

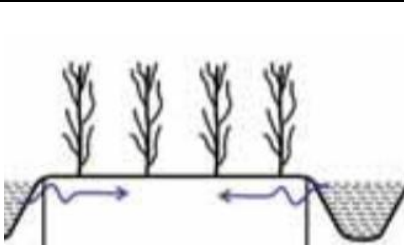
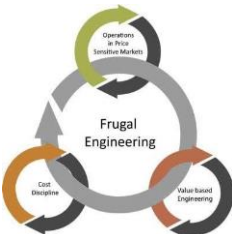
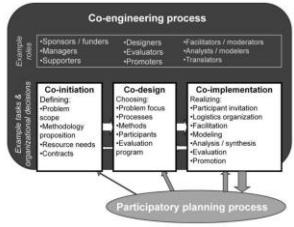
Scaling Readiness Innovation Profile
of
Mechanized Raised (Seed)bed Technology
in
Egypt
for
Improving incomes of small scale farmers

in
2020-11-20

Draft 1

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Innovation Profile Sheet

		Mechanized Raised (Seed)bed Technology Mechanized Raised Seedbed Technology is a multi-functional farming solution for crop production in dryland areas irrigated with flooded irrigation. It is applied as a lightweight tractor implement designed for small farm sizes that combine tilling and planting. It saves water, fertilizer and reduces labor necessary for crop production. It can be used for producing wheat, rice, fava beans, corn, cotton, vegetables, and other fully irrigated crops.	
Used by Farmers Farming service providers Delivered by Farmers' associations Local extensionist Benefits Local machinery production companies	Contributes to TARGET 2-3  DOUBLE THE PRODUCTIVITY AND INCOMES OF SMALL-SCALE FOOD PRODUCERS TARGET 12-2  SUSTAINABLE MANAGEMENT AND USE OF NATURAL RESOURCES	Pros Higher durability Small size Easier to use Lighter weight	Cons Requires high-quality seeds It might require leveling the field before use Might need customization based on soil characteristics
	Used in Egypt Sudan Nigeria	Applied in Semi-arid and arid areas with less rainfall than 250mm/year Areas with less slope than 5% Altitude 1000m or less	
Used by			
 Ministry of Egypt	 Ministry of Agriculture of Sudan	 Nigerian Federal Ministry of Agriculture	
Novel Components			
			
Raised bed irrigation technique	Frugal (Engineering) Design Principle	Participatory (Engineering) Development Principle	
			
Locally produced machine parts	Multi crop functionality	Multi agricultural practice functionality	

Innovation Readiness Scores

Space: Egypt

Time: November 2020

Goal: Improving incomes of small scale farmers

Components of the Technology	Type	Readiness Level	Evidence Sources ¹
Mechanical Implement	Tool	7	1, 2
Raised Bed Irrigation Technique	Technique	8	1,3, 2,4,5
Frugal Engineering Design Principle	Principle	5	3, 6, 7
Participatory (Engineering) Development Principle	Principle	5	8,
Locally Produced Machine Parts	Feature	4	9, 10,11
Multi-crop functionality	Feature	9	12
Multi agricultural practice functionality	Feature	4	13, 14

Highlights

- MRB is a composite technology with seven key components.
- These seven components are different types. One of them is a tool, one of them is a technique, two of them are principles, and three are features.
- The Readiness of the components varies between 4, i.e., application model and 9, proven to work in Egypt for improving the incomes of small-scale farmers.
- Available evidence in Egypt on the components of MRB is limited. Existing evidence is very old.

¹References ^{15–17}, ^{18,19} did not provide evidence on the components of MRB although they reported information on them.

