



Participants attending training about machine usage in a Hub (ICARDA)

The 4-Wheels Approach for sustainable scaling (Tunisia)

DESCRIPCIÓN

The 4-Wheels Approach addresses the challenge of slow adoption of agricultural innovations among smallholder farmers by establishing Knowledge Hubs and partnerships with diverse stakeholders. The focus is on income-generating technologies and essential factors behind successful scaling up of innovations, ultimately driving agricultural modernization and sustainability.

The challenge of low and slow adoption of innovations from agricultural research by smallholder farmers is difficult, complex, and is impeding the progress of agricultural modernization in many developing countries. This issue has negative consequences on farm productivity and farmers' livelihoods. Furthermore, it influences the outcomes of investments made by both national and international agricultural research and development initiatives. The problem is exacerbated by evolving climatic and social conditions, which makes more urgent the need for systemic transformation and modernization to enhance food production - while ensuring sustainability.

To confront this challenge of low rates of scaling up and adoption, the International Center of Agricultural Research in Dry Areas (ICARDA) introduced and validated the "4-Wheels Approach" in countries where ICARDA is active, including Algeria and Tunisia. Among other innovations, two types of machinery are being scaled up this way: (a) the pelletizer (which creates feed pellets from by-products) and (b) the seed cleaning machine (for mechanical seed cleaning, substantially reducing workload). Both technologies have been documented in WOCAT's global database.

The 4-Wheels Approach is built upon Knowledge Hubs and dynamic partnerships. Knowledge Hubs encompass physical structures, such as (informal) training centres, which usually belong to local farmers' associations and cooperatives. The purpose of these hubs is to refine and disseminate knowledge locally in a self-sustained way, potentially through established partnerships with key local and regional stakeholders and scaling partners. Four categories of stakeholders, also referred to as change-agents and facilitators of technology dissemination, are identified: i) farmers' groups and various other local associations, ii) civil society (including non-governmental organizations (NGOs) and the private sector), iii) national public development partners, and iv) lead farmers and extensionists, all of whom play a pivotal role in holding the key knowledge about the technology and spreading it locally. Consequently, these Knowledge Hubs serve to further adapt and mainstream technical knowledge through intermediary beneficiaries (also called proxies or "ambassadors" of the technology), who in turn facilitate dissemination to the ultimate users and beneficiaries, namely the farmers. Viewing the approach's scaling and Knowledge Hubs through this lens underscores the necessity of investing in continuous and comprehensive networking, which doesn't overlook any of the possible and relevant scaling partners.

The implementation of the 4-Wheels Approach via Knowledge Hubs and collaborative partnerships has emerged as a compelling strategy for challenges in the uptake of agricultural innovations, fostering a sustainable pathway towards modernization, and thus uplifting the

LUGAR



Lugar: Tunisia

Georreferencia de sitios seleccionados

- 8.92969, 34.38334
- 4.14844, 34.68743

Dato de inicio: n.d.

Año de conclusión: n.d.

Tipo de Enfoque

- ☐ tradicional/ local
- ☐ iniciativa local reciente/ innovadora
- ☒ proyecto/ basado en un programa

well-being of smallholder farmers in developing areas. The concepts of 4-Wheels Approach and Knowledge Hubs are closely related and interlinked/integrated. The participation of the four types of partners who are engaged through the 4-Wheels Approach within the Knowledge Hub activities allows them to better understand, participate and advocate for relevant local innovations. The 4-Wheels Approach ensures the concentrated involvement of scaling partners of different background within the same landscape, and thus efforts to engage innovation actors become more fruitful by being more accessible and inclusive.

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The seed cleaning machine (Udo Rudiger)



The Pelletizer (Udo Rudiger)

METAS DEL ENFOQUE Y ENTORNO FACILITADOR

Propósitos/ objetivos principales del Enfoque

The aim of this approach is to achieve sustainable scaling and foster greater adoption of innovations. This is pursued through the establishment of Knowledge Hubs (as spaces of innovation) where, the formation of partnerships (based on the 4-Wheels Approach), and the research into viable business models is carefully and step-wise implemented (in reference list see the protocol for implementation in Frija & Idoudi 2020).

