

UPSCALE

UPSCALING THE BENEFITS OF PUSH-PULL TECHNOLOGY FOR
SUSTAINABLE AGRICULTURAL INTENSIFICATION IN EAST AFRICA



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D8.7: Updated Knowledge Exchange Hub

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Abstract:	This deliverable presents UPSCALE's web-based Knowledge Exchange Hub (KEH), falling under the framework of Work Package 8 and the second iteration in the execution of Task 8.2. The KEH report is a living document that is to be revised and updated throughout the project (M18 and M48) in line with updates of the KEH itself. The report aims to summarize the strategy and concrete actions to follow by the consortium in the scope of knowledge exchange efforts. To support these efforts, the KEH report contains the concept, description and technical specification of the online content.

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Table of contents

Summary	6
1 UPSCALE Project Introduction	6
1.1 Project in Brief	6
1.2 Dissemination of Push-Pull Technology (Project Objective 7)	6
1.3 Knowledge Exchange Hub Objectives	7
1.3.1 Progress of the Objectives	8
2 Knowledge Exchange Hub Update	10
2.1 Detailed Presentation of Current KEH Webpages & Functionalities.....	12
2.1.1 About KEH	12
2.1.2 Data	14
2.1.3 Push-Pull Network.....	15
2.1.4 Knowledge Sharing.....	20
2.1.5 UPSCALE Apps	25
2.1.6 FAQ.....	25
2.2 KEH Technical specification	25
3 Conclusion.....	25
4 Appendix	26

List of tables

Table 1 First Structure of Knowledge Exchange Hub’s main menu	7
Table 2 List of Dissemination and Communication Objectives.....	7
Table 3 Updated Structure of Knowledge Exchange Hub’s main menu	10
Table 4 A1 UPSCALE Stakeholder types and profiles.....	26

List of figures

Figure 1 KEH Main Menu - old (upper figure) and updated version of the main menu	9
Figure 2 KEH sidebar on page Push-pull in practice	10
Figure 3 KEH About page	12
Figure 4 KEH Data page	14
Figure 5 KEH Maps and imagery page	15
Figure 6 KEH Find your local key contact point display	16
Figure 7 KEH Find your local Push-pull Knowledge Centre and Input Supplier map	16
Figure 8 KEH Find out how to do push-pull display	17
Figure 9 KEH Stakeholder map	18
Figure 10 KEH Event calendar.....	19
Figure 11 KEH How to Push-Pull page	21
Figure 12 KEH Push-Pull in Practice page	22
Figure 13 KEH Multimedia page	23
Figure 14 KEH Publication structure	24

List of Abbreviations and Acronyms	
CA	Consortium Agreement
DC	Dissemination and Communication
EC	European Commission
EU	European Union
GA	Grant Agreement
GDPR	General Data Protection Regulation
IPR	Intellectual Property Rights
KEH	Knowledge Exchange Hub
KPI	Key Performance Indicator
SCDP	Strategic communication and dissemination plan
MAC	Multi-actor communities of practice
NCP	National Coordinator Partners
WP	Work Package
Q&A	Questions and Answers

Summary

This deliverable D8.7 introduces the updated UPSCALE Knowledge Exchange Hub (KEH), which is a comprehensive online platform for the effective dissemination of knowledge and project results among stakeholders, collecting feedback and ensuring the transfer of sustainable intensification practices and relevant push-pull technology and related market information to farming, research and policy communities and wider society. The KEH has been structured in a way that is informative, easy to navigate and can target all different types of stakeholders. It is linked to UPSCALE social network channels that have been providing up-to-date information about the project since the project was launched. The KEH functions as an online knowledge repository on push-pull technology, including content such as an advisory contact hotline and knowledge network mapping in five countries, explanatory blog articles (e.g. success stories), scientific papers, policy briefs, best practice reports, photo gallery of events and push-pull plants and insects, and stakeholder database. Moreover, the KEH provides regular updates on the status of the project to all stakeholders, as well as targeted development of information sharing and capacity-building materials (posters, pamphlets, technical advisory notes, brochures, etc.) and media outreach for different stakeholder audiences (farmers, policymakers, businesses). KEH content has been regularly edited and uploaded on <https://upscale-hub.eu/>; the web pages are improved with design and visitor's accessibility and clarity, and more sections were gradually added as the project evolved. This deliverable aims to complement the online platform by providing a written report describing the technical architecture and main functionalities of the KEH.

This deliverable consists of the following sections:

- Chapter 1 provides a brief introduction to the UPSCALE project and its KEH-related objective.
- Chapter 2 introduces the main KEH categories, their functionalities and KEH technical specifications.
- Chapter 3 gives a short conclusion and outlines the further steps.

1 UPSCALE Project Introduction

1.1 Project in Brief

UPSCALE is an H2020 Research & Innovation project, which started in November 2020 with a duration of 5 years. The project aims to take key steps to realize the transformative potential of push-pull technology by expanding its scope and applicability from individual fields to whole landscapes and regions, and from cereal to other important crops and cultivation systems. The overall goal is to address food security, livelihoods and climate change resilience in the sub-Saharan region of East Africa while reducing the environmental impact of agricultural practices. The project activities are conducted in five main study regions within East African countries (Ethiopia, Kenya, Uganda, Rwanda, Tanzania), each of these regions being selected to encompass different biophysical (including climate, soils, topography) and farming system characteristics.

1.2 Dissemination of Push-Pull Technology (Project Objective 7)

The UPSCALE project aims to achieve the high-level objectives by developing solutions for targeted optimal implementation and dissemination of push-pull technology, evaluating the cross-scale impacts of push-pull expansion, improving, expanding and integrating push-pull principles across cropping systems and identify pathways to overcome barriers to push-pull adoption. This will be managed through active engagement of multi-actor communities that participate in the case study activities. The KEH directly results from achieving Objective 7 presented below.

O7	Establish a knowledge exchange hub and communities of practice for optimal flow of information between stakeholders at all levels for active communication, coordination, dissemination and facilitation of sustainable intensification methods including push-pull in different systems and regions of East Africa.
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In accordance with O7, the KEH was created by InoSens and its first formation is presented in the deliverable D8.6 in 2022. Initial website structure was shaped according to the following categories:

Table 1 First Structure of Knowledge Exchange Hub's main menu

Stakeholder Map	A graphical representation of main stakeholder types identified in MAC meetings and dedicated work package deliverables.
Connect	Online calendar with universal downloadable events and subscription option.
Deliverables	UPSCALE project work package objectives with accompanying deliverables and downloadable public content.
Policy Briefs, Scientific papers and reports	Online repository of relevant documents, categorized by type, country and topic.
Knowledge and best practices	Practice abstracts on dedicated topics available for download.
Media	Online repository of communication materials.
Forum	Registration based forum for knowledge exchange.
Questions and Answers	A Q&A section containing answers to most frequent questions.

1.3 Knowledge Exchange Hub Objectives

UPSCALE dissemination and communication strategies directly translate to KEH objectives. The Key Performance Indicators (KPIs) are closely related to UPSCALE stakeholders' engagement and the exploitation activities with specific dissemination and communication objectives (DCO) presented below in Table 2.

