UPSCALE

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

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D8.4:

First batch of practice abstracts

March 2024

UPSCALE

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Abstract:	This deliverable presents the first batch of the UPSCALE's practice abstracts, falling under the framework of the Work Package 8 and the execution of Task 8.1. The SCDP is a binder document of practice abstracts already published on the project website and the knowledge exchange hub as separate documents. In addition, to ensure the consistent visual identity of the project, common layout and template was applied for all practice abstracts.

Document Revision History			
Date	**Version**	**Author/Contributor/ Reviewer**	**Summary of main changes**
18/09/2023	1.0	Jelena Đokić (INO)	ToC, Executive Summary, first version
20/09/2023	1.1	Emily Poppenborg (JLU)	First version review & edit
25/10/2023	2.0	Jelena Đokić (INO)	Final Version
31/10/2023	2.1	Emily Poppenborg (JLU)	Final version review

Dissemination Level		
PU	Public Deliverable	✔
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

UPSCALE Consortium			
No	**Participant Organisation Name**	**Short Name**	**Country**
1	JUSTUS LIEBIG UNIVERSITAET GIESSEN	JLU	DE
2	THE INTERNATIONAL CENTRE OF INSECT PHYSIOLOGY AND ECOLOGY LBG	ICIPE	KE
3	BAYERISCHE FORSCHUNGSALLIANZ BAVARIAN RESEARCH ALLIANCE GMBH	BayFOR	DE
4	EASTERN AFRICA FARMERS' FEDERATION SOCIETY	EAFF	KE
5	JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY	JKUAT	KE
6	KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANISATION	KALRO	KE
7	MASENO UNIVERSITY	MU	KE
8	FH ASSOCIATION	FH	CH
9	RWANDA AGRICULTURE AND ANIMAL RESOURCES DEVELOPMENT BOARD	RAB	RW
10	INO DOO NOVI SAD	INO	RS
11	UNIVERSITY OF KWAZULU-NATAL	UKN	ZA
12	LUNDS UNIVERSITET	ULUND	SE
13	SVERIGES LANTBRUKSUNIVERSITET	SLU	SE
14	UNIVERSITAT ZURICH	UZH	CH
15	TANZANIA AGRICULTURAL RESEARCH INSTITUTE	TARI	TZ
16	NATIONAL AGRICULTURAL RESEARCH ORGANISATION	NARO	UG
17	INSTITUTE FOR SUSTAINABLE DEVELOPMENT	ISD	ET
18	JULIUS-MAXIMILIANS-UNIVERSITAT WUERZBURG	UWUE	DE
19	LEIBNIZ UNIVERSITY OF HANNOVER	LUH	DE

Funding Scheme: Research and Innovation Action (RIA) ● Theme: H2020-SFS-2019-2
Project Start Date: 01 November 2020 ● Duration: 60 months

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1 Summary

This deliverable D8.4 binds together the practice abstracts produced until M41 and presents the first batch, while the second will compile all the practice abstracts and is due at the end of the project, in M60. Practice abstracts are originally created in English while versions in local languages, such as Swahili, are produced to reach a wider audience. Additional practice abstracts are expected as the project advances and research results begin to arrive. A common template form ensures successful and consistent visual representation of the project as well as its activities for successful dissemination of results.

This deliverable consists of the following practice abstracts:

- **Abstract 1**: Performance of the third-generation push-pull against striga weed, stemborers and fall armyworm
- **Abstract 1 (sw)**: Utendaji wa kizazi cha tatu cha taratibu ya sukuma-vuta (3GPPT) dhidi ya magugu ya striga, shina, na viwavi jeshi
- **Abstract 2**: Multi-Actor Communities (MACs) of Practice as Platforms for Information Sharing
- **Abstract 3**: Transdisciplinary communication and knowledge sharing strategy for upscale project
- **Abstract 3 (sw)**: Mawasiliano ya kikadi na mkakati wa kushiriki maarifa kwa
- mradi wa upscale
- **Abstract 4**: Combining Milpa and Push-Pull Technology for sustainable food production in smallholder agriculture. A review