Condiciones que facilitan la implementación de la/s Tecnología/s aplicadas bajo el Enfoque

- **Colaboración/ coordinación de actores:** This was rather enabling as different actors like OEP (livestock agency) on the regional level as well as national level were always willing to collaborate with ICARDA and the different beneficiary communities of our different projects (listed in the acknowledgement). This is also especially relevant given that the early technologies for which we built and started piloting the concept of knowledge hubs and partnership for scaling were focusing on forage crops and forage mixtures. Also INRAT was happy to collaborate in the development of the concepts and to also facilitate the overall process of partners mobilization, including collaboration with private actor such as forage seeds companies, pelletizer or seed cleaning manufacturers etc
- **Conocimiento de MST, acceso a apoyo técnico:** Technical support was guaranteed by OEP, INRAT and ICARDA and private actor. The whole idea of these partners is to generate knowledge through experimentation and demonstration, and sustain it through capacity development and partnership/networking. Communities and particularly farmers associations were key in this regards as these are supposed to be the main holders of knowledge after the project ending. The whole process of creation of KHs aims at enhancing and sustaining knowledge about key agricultural practices and technologies locally, thus making it more inclusive and accessible.
- **Mercados (para comprar insumos, vender productos) y precios:** Theoretically, markets and prices are not key aspects since we are talking about knowledge. Currently, the problem is about access to lacking knowledge by smallholder farmers and is not about "price of the knowledge" or who is paying for it. However, scaling of KH themselves would involve the development of a business model in which "payment for knowledge" would be key for its scaling and sustainability.

Condiciones que impiden la implementación de la/s Tecnología/s aplicadas bajo el Enfoque

- **Disponibilidad/ acceso a recursos y servicios financieros:** A minimum of financial resources are needed to create and establish the knowledge hub in the form of informal training center at the cooperative and farmers association level. These fees aims at creating a local space for the community which can be "pedagogically" relevant for further exchange, discussions, trainings, and joint decision making by the community. Such spaces are material investments which can partly enhance the social capital and support the process of building collective cognitive capacity of farmers.

- **Entorno institucional:** The 4-Wheels Approach supports the process of technology transfers in countries where there is a lack of connections and collaboration between research and development. Under such institutional conditions where extension services are low and unavailable, and where research programs are disconnected from the real concrete problems and development bottlenecks, the 4-Wheels approach can be instrumental to leverage the public investments in technology transfers by creating local performing knowledge hubs which would remain sustainable thanks to the mobilization of all relevant innovation and scaling partners (as identified in the 4-wheel partners typology – see above

PARTICIPACIÓN Y ROLES DE LAS PARTES INTERESADAS INVOLUCRADAS

Partes interesadas involucradas en el Enfoque y sus roles

¿Qué partes interesadas/ entidades implementadoras estuvieron involucradas en el Enfoque?	Especifique las partes interesadas	Describa los roles de las partes interesadas
usuarios locales de tierras/ comunidades locales	Farmer Cooperatives	Farmers communities, cooperatives and members are asked to engage into the participatory innovation process by defining their needs, problems, and helping to identify possible affordable solutions. They are also asked to offer a space of concentration where the overall R4D teams can meet, interact and discuss. This space is meant to be sustainable and will be used by the cooperative after the end of the project.
investigadores	INRAT and OEP	Researchers are asked to facilitate the whole process of community engagement and Knowledge Hub installation. They are also asked to install some local experiments which can provide more contextual knowledge about technologies benefits and impact in specific localities. Researchers are also asked to design and facilitate appropriate networking event thus connecting the cooperatives with all relevant public and private actors who are operating for the considered technologies of the Knowledge Hub.
sector privado	Manufacturer of the seed cleaning unit and Importer of the Pelletizer machine	Private sector in general, supports the communities with some capacity development activities in case they are providers of the technology to be scaled (object of the Knowledge Hubs). They also ensure good affordable and reliable access of farmers of the community to the relevant technologies object of the hub. In this case, they did: design and produce, or import machine; train farmers in use and maintenance; perform after sale services
organización internacional	ICARDA	Lead and coordination; installation of the hub, facilitation between research and development actors; organize training and demonstration