Table 2 List of Dissemination and Communication Objectives

DCO1	Transfer knowledge and project results among key stakeholder groups (agricultural extension, farmer groups, policymakers) on the benefits of the push-pull technology for sustainable agricultural intensification with particular focus on women and youth;
DCO2	Ensure that the wider farmer community of East Africa as well as Europe, other agro-environmental actors such as policy- and decision-makers, and the public are informed and enabled to use UPSCALE results, experiences and lessons learnt.
DCO3	Foster synergies with other EU-Africa initiatives, capitalising on existing dissemination channels and networks.
DCO4	Support further dissemination of the push-pull technology in Africa and Europe, as well as dissemination of the project results and outputs in research, public policy and new market-driven initiatives.

These specific dissemination and communication objectives are crafted to influence behaviour, develop opinions, and raise awareness of specific target groups. Through collecting feedback during Multi-Actor Community of practice (MAC) meetings and active engagement with the stakeholders, practical experience and emerging best practices are then shared on the KEH.

1.3.1 Progress of the Objectives

The main KEH objective is to serve within and beyond the project phase for a long-term, optimal flow of information between stakeholders for active communication, coordination, dissemination and facilitation of sustainable intensification practices, including, but not limited to push-pull practices in different systems and regions of Eastern Africa. More specifically, the KEH aims to:

- Serve as an umbrella hub to harmonize and increase the visibility of various sustainable intensification efforts and their synergies in East Africa, in collaboration with stakeholders and existing projects identified in MACs.
Progress: The consortium actively engaged with stakeholders through the UPSCALE MACs in each of the countries, additionally, in external events such as conferences, congresses, field days and seminars. In that sense, the research that has been carried out so far, as well as the progress of the UPSCALE project, are the focal points of dissemination.
- Receive a regular flow of content input from MACs' participative knowledge-building materials and updates prepared with MAC stakeholders, relevant for a broader community and the general public.
Progress: 6 Dashboards for tracking communication and dissemination KPIs set up in the previous period were maintained, one for each partner country and one compilation for tracking the overall progress. The Dashboard system is updated offline by *icipe* and travels for in-person meetings have taken place in order to better track and monitor the progress according to KPIs. Due to two seasons in African agriculture, partners were sending regular updates from the fields, starting from soil preparation, sowing and plant progress, farmer education to the amount of yield and the end of the season through reports. Partners were sending dissemination material such as photos, videos, and material suitable for blog stories on the KEH. Regular national and regional MAC events were organized according to the internal schedules and the partners delivered the ensuing reports.
- Enable further exchange between MAC members and other interested parties beyond project events and the project's runtime, thus enhancing the sustainability and long-term follow-up and snowball potential of the MACs.
Progress: The UPSCALE team enabled exchange of information via the page "Events" between MAC members and other interested parties beyond the project, thereby enhancing the sustainability and long-term follow-up, as well as the snowball potential of the MACs. Through proactive outreach and engagement initiatives, the team have facilitated ongoing communication channels by promoting knowledge about push-pull technology, including online events, field days and three newsletters to foster continuous dialogue among both sides. The dissemination team creates stories based on farmers testimonials and actively promotes them on Social Media platforms. The KEH hosts interactive maps which display information gathered from all countries such as Knowledge centres and Seed Merchants map, as well distils information on all MAC stakeholders in an interactive Stakeholders database.
- Represent an online repository for communication and dissemination of materials, as well as an interactive platform with strong regional and local links for knowledge exchange and dissemination directly at the level of communities, farmers, local NGOs, and extension agencies.
Progress: Substantial progress has been achieved in representing an online repository for communication and dissemination of materials. In at least three sections, KEH gathers more than 50 relevant materials on push-pull, most notably under [Publications](#), [How to Push-Pull](#) and [Multimedia](#). Scientific publications, photos, reports and events are gathered and listed for free use and contribution to open research. Moreover, content in local languages, such as Swahili, has been included.
- Provide easy navigation and user experience on Android devices, smartphones in particular.
Progress: The website has been redesigned to use a responsive design that adapts to viewing on desktop, tablet and mobile devices. With the improvements, visitors can get greater ease of use and can easily navigate through the website.

Division of the KEH website into 6 categories according to the type of content creates a more immersive user experience. This website has the goal of sustaining long-lasting visibility of the project through communication and dissemination of different activities. After revision and update, the website visitor now has a better view of the structure and therefore spends less time searching for the desired categories, at the same time spending more time reading, listening and watching the materials, according to the latest *Google analytics* (3 minutes and 17 seconds instead of 2 minutes and 38 seconds).

