricultural research and channeling appropriate funding mechanisms to bridge the gap between innovation and implementation. It critically examines the opportunities that modern technologies and supportive policies offer, and the challenges that hinder effective dissemination of research outcomes to farmers. The goal is to identify pathways for fostering a dynamic, innovation-driven agricultural sector that is inclusive, adaptive, and sustainable.

Key sources of funding for "lab to land" research:

- **National agricultural research institutes:**

Organizations like the Indian Council of Agricultural Research (ICAR) often have dedicated programs to fund research with a strong focus on technology transfer to farmers.

- **Department of Agriculture within government ministries:**

Ministries responsible for agriculture often allocate funds for research projects that aim to address specific challenges faced by farmers in a region.

- **State government agricultural departments:**

  State governments may also provide funding for "lab to land" research projects relevant to their local agricultural needs.

- **Donor agencies and international development organizations:**

  Some international organizations support agricultural research initiatives in developing countries, often with a focus on technology transfer and farmer adoption.

  Mechanisms to promote "lab to land" research:

- **Competitive grant programs:**

  Researchers can apply for grants to fund specific "lab to land" research projects, with a focus on practical applications and farmer engagement.

- **Technology demonstration farms:**

  Establishing demonstration plots on farms to showcase new technologies and practices to farmers.

- **Farmer participatory research:**

  Actively involving farmers in the research process to ensure the developed technologies are relevant and adaptable to their needs.

- **Extension services:**

  Utilizing agricultural extension agents to disseminate research findings and provide training to farmers on new technologies.

  Public-private partnerships:

- Collaborating with private companies to scale up the adoption of new technologies by providing access to markets and distribution channels.

  Important aspects of "lab to land" research funding:

- **Focus on practical applications:**

  Funding should prioritize research projects that directly address farmer challenges and can be readily implemented on farms.

- **On-farm trials and validation:**

  Research projects should include field trials to assess the effectiveness of new technologies under real-world conditions.

- **Farmer feedback and engagement:**

  Incorporating farmer input throughout the research process to ensure the developed technologies are relevant and adopted.

- According to UN projections, the **population of India** is expected to reach **billion by 2050. Qualitative and quantitative feeding** of such a huge population is a **formidable challenge** owing to deteriorating natural resources, shrinking arable land, and the deleterious impacts of global climate change.

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- However, **emerging technologies and farm innovations** have the potential to be game changers in ensuring food security for all.

Lab to Land Programme

- The **Indian Council of Agricultural Research (ICAR),** the national apex body for agricultural research, education, and extension is spearheading the '**Lab to Land programme'**.
- The programme covers all activities pertaining to the **transfer of technologies, innovations, and information to farmers and fields.**
- ICAR implements the 'Lab to Land programme' through its 731 strong networks of **Krishi Vigyan Kendra's (KVKs)** across the country.

Role of KVKs

- KVKs were introduced in 1974 in Puducherry on pilot basis for the **transfer of agricultural technologies and knowledge to farmers.**
- Currently, it is the only institution at the district level that acts as a **knowledge and resource centre with a two-way link between farmers and researchers.**
- Its major and regular activities include
  - **on farm testing** to assess the location specificity agricultural technologies under various farming systems;
  - **conducting frontline demonstrations** to establish the production potential of technologies on farmers' fields;
  - **capacity development** of farmers and extension personnel;
  - acting as a **knowledge and resource centre** of technologies;
  - providing **farm-advisories** to farmers.

Other Initiatives towards Lab to Land

- **More than 3.5 lakh Common Service Centres (CSCs)** in rural areas have been **linked with the KVKs** for providing technological solutions to the farmers visiting CSCs with agriculture related problems.

'Mera Gaon, Mera Gaurav' (My Village, My Pride) is a novel Lab to Land initiative by **ICAR** in which **groups of**

- **scientists identify/adopt villages for dissemination of technologies, and information to farmers.**

ARYA (Attracting and Retaining Youth in Agriculture) is a specialised initiative which aims to **create job opportunities in rural areas** by skilling/training youth in various **agro-enterprises.**

- The **Ministry of Agriculture and Farmers' Welfare** has launched the **mKISAN** portal which aims at **quick transfer of technology to farmers.**
- **'Kisan Suvidha'** is an omnibus mobile app developed by the **Ministry of Agriculture and Farmers' Welfare** which facilitates **transfer of information to farmers** on some critical parameters such as weather, market prices, plant protection, cold storage, etc.

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Conclusion- Various government and private agencies are supporting Lab to Land initiatives through social media platforms as well. Various modules of extension services in India are moving and converging in a fast-track mode to deliver best knowledge services and transfer of technologies to bridge the gap.

Regarding the development of innovations, empowerment of innovators to tap various sources of funding is critical. As compared to agricultural practices and varieties, the improvements in mechanical innovations need considerable financial investments and also consume time. Most of the innovators are from poor socio-economic backgrounds and cannot bear the financial commitments.

Identification and involvement of interested mentors is very important for facilitating development and diffusion. It has been observed that innovators in mechanical/engineering fields are aware of IPR aspects and most of them want to protect their innovation before diffusion. But among the farmers who developed agricultural practices, most are willing to share their knowledge without any restriction or condition. If the innovation is in the open-source domain and no IPR conditions are imposed, the further improvement and development of the innovation by other innovators has been noticed. Formal recognition has a very good impact on wider diffusion of farmers' innovations. This has helped for media coverage and publicity though the media has facilitated widescale diffusion of practices. Support and recognition by the formal sector of farmer innovation will help the innovators to market their product. Innovations which have economic and market value have diffused faster. Innovative technologies need innovative methodologies for their diffusion. Socio-cultural factors also play a key role in the innovation process. Empowerment and capacity building of users in the innovation is very critical in its dissemination.

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