Agencia líder

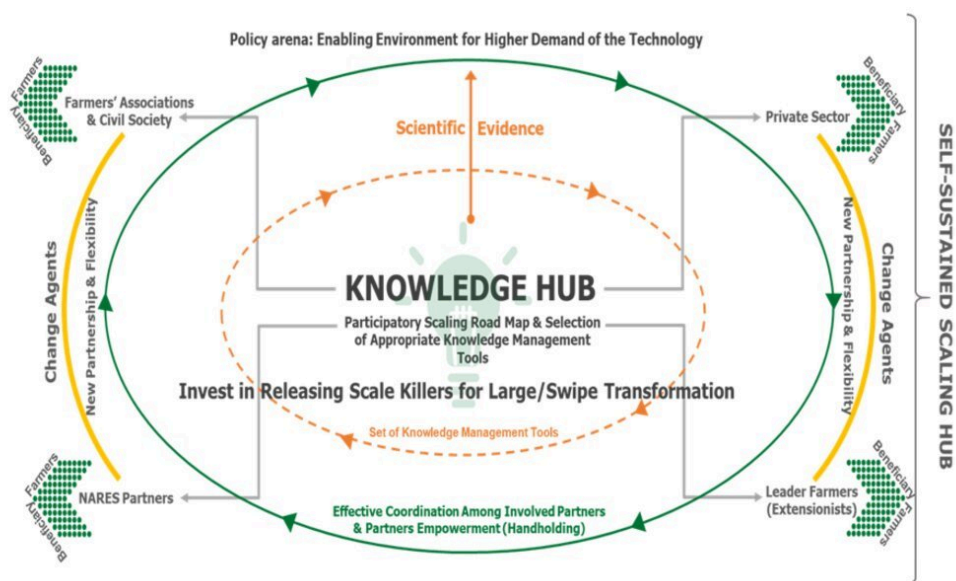
ICARDA

Involucramiento de los usuarios locales de tierras/ comunidades locales en las distintas fases del Enfoque

	ninguno	pasivo	apoyo externo	interactivo	auto-mobilización	
iniciación/ motivación	✓					ICARDA and OEP led discussion with the importer and manufacturer. Discussion between ICARDA, OEP, GIZ, INGC, to identify potential beneficiaries of the machines.
planificación	✓					
implementación				✓		ICARDA and OEP discussed with farmer cooperatives their interests in the machines. ICARDA, OEP, and manufacture produced and distributed the machines. Financial contribution of the farmer cooperation was requested to foster ownership.
monitoreo y evaluación				✓		ICARDA and OEP visits the farmer cooperatives every three months to collect business data, see if the machine operates correctly, and to identify constraints.

Flujograma

The 4-Wheels Approach for effective partnership for scaling



Autor: Aymen Frija, Zied Idoudi. (18/12/2020). Self-Sustained "Scaling Hubs" for Agricultural Technologies: Definition of Concepts, Protocols, and Implementation. (ICARDA)

La toma de decisiones en la selección de Tecnología MST

Las decisiones fueron tomadas por

- ☐ solamente usuarios de tierras (autoiniciativa)
- ☐ principalmente usuarios de tierras con el apoyo de especialistas MST
- ☐ todos los actores relevantes, como parte de un enfoque participativo
- ☐ principalmente por especialistas MST en consulta con usuarios de tierras
- ☒ solo por especialistas MST
- ☐ por políticos/ líderes

La toma de decisiones se basa en

- ☒ la evaluación de conocimiento MST bien documentado (la toma de decisiones se basa en evidencia)
- ☒ hallazgos de investigaciones
- ☒ la experiencia personal y opiniones (no documentadas)

APOYO TÉCNICO, FORTALECIMIENTO INSTITUCIONAL Y GESTIÓN DEL CONOCIMIENTO

Las siguientes actividades o servicios fueron parte del enfoque

- ☒ Construcción de capacidades / capacitación
- ☒ Servicio de asesoría
- ☒ Fortalecimiento institucional (desarrollo institucional)
- ☒ Monitoreo y evaluación
- ☒ Investigación

Construcción de capacidades/ capacitación

Se proporcionó capacitación a las siguientes partes interesadas

- ☒ usuarios de tierras
- ☐ personal de campo/ consejeros

Forma de capacitación

- ☒ en el contexto de trabajo de agricultor a agricultor
- ☒ áreas de demostración
- ☒ reuniones públicas
- ☒ cursos