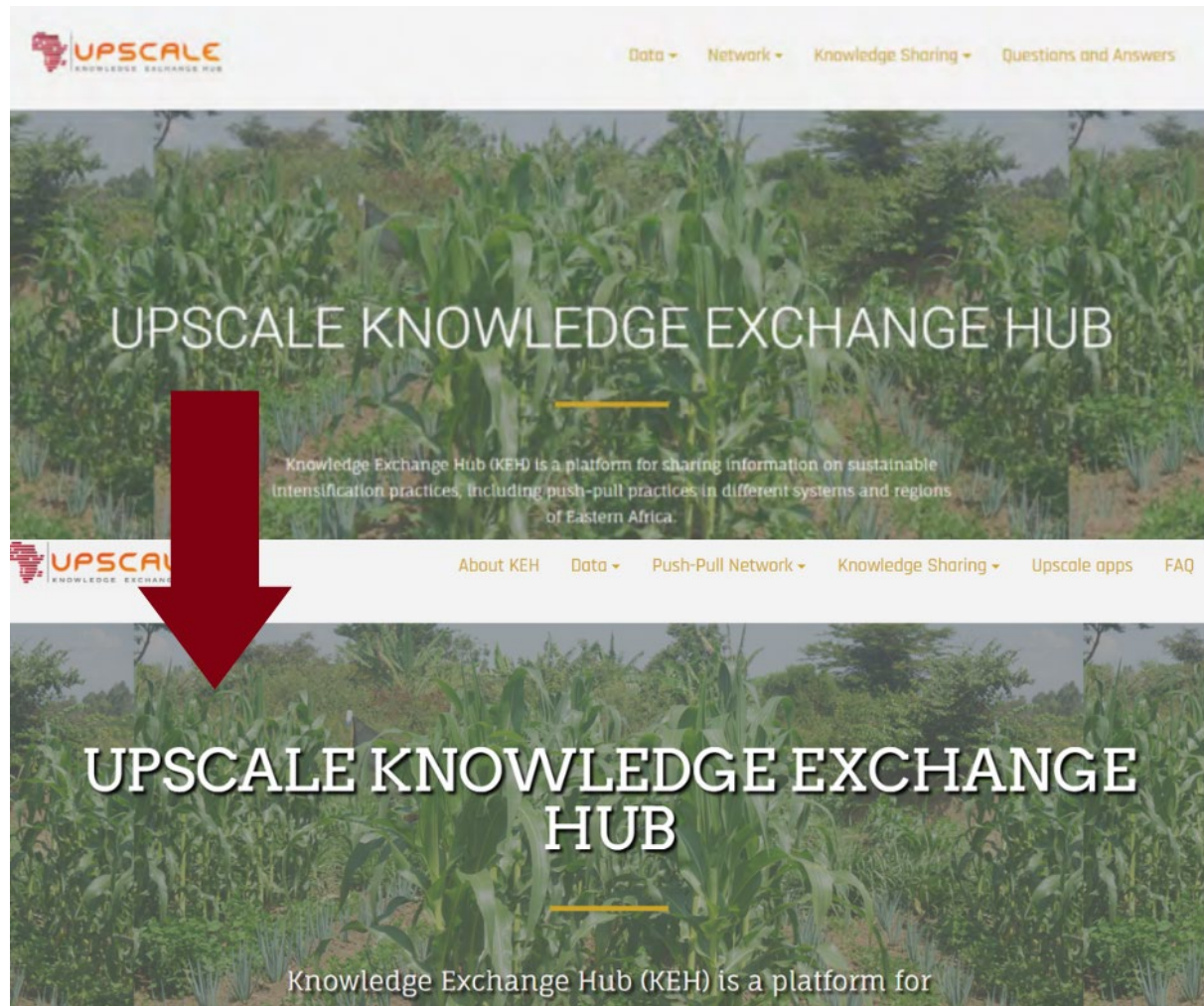


Figure 1 KEH Main Menu - old (upper figure) and updated version of the main menu

2 Knowledge Exchange Hub Update

Content is updated regularly according to the project activities and progress. Besides blogs and photo material, KEH now has a sidebar with short project news, upcoming events on EU - AU level and Twitter on the right side of the page.

The screenshot shows the right-hand sidebar of the Knowledge Exchange Hub website. At the top, there is a photo of a woman in a field, followed by a blog post titled "Sustainable Intensification of Push-Pull System with Vegetables" dated December 7, 2023. Below this is a "CONTINUE READING..." button. To the right of the blog post is a calendar section listing events for October 22 (Organic Innovation Days 2024) and October 23 (Global Bioeconomy Summit 2024), and November 04 (Tropical Summit 2024). Below the calendar is a "TWITTER" section featuring the UPSCALE account (@InoSens_rs) with a "Follow" button and a tweet about upscaling push-pull technology. At the bottom of the sidebar is a "FARMERS' GUIDE ON PLANTING A PUSH-PULL FIELD USING" graphic with the icipe logo.

Figure 2 KEH sidebar on page Push-pull in practice

Table 3 Updated Structure of Knowledge Exchange Hub's main menu

ABOUT KEH		Informative and User-Friendly Linked to Social Networks Advocacy Knowledge Repository Regular Updates and Capacity-Building
DATA	Maps and imagery Statistics	Soil Map Drought Severity Map Leaf Area Index and Leaf Area Index Maps Temperature Trend Map UPSCALE project meta data

PUSH PULL NETWORK	Contacts Nearby	Find your local key contact point Find your local Push-pull Knowledge Centre and Input Supplier Join your local community of practice around push-pull Find out how to do push-pull Push-pull farms near you Join the market with e-Granary
	Stakeholders	Online interactive database of over 180 organizations sorted by <i>Group, Type, Area, Country</i> and <i>Location</i> , providing links for more information.
	Events	Online calendar with universal downloadable events and subscription option.
	Forum	Community forum
KNOWLEDGE SHARING	How to push-pull	Overall guidance for website visitors in the domain of Push-Pull technology.
	Push-Pull in Practice	Blog posts related to Push-Pull farming practice, promoting knowledge transfer through testimonials and practical advice.
	Multimedia	YouTube videos and Flickr photo hub
	Publications	Publications database sorted by <i>Country, Theme, Category, Type</i> and <i>Tags</i>
Upscale apps	Push-Pull app	PUSH-PULL app description with link to the Google Play install.
	eGranary	eGranary app description with link to the desktop registration webpage.
Q&A	Questions and Answers	Accordion text with practical advice for establishing Push-Pull plots.

Compared to the last update of the KEH website, all content and categories went through visual adjustments, with the aim of optimising user experience. Also, from 8 categories on the old KEH structure, the updated KEH has 6 categories, optimizing some of the sections.

2.1 Detailed Presentation of Current KEH Webpages & Functionalities

2.1.1 About KEH

This site, which is a treasure trove of collected knowledge, was created as part of the H2020 UPSCALE project. Inosens, a partner included in WP8 - Exploit, disseminate and communicate push-pull innovation in East Africa and beyond, responsible for *Task 8.1: Communication and dissemination activities* and *Task 8.2: The UPSCALE Knowledge Exchange Hub*, created KEH in cooperation with other partners.

This chapter is dedicated to a new page called *“About KEH”* which represents an overall presentation of the KEH structure, taking certain parts of the website as a focal point for the page visitors. This page was not previously planned according to the Grant Agreement, but was identified as needed by the website visitors in order to get an overall understanding of the KEH. The section *“About KEH”* contains subsections where the main characteristics of the KEH are listed.

Informative and User-Friendly

Unleash the power of knowledge with our user-friendly Knowledge Exchange Hub. Navigate effortlessly through its intuitive structure, catering to diverse stakeholders and ensuring everyone can access valuable resources and insights.



Linked to Social Networks

Stay ahead of the curve with our Knowledge Exchange Hub, seamlessly integrated with UPSCALE’s vibrant social network channels. Be the first to receive up-to-the-minute project updates and actively engage in dynamic conversations shaping the future of agriculture.



Advocacy Knowledge Repository

Unlock a treasure trove of success stories, groundbreaking scientific papers, concise policy briefs, and illuminating best practice reports. Our Knowledge Exchange Hub serves as an advocacy knowledge repository, empowering you to drive positive change.

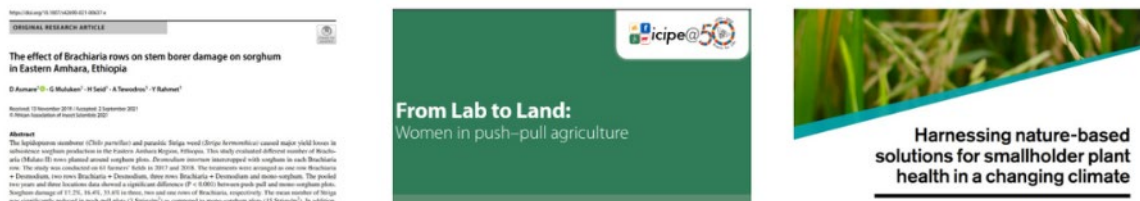


Figure 3 KEH About page

The KEH is defined by the following characteristics:

- **Informative and User-Friendly** – without much effort, visitors can have access to valuable resources and insights using this website. After this subtitle, visitor have opportunity to choose among clickable images that are linked to the blog post *“Losing your maize yield to stemborers and striga?”*, a video from YouTube and its playlist called *How to push-pull* about

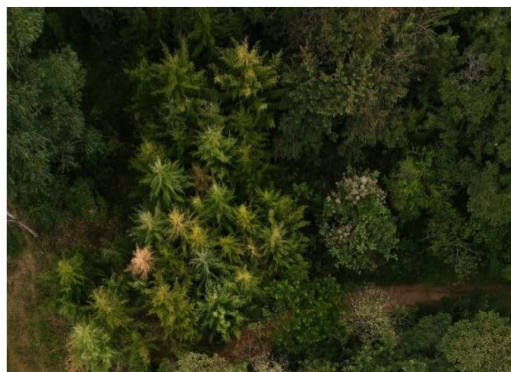
UPSCALE How to Push Pull tutorial series 01 What is push-pull? and image about Frequently Asked Questions About Push-pull Cropping Systems.