ABSTRACT
#1

Performance of the third-generation push-pull against striga weed, stemborers and fall armyworm

To improve the resilience of the climate-smart push-pull technology (CSPPT) against climate change, we tested more adapted companion plants; Brachiaria cv. Xaraes and Desmodium uncinatum for their suitability in controlling maize pests and striga weed in a multisite comparison study in western Kenya. A new version of PPT, termed 'third generation PPT' (3GPPT) equally suppressed striga weed together with the recently emerged fall armyworm, just as much as the climate-smart PPT, and even much better than farmers` own practices. Control of stemborers was marginally poorer within the 3GPPT compared to the CSPPT, but higher than plots involving farmers own practices. In post-season evaluations, farmers rated the 3GPPT highly this preference was based on additional superior traits of mite resistance, higher biomass yield and drought tolerance in the fodder grass Xaraes and seed production. Desmodium incanum was preferred for improved drought tolerance and seed production, thereby addressing some of the major constraints within previous versions of the PPT. The 3GPPT therefore provides competitive advantages that improve chances for upscaling the PPT even to farmers within regions of limited rainfall.

Authors: Frank Chidawanyika (*icipe*)
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Date: April 2022
UPSCALE: Upscaling the benefits of push-pull technology for sustainable agricultural intensification in East Africa.
Research and Innovation project 2020-2025.
Social Media: LinkedIn [UPSCALE] & Twitter [@upscale_h2020]

Further information

Cheruiyot, D., Chidawanyika, F., Midega, C. A. O., Pittchar, J. O., Pickett, J. A., & Khan, Z. R. (2021). Field evaluation of a new third generation push-pull technology for control of striga weed, stemborers, and fall armyworm in western Kenya. Experimental Agriculture, 57(5), 301-315. https://doi.org/10.1017/s0014479721000260

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ABSTRACT
#1

Utendaji wa kizazi cha tatu cha taratibu ya sukuma-vuta (3GPPT) dhidi ya magugu ya striga, shina, na viwavi jeshi

Ili kuboresha ustahimilivu wa teknolojia ya climate-smart push-pull (CSPPT) dhidi ya mabadiliko ya hali ya hewa, majaribio yalihusisha mimea yaliochukuliwa kwa uwezo na faida zao; Brachiaria cv. Xaraes na Desmodium uncinatum zilifaa katika kudhibiti wadudu waharibifu wa mahindi na pia magugu ya striga, katika utafiti wa kulinganisha wa maeneo mengi magharibi mwa Kenya. Toleo jipya la taratibu PPT, linaloitwa 'kizazi cha tatu cha PPT' (3GPPT) kwa usawa lilikandamiza magugu ya striga pamoja na viwavi jeshi walioibuka hivi karibuni, sawa na PPT inayozingatia hali ya hewa, na bora zaidi kuliko mazoea ya wakulima wenyewe. Udhibiti wa mabuu ya wadudu ulikuwa duni zaidi ndani ya taratibu 3GPPT ikilinganishwa na taratibu ya CSPPT, lakini juu kuliko mashamba yanayohusisha taratibu jadi za kilimo. Katika tathmini za baada ya msimu, wakulima walikadiria taratibu ya 3GPPT kuwa ya juu zaidi, upendeleo huu ulitokana na sifa bora zaidi za kustahimili wadudu (mites), mavuno ya juu ya majani na kustahimili ukame katika nyasi za malisho za Xaraes pamoja na uzalishaji wa mbegu.
Desmodium incanum ilipendekezwa kwa sababu ya kustahimili ukame na uzalishaji wa mbegu, na hivyo kuwa mojawapo ya suluhu baadhi ya vikwazo vikuu ndani ya aina za awali ya PPT. Kwa hiyo taratibu ya 3GPPT inatoa faida zaidi zinazoboresha nafasi za kuongeza PPT hata kwa wakulima kwenye maeneo yenye mvua chache.

