

Concept note –

Push-pull Agroecology Community of Practice (CoP) Co-construction Workshop

icipe Duduville, Nairobi, 15 -16 August 2024

Background and Rationale:

A. The Push-pull innovation R&D milestones and challenges

Push-Pull is an agroecological IPM strategy originally designed to control major pests in cereal-based farming systems. The strategy has been expanded to control pests in horticultural and commercial crops. The technology has been proven to manage major constraints to cereal production including the parasitic striga weeds (Khan et al., 2008a), stemborers (Khan et al. 2008b), and the invasive fall armyworm (Khan et al., 2018). It also reduces mycotoxin contamination of cereal grains (Owuor et al., 2018), improves low soil fertility (Drinkwater, 2021) and addresses shortage of livestock fodder (Khan and Pickett 2014), and enhances resilience to unreliable rainfall (Khan et al., 2011) and climate change (Ndayisaba, 2023), with significant economic benefits (Kassie et al., 2018) to smallholder farmers. *icipe* is building upon the previous chemical ecology work to research on the biocontrol of stemborers and the invasive fall armyworm using the push-pull stimulo-deterrent tactic as well as natural enemies of the pests. The centre continues to investigate mechanisms underlying plant-plant and plant-insect interactions, above- and below-ground effects, including allelochemical management of the parasitic Striga weeds, as well as effects on soil health. Broadly, the chemical ecology of the tritrophic interactions is being investigated while exploiting the innate inducible defence systems through the recruitment of effective local natural enemies (Tamiru et al, 2012). The push-pull technology is being developed further by integrating high-value crops such as vegetables (Chidawanyika et al, 2023). New research is adapting and intensifying the push-pull IPM strategy for smallholder farmers in an expanded range of agro-ecosystems, exploiting more climate-resilient attractive trap plants and repellent intercrops. Through multiple partnerships in Sub-Saharan Africa, the programme is scaling up the available push-pull options by establishing closer linkages between researchers, extensionists, and farmers.

Whereas *icipe* innovated Push-pull and is leading its continued improvements, its full potential as an integrated agroecological solution has not been fully exploited. Several variants of Push-Pull implementations and adaptation based on its agroecological principles have sprung up in Africa (Ratto, 2022). These new practices may use similar IPM tactics but may not necessarily be linked to the original Push-pull developed by *icipe*, which is also evolving. There is an opportunity to harness synergistic development of Push-Pull related initiatives to build more development value through a CoP for more adaptable, resilient cropping systems. *icipe* is also investigating the heterogeneity of farmer characteristics, their needs, the suitability of tested dissemination pathways, and how they reinforce each other to respond to contextual changes that farmers report as influencing the successful uptake and long-term use of the technology. Developing Africa's agri-food systems requires moving beyond technocratic approaches to nurturing context-specific, farmer-centric innovation pathways that recognise smallholders' ingenuity in navigating heterogeneous realities. Innovation unfolds as a dynamic process requiring inclusive participation, flexibility for local adaptation, and long-term collaboration with farmers as partners in finding solutions (Adesina et al., 2023).

Few projects have investigated agroecological interventions across different farming contexts and scales in Africa (Ratto et al, 2022), highlighting an urgent need for landscape-scale interventions to address land-use impacts on agroecological effectiveness. Limited evidence also exists on the synergistic effects of agroecological technologies on multiple ecosystem services and on non-target/beneficial organisms. Also lacking are interdisciplinary interventions that addressed the wider indirect benefits of not using chemical pesticides, associated health and ecological impacts, the social-economic outcomes, as well as adequate knowledge on barriers to adoption by farmers, which are

necessary to identify pathways to greater adoption and to support policy advocacy of agroecological interventions in Sub Saharan Africa.

The CoP co-construction workshop aims to initiate the development of a Push-Pull community of practice which integrates related agroecological innovations to enhance food security, environmental safety, and incomes of smallholder producers in sub-Saharan Africa.