- **Linked to Social Networks** – the subtitle refers to social media icons (LinkedIn, Facebook, and Twitter (X)) that are directly linked to the UPSCALE social media profiles. Using call to action phrase “follow us”, visitor is encouraged to visit UPSCALE social media the profiles.
- **Advocacy Knowledge Repository** – To showcase the versatile content of the KEH, visitors are offered three clickable images that are linked to: 1. Scientific papers (e.g. “*The effect of Brachiaria rows on stem borer damage on sorghum in Eastern Amhara, Ethiopia*”); 2. Reports (e.g. “*From Lab to Land: Women in push–pull agriculture*”; “*Harnessing nature-based solutions for smallholder plant health in a changing climate*”)
- **Regular Updates and Capacity-Building** – this subtitle refers to project updates through targeted materials like captivating posters, engaging pamphlets, expert technical advisory notes and enticing brochures. The images are linked to the Media Kit, UPSCALE study regions and Publications and Reports page.

2.1.2 Data

Maps and imagery

This page gathers up-to-date spatial information on push-pull farms and contact centers for learning. Peek at environmental conditions maps to see where you stand. You can also learn more online with the [Push-pull App](#), [Push-pull FAQ](#) and our [Knowledge repository](#).



Statistics

UPSCALE project is committed to Open Science. Explore our database on Climatic and soil characteristics of baseline survey sites, metadata for the baseline survey conducted and eGranary data.



Figure 4 KEH Data page

The **"Data"** page has been redesigned to include two distinct sections instead of three as it was in the previous deliverable period (D8.6): one dedicated to Maps and Imagery, and another focused on Statistics. Additionally, each section is accompanied by a brief description to inform visitors about the contents therein. The push-pull map, map of National Contact Points and the Knowledge Center map have been removed from the **"Data"** page and migrated into a new section as the first subtitle under the **"Push-Pull Network"** page, called **"Contacts nearby"**. The database of the project will be active 4 years after funding but without maintenance. Before the end of the funding period, partner UWUE, responsible for the database, will migrate and publish the datasets in Zenodo under community Upscale project (<https://zenodo.org/communities/upscale-h2020>). All project datasets from the database, publications, news etc. will be archived there (for at least 20 years as per Zenodo lifetime projection¹) and are citable with DOIs.

2.1.2.1 Maps and imagery

By utilizing data insights, the **"Maps and Imagery"** section seeks to support well-informed decision-making. These maps are essential resources for researchers and farmers in order to gather data and create decisions. With a focus on Kenya, Tanzania, Rwanda, Uganda, and Ethiopia, the UPSCALE team produce educational maps that illustrate empirical results about biophysical and climatic conditions in East Africa by using satellite images. Visitors to this page can freely utilize publicly accessible MODIS satellite data from NASA's Terra and Aqua satellites to extract useful information on the region's temperature trends, vegetation, and severity of drought.

The section **"Maps and imagery"** currently includes:

- Soil Map,
- Drought Severity Map,
- Leaf Area Index and Leaf Area Index Maps,
- Temperature Trend Map.

¹ Accessed 17.10.2024:

[https://help.zenodo.org/guides/nih/element4/#:~:text=Zenodo%20supports%20long%2Dterm%20preservation,years%20\(see%20Zenodo's%20Policies\).](https://help.zenodo.org/guides/nih/element4/#:~:text=Zenodo%20supports%20long%2Dterm%20preservation,years%20(see%20Zenodo's%20Policies).)

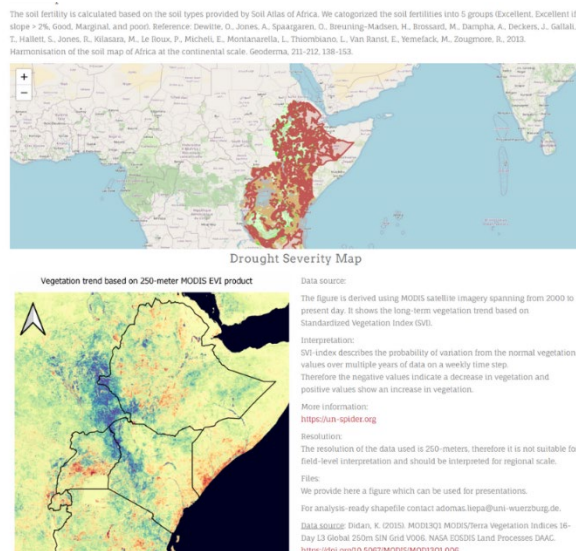


Figure 5 KEH Maps and imagery page

It is important to note that the information update process is iterative and as the project is developing further results as well as the network of stakeholders and partners, it is expected to expand our map offerings, both at regional and local levels.

2.1.2.2 Statistics

This [section](#) contains a brief overview of the UPSCALE database, an online resource established in December 2022. Metadata, essential to every dataset in the database, serves to summarize crucial information, facilitating data discovery and comprehension.

All datasets in the UPSCALE database are documented using a common metadata format, which is available at <https://www.upscale.biozentrum.uni-wuerzburg.de>. Using versioned and structured dataset storage, it facilitates multi-user access and guarantees data preservation. The request-grant-access process for data exchange is compliant with the UPSCALE data sharing and publishing policy.

2.1.3 Push-Pull Network

The „[Push-Pull Network](#)“ section underwent moderate updates, offering a direct link to the Contacts nearby page and the stakeholder database including four blocks (research institution, farming sector, push-pull enablers and societal actors). Below the blocks, visitors have the possibility to check upcoming events and share their experiences on the forum.

2.1.3.1 Contacts Nearby

The page „[Contacts Nearby](#)“ has been updated with multiple and major changes in the text and structure, including a push-pull map, maps of National Coordinator Partners (NCP) and of Village Knowledge Centres. The structure of the page is separated with the following subtitles:

- Find your local key contact point
- Find your local Push-pull Knowledge Centre and Input Supplier
- Join your local community of practice around push-pull
- Find out how to do push-pull
- Push-pull farms near you
- Join the market with e-Granary

The “[Find your local key contact point](#)” subtitle aims to provide users with contact information of key figures involved in the UPSCALE project within their region, East Africa. It serves as a gateway for local support and guidance. The following contact information are available:

1. Name and surname of the person involved in the UPSCALE project as contact point
2. Organization
3. Email address
4. Phone number
5. City and country

Contact points are designed to be easily updated in case of staff changes in the future within NCP organizations in each country.

Find your local key contact point

UPSCALE Key PPT hotline contact points

<p>Dickens Nyagol</p> <p>icipe - Kenya</p> <p>dnyagol@icipe.org</p> <p>+254722210174</p> <p>ICIPE Mbita, Kenya</p>	<p>Moses Lutaakome</p> <p>NARO - Uganda</p> <p>mosesluta5@gmail.com</p> <p>+256779587597</p> <p>NARO - NACCRI, Namulonge, Uganda</p>
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Figure 6 KEH Find your local key contact point display

The "Find your local Push-pull Knowledge Centre and Input Supplier" section is meant to connect users in push-pull regions with centres of expertise (Knowledge Centres) and suppliers of inputs needed for the push-pull technology. Compared to the previous KEH version, the pins for NCP, Knowledge Centres and seed merchants have been changed into three different colours. Additionally, formatting and fonts were corrected for uniformity as well as the colour of the text.