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Further information

Cheruiyot, D., Chidawanyika, F., Midega, C. A. O., Pittchar, J. O., Pickett, J. A., & Khan, Z. R. (2021). Field evaluation of a new third generation push-pull technology for control of striga weed, stemborers, and fall armyworm in western Kenya. Experimental Agriculture, 57(5), 301-315. https://doi.org/10.1017/s0014479721000260

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ABSTRACT #2

Multi-Actor Communities (MACs) of Practice as Platforms for Information Sharing

UPSCALE, an EU H2020 research and innovation project aims at expanding adoption of push-pull technology (PPT) by better understanding its applicability under diversified cultivation systems in the East African Region. UPSCALE forms and uses Multi-Actor Communities (MACs) of practice platforms to achieve effective transdisciplinary collaboration and participatory research approaches among UPSCALE partners and stakeholders at national and regional levels. MACs will strengthen functional linkages between UPSCALE research and innovation activities and farmers, policy and value chain-oriented extension stakeholders. This will help build networks to support advocacy and enabling policy environment for dissemination and adoption of PPT, and subsequently identify best practices for sustainable PPT intensification. MACs which comprise UPSCALE partners and stakeholders along PPT value chains, have been formed in Kenya, Uganda, Tanzania, Rwanda and Ethiopia. As a platform for co-creation and information sharing, MACs conduct regular project meetings, participate in value chain analysis, PPT field research, farmer trainings through farmer teachers, and farmer mind-set change through demonstration fields. MACs also initiate village PPT meetings, conduct local advocacy processes, link with extension services and farmer groups. Various communications channels and tools such as the UPSCALE Website, the Knowledge Exchange Hub, social media channels e.g. LinkedIn, Twitter, Facebook have been established to support knowledge sharing. MACs participate in transdisciplinary and collaborative co-construction of information sharing and capacity-building materials to target audiences through the Knowledge Exchange Hub.

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ABSTRACT #3

Trans-disciplinary communicaiton and knowledge sharing strategy for the UPSCALE project

UPSCALE project has developed a trans-disciplinary knowledge sharing and capacity building strategy with an aim of breaking the disciplinary barriers among multi-actor communities of practice (MACs) in East Africa. UPSCALE considers MACs as a platform that incorporate partners and other stakeholders to enable participatory information sharing and capacity building on the intensification of push-pull technology (PPT). MACs enhance scaling up PPT through multi-actor technical and commercial interactions along different commodity value chains. UPSCALE has both internal and external communication channels that enable continual interaction among partners and stakeholders. We use in-person and on-line meetings, setting up local information centers, translation of knowledge resources to local languages, expanding farmer teachers' model and producing targeted policy briefs to collaborate and communicate our results. Our website https:// upscale-h2020.eu/ knowledge exchange hub https://upscale-hub.eu and the e-Granary curate our findings.

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Photo information
UPSCALE in-person and online Work Package 8 workshop held at icipe, Duduville, Nairobi, Kenya on 14th and 15th November 2022.

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ABSTRACT #3

Mawasiliano ya kikadi na mkakati wa kushiriki maarifa kwa mradi wa upscale

Mradi wa UPSCALE umeandaa mkakati wa kubadilishana ujuzi wa kubadilishana taaluma na kujenga uwezo kwa lengo la kuvunja vikwazo vya kinidhamu miongoni mwa jumuiya za watendaji mbalimbali (MACs) katika Afrika Mashariki. UPSCALE inachukulia MAC kama jukwaa linalojumuisha washirika na washikadau wengine ili kuwezesha ushirikishaji habari shirikishi na kujenga uwezo juu ya uimarishaji wa teknolojia ya sukuma vuta (PPT). MACs huboresha uongezaji wa teknolojia ya sukuma vuta kupitia mwingiliano wa waigizaji wengi wa kiufundi na kibiashara pamoja na misururu tofauti ya thamani ya bidhaa. UPSCALE ina njia za mawasiliano za ndani na nje zinazowezesha mwingiliano endelevu kati ya washirika na washikadau. Tunatumia mikutano ya ana kwa ana na mtandaoni, kuanzisha vituo vya habari vya ndani, kutafsiri rasilimali za maarifa kwa lugha za kienyeji, kupanua miundo ya walimu wa wakulima, na kutoa muhtasari wa sera unaolengwa ili kushirikiana na kuwasilisha matokeo yetu. Tovuti yetu https://upscale-h2020.eu/ kitovu cha kubadilishana maarifa https://upscale-hub.eu na e-Granary huratibu matokeo yetu.