Recommendations

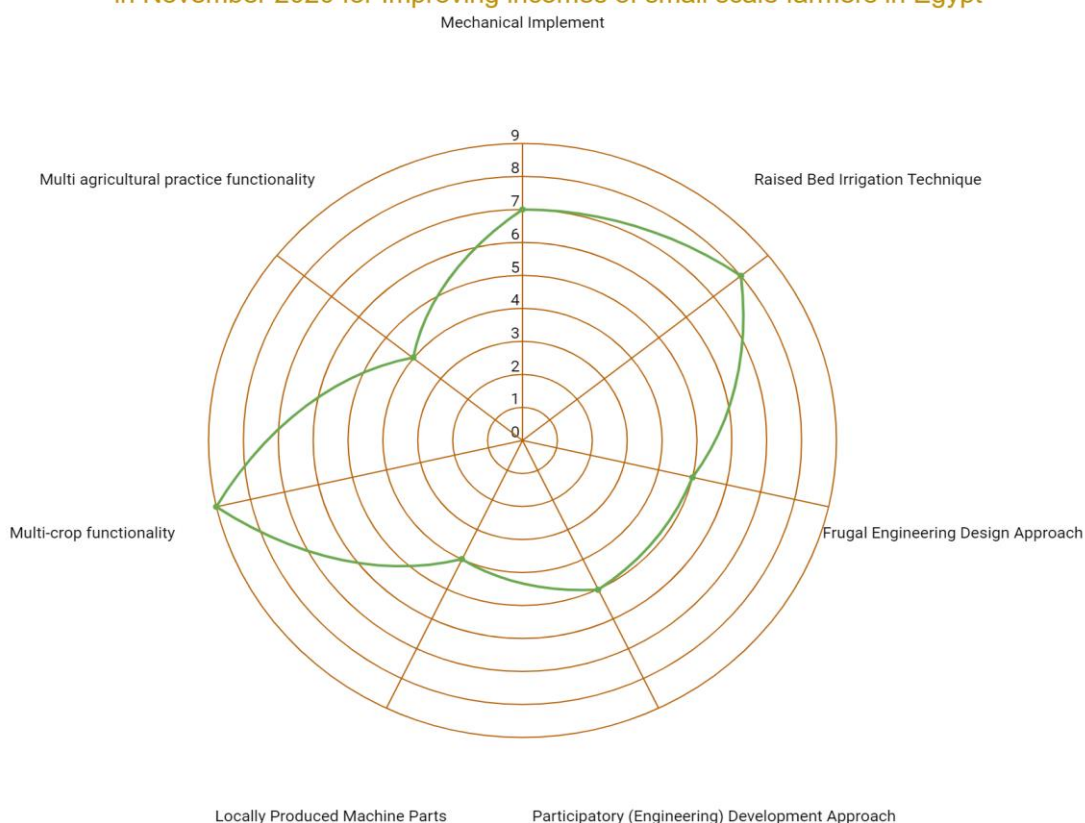
Improving innovation readiness of the MRB technology requires

- Generation and analysis of empirical data on the contribution of the locally produced machine parts and multi agricultural practice functionalities to the performance of MRB by the researchers working on MRB
- Studying or presenting the changes in the MRB due to having a frugal design and participatory development principle by developers and testers of MRB
- Testing and generating evidence of the performance of the mechanical implement and raised bed irrigation in conditions without any support from projects implemented by ICARDA or other R4D organizations by the local or international researchers working in MRB

Other recommendations that can contribute to advancing Agricultural Innovation Systems in Egypt

- Raise awareness about the vital role of agricultural mechanization in national research systems and agricultural ministry units in Egypt
- Facilitating documentation of the learning about implementing R4D projects in agricultural mechanization and related fields by the organization that work on scaling MRB

Readiness Levels of the Components of the Mechanized Raised (Seed)bed in November 2020 for Improving incomes of small scale farmers in Egypt



Further Steps for Assessing Scaling Readiness of the Mechanized Raised Seedbed Technology

The innovation profile focuses on the description and the Readiness of the innovation, i.e., maturity or effectiveness of innovation is to achieve its use objectives. Although Innovation Readiness is necessary to assess the impact at scale potential of innovations via Scaling Readiness scores, it is not sufficient alone. To complete the Scaling Readiness of the Mechanized Raised Seedbed Technology, we recommend complementing this study with Innovation Use Assessment, design of the innovation package for scaling the technology, and full Scaling Readiness assessment of the Innovation Package. We provide further information about innovation use, innovation package, and other relevant Scaling Readiness Concepts in the Annexes.

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ANNEX -1: SCALING READINESS CONCEPTS

Evidence-based measurement: Innovation Readiness scores (Annex - 2) are calculated using evidence. Specific claims of Readiness are assessed through a hierarchy of sources of verification. High-quality science articles and other peer-reviewed documents are the first sources. In their absence, technical reports or other publicly scrutinized documents are used to back up specific evidence claims. In the lack of any documents, different opinions of experts proven to have sufficient competencies are triangulated to identify the measures.

Innovation Component: A tool, technique, concept, principle, feature that constitutes a part of innovations. Although components can be novel, they can not be considered innovations as they can not address social and economic problems alone. In Scaling Readiness, novel components of innovations are characterized and diagnosed. Research for development interventions can control the design, development, and delivery of innovation components.

Innovation: A novel product, service, approach, an organizational and institutional arrangement with an economic, environmental, health, industrial, etc. use in the society. Innovations can be technical or social. They can be tangible and intangible. In Scaling Readiness, innovations are characterized, diagnosed, and strategized. Research for development interventions can control or strongly influence the design, development, and delivery of innovations.

Innovation Package: The combination of the innovations a project aims to scale and other innovations necessary to scale them. Innovation packages usually consist of technologies and other products, services, approaches, organizational and institutional arrangements required to improve awareness of, accessibility, affordability, and usability of the technologies at scale. Innovation package is the fundamental unit of analysis for scaling innovations in Scaling Readiness. Research for development interventions can influence the design and delivery of innovation packages, but they can not control it. Many innovations in the innovation packages are beyond the control and influence zone of interventions; therefore, partnerships are vital in improving the overall Readiness of innovation packages.