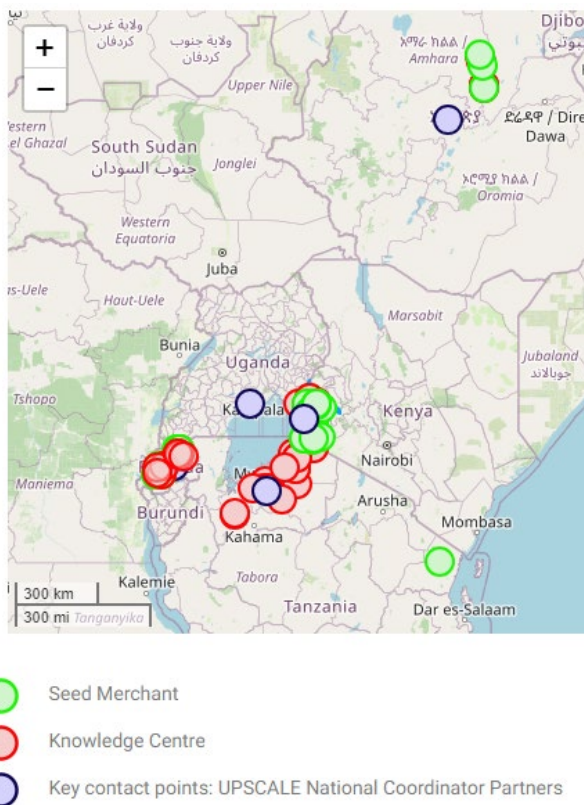
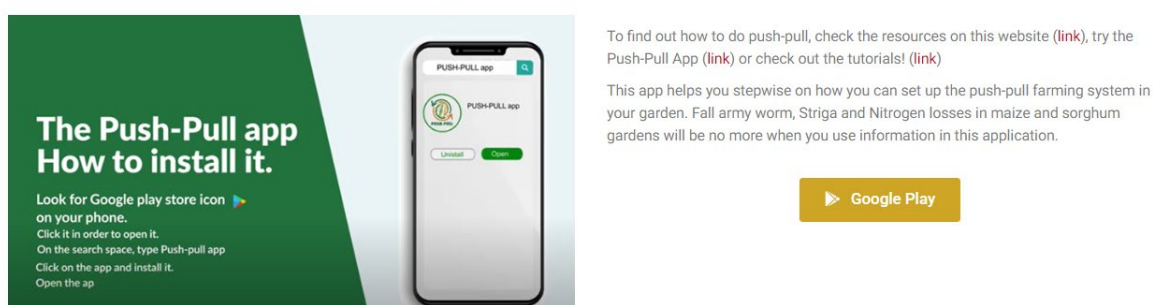


Figure 7 KEH Find your local Push-pull Knowledge Centre and Input Supplier map

The “Join your local community of practice around push-pull” subtitle presents the importance of NCP. These points have been placed on the Knowledge Centres map, which visitors can find above. After explanation of term NCP, visitors have source linked to the contact point information by country and the stakeholder database. Having information on the NCP for website visitors (usually farmers and extension advisors) available on the KEH is essential for several reasons. It ensures that visitors can easily access support and resources related to agriculture, facilitates effective communication between farmers and agricultural authorities, and promotes the dissemination of best practices. A national contact point helps coordinate agricultural programs, manages crises by providing timely information, and offers access to financial and technical assistance. This kind of database encourages farmer participation in additional activity on the website and also serves as a central source of information that advocates for sustainable agricultural practices, contributing to the overall productivity, sustainability, and well-being of farmers.

Find out how to do push-pull



The screenshot shows a webpage section titled "Find out how to do push-pull". On the left, there is a green banner with the text "The Push-Pull app How to install it." and a list of instructions: "Look for Google play store icon on your phone.", "Click it in order to open it.", "On the search space, type Push-pull app", "Click on the app and install it.", and "Open the ap". To the right of the banner is a smartphone displaying the "PUSH-PULL app" interface with "Uninstall" and "Open" buttons. Further right, there is text: "To find out how to do push-pull, check the resources on this website ([link](#)), try the Push-Pull App ([link](#)) or check out the tutorials! ([link](#))". Below this is another paragraph: "This app helps you stepwise on how you can set up the push-pull farming system in your garden. Fall army worm, Striga and Nitrogen losses in maize and sorghum gardens will be no more when you use information in this application." At the bottom right of the section is a yellow "Google Play" button.

Figure 8 KEH Find out how to do push-pull display

“Find out how to do push-pull” refers to the app led by partner *icipe*, created for the purpose of spreading the knowledge of push-pull technology to farmers - how to set up the push-pull farming system in their garden or defeat pests.

The “Push-pull farms near you” subtitle contains a map with the distribution of all push-pull farms that local partners of Ethiopia, Kenya, Uganda, Tanzania, Rwanda have recorded in selected regions. The selected regions in Ethiopia are Kewet and Dawa Chefa; in Kenya are Homa bay, Kisumu, Migori, Siaya, Kakamega, Vihiga; in Uganda are Kamuli and Iganda; in Tanzania is Mara; in Rwanda is Gatsibo.

The “Join the market with e-Granary” subtitle at the very bottom of the “Contacts nearby” page, invites the user to join the e-Granary platform led by partner EAFF, which has been adapted for push-pull farmers and enhances capacity for product aggregation and value chain access as well as for efficient dissemination of push-pull messaging, including awareness and tutorial videos created within WP8.

2.1.3.2 Meet Our Stakeholders

The key factor for sustainability and full impact lies in going beyond the borders of case study regions and expanding to a wider array of relevant stakeholders. Stakeholders are defined as those with an interest or concern in UPSCALE, who are both impacted by it and can have impact on the project themselves. Therefore, it is a broad group of 180 stakeholders, including individuals, groups, institutions, and organizations (non-exhaustive) who can affect the decision-making process in the project and, more importantly, its outcomes.



Figure 9 KEH Stakeholder map

As the structure of the KEH was revised, the primary objective was to interlink the pages. Consequently, website visitors can easily navigate between the landing page, the Contacts Nearby page, the Push-Pull Network page, and the ["Meet Our Stakeholders"](#) page, since every page contains information about the stakeholder map.

The initial list of stakeholders (Table 3 A1 in the Appendix) accompanying the map was compiled based on the D1.1 Report on Identity and Structure of MACs, the D1.3 Strategic Plan for Knowledge-Sharing and Capacity-Building in MACs, the Multi-Actor Needs Assessment Report from WP6, and information gathered from consortium partners and directly from MAC members. This list is regularly reviewed throughout the project's duration. Subsequent deliverables will include the updated list, if applicable.