Temas avanzados

The use of the machinery, their maintenance and recipes for pellets

Servicio de asesoría

Se proporcionó servicio de asesoría

- ☒ en los campos de los usuarios de tierras
- ☐ en centros permanentes

Fortalecimiento institucional

Se fortalecieron/ establecieron instituciones

- ☐ no
- ☐ sí, un poco
- ☒ sí, moderadamente
- ☐ sí, mucho

en el siguiente nivel

- ☒ local
- ☐ regional
- ☐ nacional

Describe la institución, los roles y las responsabilidades, miembros, etc.

Farmer cooperation and knowledge hubs were established. The rationale is that because the machines are economically viable on their own, the cooperation will keep on sharing the knowledge using the hubs.

Tipo de apoyo

- ☐ financiero
- ☒ construcción de capacidades/ entrenamiento
- ☒ equipo

Detalles adicionales

Monitoreo y evaluación

By monitoring certain indicators, such as the number of beneficiaries, pellets produced, seed cleaned, etc. In addition, ICARDA is frequently visiting the hubs to see progress and solve problems that occurred.

Investigación

La investigación trató los siguientes temas

- ☒ sociología
- ☒ economía/ marketing
- ☒ ecología
- ☒ tecnología

FINANCIAMIENTO Y APOYO MATERIAL EXTERNO

Presupuesto anual en dólares americanos para el componente MST

- ☐ < 2,000
- ☐ 2,000-10,000
- ☒ 10,000-100,000
- ☐ 100,000-1,000,000
- ☐ > 1,000,000

Precise annual budget: n.d.

This includes the machines and trainings.

Los siguientes servicios o incentivos fueron proporcionados a los usuarios de las tierras

- ☒ Apoyo financiero/material proporcionado a los usuarios de tierras
- ☒ Subsidios para insumos específicos
- ☐ Crédito
- ☐ Otros incentivos o instrumentos

Apoyo financiero/material proporcionado a los usuarios de tierras

The land users, organized in farmer cooperation, were supported with machinery

parcialmente financiado
totalmente financiado

equipo: maquinaria

The farmer cooperatives made a financial contribution.

☒

El trabajo de los usuarios de las tierras fue

- ☐ voluntario?
- ☐ comida por trabajo?
- ☐ pagado en efectivo?
- ☐ recompensado con otro tipo de apoyo material?

ANÁLISIS DE IMPACTO Y COMENTARIOS DE CONCLUSIÓN

Impactos del Enfoque

No
Sí, un poco
Sí, moderadamente
Sí, mucho

¿El Enfoque empoderó a los usuarios locales de tierras, mejoró el involucramiento de las partes interesadas?

Land users were empowered because the machines strengthen the cooperatives.

☐ ☐ ☐ ☒

¿El Enfoque ayudó a los usuarios de tierras a implementar y mantener Tecnologías MST?

☐ ☐ ☐ ☒

¿El Enfoque mejoró el conocimiento y capacidades de los usuarios para implementar MST?

Farmers received training on how to operate and maintain the machinery, but they are still struggling with the optimal recipes for the pellets.

☐ ☐ ☒ ☐

¿El Enfoque construyó/ fortaleció instituciones, colaboración entre partes interesadas?

The projects was a successful collaboration between many different organization. Its success has strengthen the relations.

☐ ☐ ☒ ☐

¿El Enfoque mejoró la equidad de género y empoderó a las mujeres y niñas?

Conventionally, the cleaning of seeds was done by hand by women and children. The use of machinery has substantially lowered their workload.

☐ ☐ ☐ ☒

¿El Enfoque resultó en mejor seguridad alimentaria/ mejoró la nutrición?

The use of the machinery lead to improved food security.