Waandishi: Esther Ng'ong'a; Winnie Oliech; Dennis Mulupi; Cosmas Kiprono; Fredrick Aila; Benjamin Ombok; George Odhiambo
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Photo
Warsha ya mradi wa UPSCALE ya ana kwa ana na mtandaoni ya WP8 iliyofanyika icipe, Duduville, Nairobi, Kenya tarehe 14 na 15 Novemba 2022.

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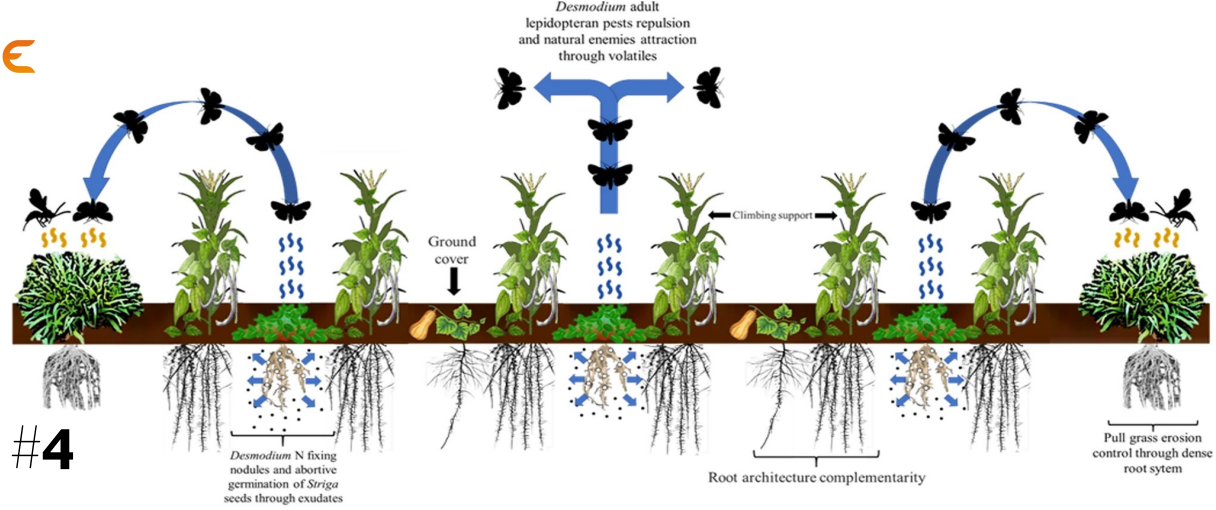
UPSCALE



ABSTRACT #4

Combining Milpa and Push-Pull Technology for sustainable food production in smallholder agriculture. A review

We reviewed two systems of small-scale cereal production in the tropics, the Mesoamerican milpa and the East African Push-Pull Technology, and present the advantages likely to be obtained by combining these technologies into a milpa push-pull system. In addition to key benefits for pest control and food production, the proposed system has the potential to adapt to different conditions of altitude, rainfall, and soil nutrient levels. We compiled lists of plants with a documented potential to maximize synergies in such intensified mixed cereal systems according to socio-cultural context and local environmental conditions. We also reviewed available knowledge on planting timings, densities and main recommendations for the fight against the major cereal pests, witchweed (Striga spp.), fall armyworm and stemborers. Our objective is to highlight promising options small-scale farmers have to fulfill production needs, personal and socio-cultural preferences while being sustainable, by leveraging the breadth of existing and future knowledge on effective plant associations for farming practice. We identified a number of native plants, with high nutritional value and ease of access, that can control pests and increase yields while diversifying farmers' diets. Co-development and testing of the milpa push-pull and related concepts by farmers and scientists will bring further insight into the effectiveness and optimal design of crop mixtures on tropical farms.

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Photo information
Figure 3 Milpa push-pull, CC UPSCALE project 2023

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