2.1.3.3 Events

Through the observed period, the ["Events"](#) section has been updated with 50 events, with online and offline presence. In optimization of the dissemination effort, UPSCALE meetings were posted on all the project Social Media accounts (LinkedIn, Facebook, and Twitter (X)). The ["Events"](#) section represents a dynamic calendar containing information about date, time, location, and links for registrations, allowing stakeholders to integrate events into their schedules. This calendar interface provides a comprehensive view of both past and upcoming events, facilitating easy access to accompanying materials such as PDFs, links, and multimedia resources.

The type of the events posted on the KEH are the following:

1. Internal

The internal events are closely linked to the UPSCALE project and function for conversations, teamwork, and information exchange between stakeholders and project participants. Examples of internal events are the General Assembly and MAC meetings.

2. External

The external events are those who are organized by someone outside of the consortium and the partners are actively participating. These activities, which offer chances for networking, education, and cooperation within the larger community beyond the project's direct area, include conferences, workshops, seminars, and other get-togethers organized by outside groups or institutions.

3. Related

This type of the events that are included on the KEH are intended to provide a wide range of activities in the areas of rural development, women's empowerment, and agriculture in Africa and on the global level. The main goal of the third type of event is to give website users more options for interaction and education in these important fields.

FIND EVENTS

[List](#)
[Month](#)
[Day](#)

< >

Today

Upcoming

v

July 2024



<p>MON</p> <p style="font-size: 24px; font-weight: bold;">1</p>	<p>July 1 - July 5</p> <p style="font-size: 18px; font-weight: bold; color: #0056b3;"><u>CGIAR Science Week</u></p> <p>Nairobi, Kenya Nairobi, Kenya</p> <p>With science we can reimagine a sustainable and healthy future for people and the planet. Join Science week in Nairobi, Kenya.</p>	
<p>SUN</p> <p style="font-size: 24px; font-weight: bold;">14</p>	<p>July 14 - July 18</p> <p style="font-size: 18px; font-weight: bold; color: #0056b3;"><u>60th Annual Meeting of the Association for</u></p>	

Figure 10 KEH Event calendar

Besides partner newsletters, InoSens's best practice for gathering related events, is to obtain information through the following channels: websites dedicated to agriculture, women's empowerment, and rural development (for example *Ruforum*); websites of governmental and non-governmental organizations (for example *Ministry of Agriculture & Livestock Development from Kenya*); European academic institutions which provide scholarships or grants for African students; and international and regional development agencies that are based in Africa.

Most of the events are based in East African countries, offline and in person, but also, there are plenty of online events organized by stakeholders from Europe and the United States.

Above mentioned international conferences, summits and meetings play a pivotal role in the dissemination of project outcomes on a global scale. These gatherings provide a unique platform for UPSCALE researchers and stakeholders to exchange ideas and share the latest advancements in the push-pull technology.

2.1.3.4 Forum

The [UPSCALE forum](#) subsite has recently undergone a redesign in sense of structure, increasing functionality and user experience. The main menu contains clearly defined sections: *Forums*, *Members*, *Recent Posts*, *Register*, *Login*, and a *Search button*. The “Forum” section provides a structured space for discussions, where registered users can add topics, write comments, and share on Twitter (X) and WhatsApp. Forum is an interactive place for forum users to exchange ideas on a more personal level and give details about their experience, offer advice and best practice tips.

The Members area represents the repository of all the contacts, placed in blocks. Each block contains basic information about the user (name and surname, join date, written topics and posts). Also, each user has an own subpage with more information.

The Recent Posts section ensures users stay updated with the latest activity. The forum is complementary to e-granary and live MAC communities and includes direct links to facilitate further information search and networking.

As it is mentioned in the previous report, access to the forum is public and anyone may view the discussion topics and threads, while registration is mandatory in order to post and reply. The moderation of discussions is intentionally kept loose to provide ease of engagement until otherwise proven necessary.

2.1.4 Knowledge Sharing

The “[Knowledge Sharing](#)” page was updated by the subpage addition - “*How to Push-Pull*”. This subpage will serve as overall guidance for website visitors in the domain of push-pull technology. Going through the page, visitors can explore different variations of materials such as definitions of push-pull technology, comics made for the younger population, blog posts, video material from the UPSCALE YouTube channel and at the end, a call for a newsletter subscription. The last one is essential for building and nurturing a direct connection with the audience, enabling regular communication by spreading the newsletter.

2.1.4.1 How to push-pull

The initial and achieved purpose of the [“How to Push-Pull”](#) page is to gather useful material for beginners adopting the push-pull technology.

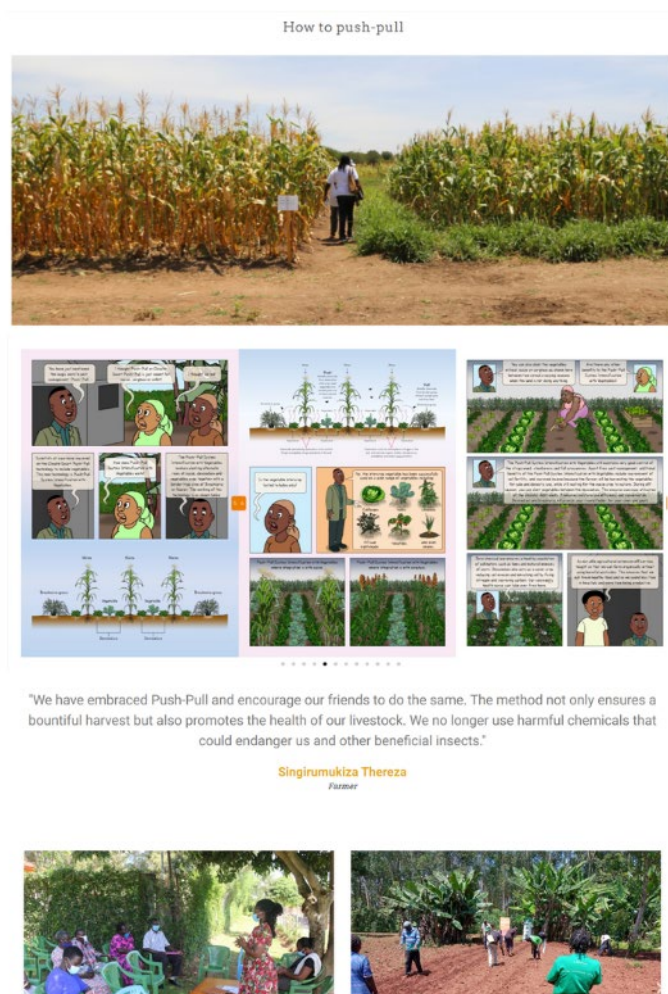


Figure 11 KEH How to Push-Pull page

This includes, but is not be limited to, push-pull diagram images, tutorial videos, in-depth blog posts and a set of descriptive images.

As mentioned above, the KEH structure has been created to interlink the pages. Information from the [“How to push-pull”](#) could be found on other pages of KEH such as images, videos, and blog posts. The primary belief is that if the site visitor encounters similar information multiple times, they will more effectively assimilate knowledge about the push-pull technology and the UPSCALE project.