☐ ☐ ☐ ☒

Motivación principal del usuario de la tierra para implementar MST

- ☒ producción incrementada
- ☒ incremento de la renta(bilidad), proporción mejorada de costo-beneficio
- ☐ reducción de la degradación de la tierra
- ☒ reducción del riesgo de desastres naturales
- ☒ carga de trabajo reducida
- ☐ pagos/ subsidios
- ☐ reglas y reglamentos (multas)/ aplicación
- ☐ prestigio, presión social/ cohesión social

Sostenibilidad de las actividades del Enfoque

¿Pueden los usuarios de tierras sostener lo que se implementó mediante el Enfoque (sin apoyo externo)?

- ☐ no
- ☒ sí
- ☐ incierto

The machines on their self are economically viable.

- afiliación al movimiento/ proyecto/ grupo/ redes
- conciencia medioambiental
- costumbres y creencias, moral
- conocimiento y capacidades mejorados de MST
- mejoramiento estético
- mitigación de conflicto

CONCLUSIONES Y LECCIONES APRENDIDAS

Fortalezas: perspectiva del usuario de tierras

- Seed Cleaning Unit: better seeds, improves yield, higher income, less workload
- Feed Pelletizer: use of agricultural by-products, cheap compound feed, less workload

Fortalezas: punto de vista del compilador o de otra persona recurso clave

- Major strength of the 4-Wheels approach is the aspect of the collaboration, between private actor (machine manufacturer or importer), farmer organization, lead farmer of the organization, OEP (extension), INRAT (research for composition). This multi-actor collaboration is key of the 4-wheel approach and key of the success of the scaling of the two technologies
- Seed Cleaning Unit: better seeds, improves yield, higher income, less workload
- Feed Pelletizer: use of agricultural by-products, cheap compound feed, less workload
- The 4-Wheels Approach ensures ownership over the machinery while building capacity

Debilidades/ desventajas/ riesgos: perspectiva del usuario de tierras cómo sobreponerse

- Feed Pelletizer: Farmers still don't know the optimum mixture of ingredients to produce pellets for each region and categories of animals (sheep / cow / camel). Intense collaboration with agricultural research

Debilidades/ desventajas/ riesgos: punto de vista del compilador o de otra persona recurso clave cómo sobreponerse

- A risk of the approach is the sustainability. It is not sure (yet) if and how the knowledge hub will continue once there is no more support from ICARDA and (national) partners. The theoretical idea is that through the income generation with these machines they (farmer organization) will continue training others and sharing their knowledge.
But this theory needs to be validated and proven.
- Seed Cleaning Unit: quite expensive for a small scale farmer (7,000 US\$ nowadays) To buy the unit as a farmer organization (cooperation) and use it by many farmers
- The Feed Pelletizer can be expensive for individual small scale farmer, availability of spare parts of pelletizing machine only in Tunis (access problem), needs available by-products (they are only seasonal), need access to subsidized barley and wheat bran to produce at competitive prices. Farmer organizations have no quota for subsidized barley and wheat bran, only individual farmers to a limited amount and feed enterprises To use the feed pelletizer as a group to reduce costs per farmer; transform cooperative into a feed processing enterprise as they have access to subsidized barley and wheat bran

Compilador
Joren Verbist

Editors

Revisado por
William Critchley
Rima Mekdaschi Studer

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Personas de referencia

Frija Aymen - Agricultural Economist
Zied Idoudi - Specialist on Economics and Participatory Methods
Udo Rudiger - Agricultural Innovation Specialist

Descripción completa en la base de datos de WOCAT

https://qcat.wocat.net/es/wocat/approaches/view/approaches_6885/

Datos MST vinculados

Technologies: Small-Scale Nutrient-Dense Pellet Production https://qcat.wocat.net/es/wocat/technologies/view/technologies_6486/
Technologies: Small-Scale Seed Cleaning Unit https://qcat.wocat.net/es/wocat/technologies/view/technologies_6669/

La documentación fue facilitada por

Institución

- International Center for Agricultural Research in the Dry Areas (ICARDA) - Líbano

Proyecto

- ICARDA Institutional Knowledge Management Initiative

Vínculos a la información relevante disponible en línea

- Aymen Frija, Zied Idoudi. (18/12/2020). Self-Sustained "Scaling Hubs" for Agricultural Technologies: Definition of Concepts, Protocols, and Implementation. Lebanon: International Center for Agricultural Research in the Dry Areas (ICARDA).: <https://hdl.handle.net/20.500.11766/12248>
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