Innovation Readiness Level: It is a number indicating how mature or effective an innovation is to achieve its use objectives. It can be considered as a systematic answer to the question "*how good an innovation works at scale.*" It can be between 0, which indicates that the innovation is just an idea in the mind of its potential developers, and 9, which suggests that the innovation has been proven to achieve its use objectives in uncontrolled conditions similar to the context, the innovation is used without a research and development project support. Research and development projects increase innovation readiness levels by improving the design of the innovations, developing and validating the improved designs in uncontrolled and controlled conditions.

Innovation Use Level: It is a number indicating the level of the use of innovations at scale. It can be considered as systematic answers to the combined questions of "*who uses an innovation and in which order of magnitude.*" It can be between 0, which indicates that the innovation is not being used in the context a project aims to increase to the use of the innovation, and 9, which suggests that the innovation is being commonly used among the users who are not involved in any innovation design, development or dissemination processes. Research and development projects increase existing innovation use levels by disseminating the innovations and expanding the use of innovations by other innovation professionals who are not involved in the same projects as well as users who are not involved in any innovation processes.

Scaling Readiness Level: It is a single number combining the readiness and use level of all the innovations in the innovation package. It can be considered as a single answer to the question of "*what is the likelihood that an innovation package will achieve impact at scale.*" There are different ways of calculating Scaling Readiness Levels based on the preferences of the management system it is used. It can be an average level, a minimal level, or a weighted average level.

ANNEX -2: INNOVATION READINESS LEVELS

Innovation readiness score	Innovation readiness level	Description	Type of science	Type of evidence
0	Idea	The genesis of the innovation. Formulating an idea that innovation can meet a specific goal.	None	None
1	Hypothesis	Conceptual validation of the idea that innovation can meet specific goals and development of a hypothesis about the initial idea.	Conceptual	Generic
2	Basic Model (unproven)	Researching the hypothesis that the innovation can meet specific goals using existing basic science evidence.	Conceptual	Generic
3	Basic Model (proven)	Validation of principles that the innovation can meet specific goals using existing basic science evidence.	Basic science	Generic
4	Application Model (unproven)	Researching the capacity of the innovation to meet specific goals using existing applied-science-evidence.	Basic science	Generic
5	Application Model (proven)	Validation of the capacity of the innovation to meet specific goals using existing applied science evidence.	Applied science	Generic
6	Application (unproven)	Testing the innovation's capacity to meet specific goals within a controlled environment that reflects the specific spatial-temporal context in which the innovation is to contribute to achieving impact.	Applied science	Generic
7	Application (proven)	Validation of the innovation's capacity to meet specific goals within a controlled environment that reflects the specific spatial-temporal context in which the innovation is to contribute to achieving impact.	Applied science (controlled)	Specific to intervention context
8	Incubation	Testing the innovation's capacity to meet specific goals or impact in natural/real/uncontrolled conditions in the specific spatial-temporal context in which the innovation is to contribute to achieving impact with support from an R4D.	Applied science	Specific to intervention context
9	Ready	Validation of the innovation's capacity to meet specific goals or impact in natural/real/uncontrolled conditions in the specific spatial-temporal context in which the innovation is to contribute to achieving impact without support from an R4D.	Applied science (uncontrolled)	Specific to intervention context

ANNEX -3: INNOVATION USE LEVELS

Innovation use score	Innovation use level	Description
0	None	Innovation is not used for achieving the objective of the intervention in the specific spatial-temporal context where the innovation is to contribute to achieving impact
1	Intervention team	Innovation is only used by the intervention team who are developing the R4D intervention
2	Effective partners (rare)	Innovation has some use by effective partners who are involved in the R4D intervention
3	Effective partners (common)	Innovation is commonly used by effective partners who are involved in the R4D intervention
4	Innovation network (rare)	Innovation has some use by stakeholders who are not directly involved in the R4D intervention but are connected to the effective partners
5	Innovation network (common)	Innovation is commonly used by stakeholders who are not directly involved in the R4D intervention but are connected to the effective partners
6	Innovation system (rare)	Innovation has some use by stakeholders who work on developing similar, complementary, or competing innovations but who are not directly connected to the effective partners
7	Innovation system (common)	Innovation is commonly used by stakeholders who are developing similar, complementary, or competing innovations but who are not directly connected to the effective partners
8	Livelihood system (rare)	Innovation has some use by stakeholders who are not in any way involved in or linked to the development of the R4D innovation
9	Livelihood system (common)	Innovation is commonly used by stakeholders who are not in any way involved in or linked to the development of the R4D innovation