2.1.4.2 Push-Pull in practice

This [section](#) compiles blog posts that, while not scientific papers like those found on the [“Publication”](#) page, remain pertinent to the UPSCALE project and its activities. Given that the UPSCALE project maintains two websites (the project website and KEH) to disseminate findings and present activities, both platforms interact with the content. The subpage [“Policy Briefs, Scientific Papers, and Reports”](#) along with public deliverables from the previous reporting period, has been retained on the project website. Certain publications and all deliverables are available on the project website, whereas deliverables on the KEH are accessible only under a specific tag. As it was mentioned in D8.6, [“Push-pull in practice”](#) includes practical information (e.g *icipe* educational agriculture themed brochures) and links for other sustainable intensification practices and how these may be combined with push-pull practices in line with project networking and project outcomes. Also, resources for

these blog posts are both from UPSCALE partners and external stakeholders. Along with the practical information, *“Push-pull in practice”* contains the documentation related to events organized by UPSCALE, categorized by type and topic, as well as reports from external events where UPSCALE was presented.

A sidebar has been incorporated to create a broader page layout. This sidebar includes information such as featured posts and upcoming events, and it is also linked to the latest Twitter (X) posts.

All these blog posts have been featured on the UPSCALE social media accounts (LinkedIn, Twitter, and Facebook).

Push-Pull in Practice

The figure displays a screenshot of a webpage titled "Push-Pull in Practice". At the top, a diagram illustrates the "Push" and "Pull" mechanisms. The "Push" system involves planting Desmodium between maize rows, which releases chemicals to control Striga and deposit seeds in the soil. The "Pull" system involves planting Desmodium between maize and a vegetable, where the vegetable attracts Striga away from the maize. Below the diagram are two blog post thumbnails: "Push-pull Technology and Fodder Production" (dated December 14, 2023) and "Sustainable Intensification of Push-Pull System with Vegetables" (dated December 7, 2023). To the right, a sidebar contains a "FEATURED POSTS" section with a "Striga weeds" article (dated June 20, 2022) and an "UPCOMING EVENTS" section listing events for July 01 and July 14. At the bottom right, there is a "TWITTER" section with the UPSCALE logo and a tweet about upscaling push-pull technology in East Africa.

Figure 12 KEH Push-Pull in Practice page

2.1.4.3 Multimedia

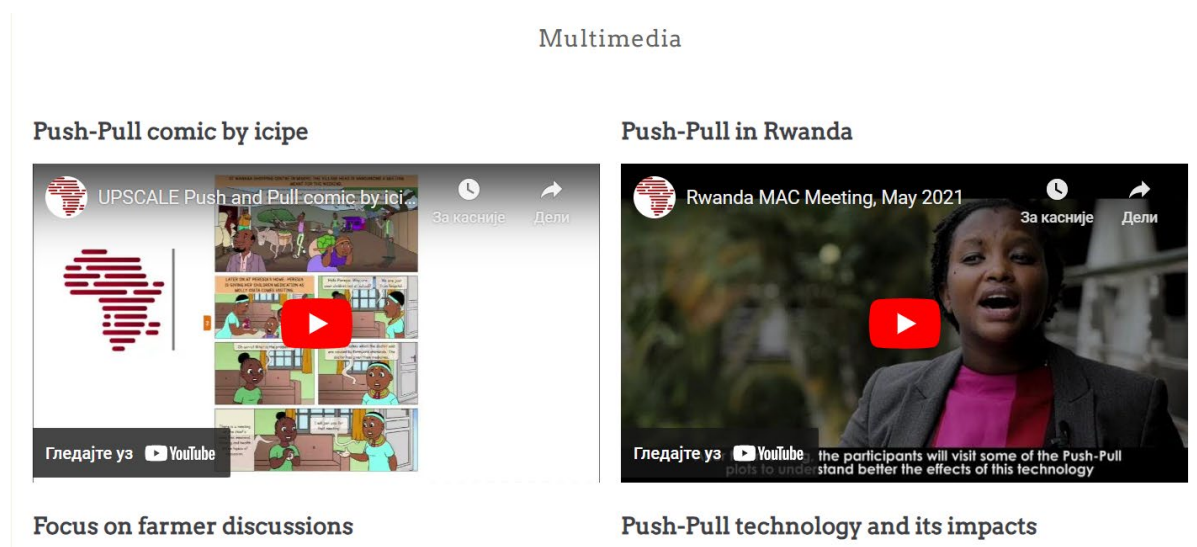


Figure 13 KEH Multimedia page

Unlike the previous version, this [section](#) of the website contains videos linked to YouTube and Flickr photos. Previous KEH had sections for Media Kit, UPSCALE videos and UPSCALE in Other Media. Most of the material has been transferred to the project website, leaving videos and photos to KEH.

Nowadays, videos are essential for social media accounts and website visibility, because users find them more information accessible and easier to understand while at the same time, their attention can be longer than reading texts. In 2024, videos are an effective way to explain complex ideas and engage the public. Moreover, videos and photos improve search engine rankings and are highly shareable on social media, extending the project's dissemination.

2.1.4.4 Publications

Within the UPSCALE project, the *"Publications"* section serves as a library (repository) of publications covering sustainable intensification, nature-based solutions, climate-smart agriculture, smallholder farming, socioeconomic and political dynamics and push-pull technology themes. These publications are classified according to the type, country, theme, category and tags. In that manner, research papers, articles, case studies and brochures represent valuable insights for the website visitor. Publications are sourced primarily from UPSCALE partners and affiliated scientists. The frequency of publication depends upon factors such as partner attendance at conferences and the availability of new research findings. On average, material is published approximately twice per month to ensure a consistent dissemination of valuable insights and updates for stakeholders. Currently, UPSCALE has 50 publications on the KEH.

Compared to the previous KEH deliverable, some minor changes happened in the publication structure. Along with the *awareness and educational materials, practice abstracts, scientific papers and technical reports and guidelines*, the structure has been updated with new types – master thesis, policy briefs and the public UPSCALE deliverables.

The country structure stayed the same since the UPSCALE project maintained partnership over the existing five project countries (Ethiopia, Kenya, Rwanda, Tanzania, Uganda). The theme section has been updated with new – *nature-based solutions*. This theme already has 13 publications.

The *Category* section was previously *Tag* section. Since the structure changes according to the needs and types of publications, i.e. the structure is a living creation, category was created to be primarily, greater separation before putting tag on specified publication. In this section, *News, Push-pull in practice* and *Uncategorized* categories have been added.

As mentioned, tags got lower in the classification structure. Upon that, new tags were created:

- Agricultural production system
- Agroforestry
- AU
- Belowground ecosystem services
- Brachiaria
- Cereal pests

Welcome to the Publications webpage of the UPSCALE Knowledge Exchange Hub! Here, you will find a diverse collection of publications covering topics such as sustainable intensification, nature-based solutions, climate-smart agriculture, smallholder farming, socioeconomic and political dynamics, and push-pull technology. Dive into a wealth of research papers, articles, and case studies that offer valuable insights and contribute to the knowledge base of agriculture. Explore the forefront of innovation and gain a deeper understanding of the complexities and opportunities within the field. Discover the power of knowledge as we strive to create a sustainable and resilient future for agriculture.