B. Co-constructing a Push-pull Agroecology Community of Practice

Purpose: The purpose of the action is to develop a community of practice (CoP) for agroecological-based cropping systems within the Push-Pull innovation ecosystem to enhance food security, environmental safety, and incomes of smallholder producers in sub-Saharan Africa.

Approach: The approach involves **developing a Push-Pull agroecology CoP** by first conceptualising sections of the CoP and their functions collaboratively with selected partners in the value chain, identifying key constraints, and designing a platform for sharing existing knowledge, best practices, and co-creation of innovation strategies. This will be achieved through continuous physical and web-based engagements. *icipe* will lead the development and processes of the CoP as both network leader and facilitator, bringing members together, creating platforms for sharing knowledge and best practices, making sure the interactions add innovation value to all members, and facilitate productive and continuous engagements between practicing members. The conceptualisation process will involve all knowledge repertoire related to Push-pull and pertinent agroecological innovations. We will identify and register actors with shared interest around the Push-Pull innovation ecosystem. Participants in the CoP will have experiences and interests in push-pull technology and agroecology in common but will be clustered according to their interests and roles, e.g., primary innovation R&D around Push-pull value chains, dissemination and scaling, supply of materials and communications to facilitate interactions, collective learning, sharing information and innovative ideas. Published evidence of relevant strategies and success stories will be documented.

The members will **co-construct the Push-pull agroecology CoP processes** through a shared practice involving the development of a knowledge exchange hub featuring shared information resources and practices, experiences, toolkits, ways of addressing agroecological problems, and co-creation of new solutions to constraints. The CoP members will establish a formalised process to govern their interactions and hold regular physical and /or web-based meetings for sustaining these interactions.

In the medium term the CoP members will develop a trans-disciplinary framework for further co-development and potential integrations of their agroecological innovations. Members will design a research-based CoP framework to sustain collaborative co-creation, adaptation, integration, and intensification of Push-pull related agroecological innovations. The framework will define the scope of content, conditions, development processes, and management structures.

In the long-term, key lessons learned through the CoP processes of Push-pull and other agroecological technologies will be synthesized and will provide a foundation for a clear policy agenda to guide future interventions, and structures designed to improve co-creation of agroecological knowledge.

Long-term Outcomes:

- (1) expand the applicability of Push-pull and other agroecological innovations to leverage their environmental and climate resilience benefits to smallholder farmers.
- (2) foster empowerment, engagement and supporting farmers (including women and youth) with new knowledge of integrated agricultural/ecological practices to improve crop/animal and factor productivity, to restore and better manage ecosystems, and resilient agrifood systems.
- (3) contribute to developing a future trajectory for expansion and dissemination of ecologically sound research, knowledge, and technology at scale with multi-stakeholder CoP participation.

Immediate Workshop Outcome: CoP concept for Push-pull agroecology innovation ecosystem developed.

Specific workshop outputs:

- 1) Potential CoP knowledge partners identified and categorised based on relevance, expertise, mandate, availability, and interest; CoP members interests identified, and mapped; Membership inclusion criteria, and potential engagement structures defined.
- 2) Push-pull agroecology strategic goals and contexts re-defined – Development problems to be addressed by the CoP identified; Knowledge/practice focus areas, scope, depth, and strategic value proposition articulated. This includes:
 - (a) re-casting and optimising the Push-pull agroecology R&D strategy.
 - (b) comprehensive development of seed production and market value chains.
- 3) Cascaded sections of the CoP and their functions conceptualised collaboratively with identified members from their published evidence; Public and private CoP spaces defined.
- 4) CoP knowledge sharing and innovation co-creation strategy developed.

C. Participants:

The initial Push-pull CoP co-creation workshop will draw participation from knowledge partners around the Push-pull innovation ecosystem, including:

1. *icipe* scientists around the Push-pull agroecology innovation ecosystem
2. Desmodium and Brachiaria seed systems public and private-sector value chain actors.
3. Biovision-funded project partners, “Scaling VIPPT through One-Health Approach”
4. Relevant UPSCALE project Multi-actor CoP institutions and members

D. Venue: *icipe* Duduville, Nairobi

E. Dates: 15 -16 August 2024