FILTER PUBLICATIONS

Country

- Ethiopia (2)
- Kenya (9)
- Rwanda (0)
- Tanzania (0)
- Uganda (0)

Theme

- Integrative cross-scale modelling (0)
- Nature-based Solutions (13)
- Scale dependencies (0)

Type

- Awareness and educational material (9)
- Master thesis (1)
- Policy briefs (4)
- Practice abstracts (5)
- Scientific papers (22)
- Technical reports and guidelines (0)
- UPSCALE Deliverables (2)

Category

- Agricultural production system (12)
- Biodiversity (6)
- Climate change (7)
- Earth Observation (1)
- Farming practice (4)
- Fertilisation (0)
- Landscape management (0)
- Multiactor communities of practice (2)
- News (2)
- Pest/disease control (14)
- Push-Pull in practice (13)
- Socioeconomic baseline surveys (1)
- Soil management (2)
- Uncategorized (1)

Tag

All Tags

Harmonized NDVI time-series from Landsat and Sentinel-2 reveal phenological patterns of diverse, small-scale cropping systems in East Africa

Capturing the phenological responses of crops in diverse, small-scale agricultural systems is one of the most notable remote sensing research gaps in Eastern Africa.

Push-pull technology improves carbon stocks in rainfed smallholder agriculture in Western Kenya

Push-pull technology improves agricultural productivity. However, its long-term effect on biomass carbon and soil organic carbon (SOC) is not yet known.

[READ MORE](#)

April 3, 2024

Push-pull technology enhances resilience to climate change and prevents land degradation: Perceptions of adopters in western Kenya

Climate change and land degradation adversely affect food security in sub-Saharan Africa (SSA).

Figure 14 KEH Publication structure

The “Publications” section of the UPSCALE project serves as a repository for a diverse range of topics related to sustainable intensification and climate-smart agriculture using push-pull technology. Furthermore, enhancements to the classification structure, including the addition of new themes and categories, facilitate easier navigation and exploration of the wealth of information available. Throughout updates, the 'Publications' section continues to serve as a valuable resource for advancing sustainable agriculture and environmental news in the region and beyond.

2.1.5 UPSCALE Apps

In the redesigned main menu, the *“UPSCALE Apps”* page has been added in order to be easily noticeable to the website visitor. The page contains two sections, each containing one application, their short description, image and button option to download apps directly.

The first app is the *PUSH-PULL app*. This app helps users stepwise on how to set up the push-pull farming system in their garden. The app promotes solutions to the major concerns of smallholder farmers - Fall armyworm, Striga and Nitrogen losses in maize and sorghum gardens.

The second app is the *e-Granary app - platform*, which aims to secure supply contracts, giving farmers a predictable and consistent market. The platform connects smallholder farmers clustered in viable economic producer groups at one end, and large off-takers at the other end. This ensures farmers are paid fair prices for their commodities and enabled to sell in bulk since partner off-takers can purchase large quantities.

2.1.6 FAQ

“FAQ” (Frequently Asked Questions) page provides quick answers to common inquiries (currently 21 Q&A) about the push-pull technology and its application on farmers’ plots, thereby enhancing user experience by allowing visitors to find information swiftly without needing to contact the UPSCALE team. This section builds trust and credibility by demonstrating UPSCALE’s transparency and willingness to assist its users, whether they are farmers or researchers. Moreover, the *“FAQ”* page contributes to improved search engine optimization (SEO) by incorporating relevant keywords, making the website more discoverable. If the user needs specific information, the email address at the bottom of the page is added to request further details.

2.2 KEH Technical specification

The KEH is made using WordPress website builder in order to make an intuitive, user friendly, responsive and secure website with design optimization for different screen resolutions over a wide spectrum of web browsers. Most importantly, it is optimized for screens of personal computers, tablets and mobile devices (including telephones, which were recognized as primary means of obtaining information among our primary end users - smallholder farmers in Eastern Africa). It uses MySQL database and WordPress plugins to extend website capabilities. The website theme and all plugins are regularly updated and backed up daily with 7 days retention. The entire website is hosted on Hetzner cloud in Germany. SSL certificates provide encrypted and secure access to all KEH content. The KEH is fully standardised for Search Engine Optimization (SEO). The complete KEH will be shared and available on GitHub, a cloud-based Git repository, for further usage beyond the project phase.

3 Conclusion

Over the observed period, the second version of KEH developed and transformed tremendously. One of the major thrusts is the extent of the revisions, as it seeks to address the core issue of the KEH – its effective service delivery. The revisions aimed at improving the visual context for the users – altering the context to enhance the visual and navigational elements of interfaces and changing functional actions consistent with the objective O7. As a consequence, the project stays ‘on course’ with regard to the activities designed and performed.

Considering the previous version of KEH several mistakes are remembered. Some measures and their performance such as that of the page *“Contacts nearby”* which was somewhat less effective were upgraded in the revised KEH. Also design and user access have improved especially on mobile devices which are critical for some targeted audiences of UPSCALE like the smallholder farmers in Eastern Africa.

InoSens and its partners put efforts to ensure that the KEH is intended to function as a relevant and sustainable knowledge exchange mechanism long after the UPSCALE project is over. The content of the website will be continuously updated with dissemination material until the completion of the UPSCALE project. Updated website information (events, news, and more) will be presented in future internal reports. As mentioned, after the project ends, the plan is to preserve the knowledge generated and ensure further uptake of the project results notably through long-term hosting of the KEH and its resources by one of the UPSCALE project partners with international reach expected to actively update and make use of the KEH for knowledge sharing and dissemination.

In the future, the focus will shift to ensuring the sustainability and growth of the KEH. We anticipate problems of maintaining the platform's relevance and availability once the project is over – especially, making the content interesting and fresh for diverse audience groups. The following stage of the project will also be focused on adjusting some fragments, for instance, enhancing more localized content, and coping with new challenges that will emerge. These measures will be helpful in achieving the sustainability and impact of the UPSCALE project in the long run.

4 Appendix

Table 4 A1 UPSCALE Stakeholder types and profiles

Stakeholder Type	Targeted Stakeholder Profiles
UPSCALE consortium partners	research, technology and education institutions, farmers federations, NGOs, SMEs
Smallholder farmers, farmer federations and cooperative societies	including women and youth in eastern Africa, Europe and beyond
Agribusinesses	commodity traders, buyers, input suppliers, seed companies (seedling nursery businesses), food processors
Agricultural extension agencies	advisory providers, community development workers and NGOs involved in efficient technology and knowledge transfer
Federal and local government agencies	national government ministries and community leaders/local administration in the project countries, the EU and internationally, especially in areas of agriculture and land use
Agro-dealers/agro-vets	wholesalers, stockists (retailers), general shops in remote areas, hardware shops
NGOs	agro-environmental actors, professional associations
Research institutions, universities and schools	in the fields of agricultural, sustainability and environmental sciences; early stage and experienced researchers
Financial institutions and intermediaries	development and commercial banks, microfinance institutions
Risk management agents	insurance providers, agri-fin-tech
Farmer Self-Help Groups	
Religious (Faith-Based) Organisations	
Consumers and representative bodies	
EU-AU projects	sister projects funded under the same call, other related EU funded projects, global umbrella initiatives
Media	radio, television and social media platforms, scientific journals, educational blogs
General public	civil society, relevant public initiatives linked to farmers, policymakers (global environmental issues)
Multinational organizations	in Africa and in Europe, supporting the project and active in the project topical area