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Institutionalizing multi-actors agricultural innovation platforms to foster field-level agricultural innovation systems by empowering smallholder farmers



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Introduction

The empowerment of smallholder farmers remains a pivotal and highly effective strategy for driving the transition towards sustainable agrifood systems. Given the unique attributes of smallholder agriculture, endeavors led by smallholder farmers have incurred significant resource and environmental costs, to the detriment of sustainability. Consequently, leveraging the potential of smallholder farmers to attain sustainability necessitates more than just the delivery of advanced, green, and user-friendly technologies. It also demands participatory approaches to knowledge generation by engaging multiple stakeholders in collaborative efforts. This undertaking calls for the active engagement of various actors, with researchers offering expertise and cutting-edge technologies, extension agents delivering information and services, lead farmers mobilizing and organizing farmers while disseminating innovations, market actors presenting innovative business models, input suppliers providing affordable and environment-friendly products, and governments formulating and implementing policies tailored to the specific needs of smallholder farmers, researchers, and market actors, and entrepreneurs.

The multi-actors agricultural innovation platforms (MAIPs) are co-innovation platforms established in rural

communities where farmers and key value chain actors become empowered through participatory action research (PAR), knowledge co-creation and application, market linkages, policy engagement, and so on. These platforms effectively amalgamate knowledge and insights from researchers alongside the practical experience of farmers. One of the most effective emerging models in this domain is the Science and Technology Backyard (STB), which empowers smallholder farmers to achieve sustainable agrifood value chains. STBs, aiming to meet the practical needs of farming communities, are conducive to building a collaborative relationship among multiple actors to activate their potential for co-innovation and develop integrated solutions.

A notable feature of MAIPs, including STBs, is the lasting physical presence of researchers and graduate students within rural communities. This allows smallholder farmers to promptly seek assistance and engage in PAR with MAIP personnel whenever they encounter agronomic problems or issues in the supply chain. This arrangement eliminates time constraints, financial barriers, and geographical distances that often hinder such interactions. Consequently, the interaction between researchers and farmers culminates in the development of comprehensive and well-rounded solutions for sustainable agrifood

Figure 1. MAIP facilitator at a training session on co-innovation on a MAIP training course



value chain development. Beyond the immediate results, the engagement with MAIPs stimulates the self-learning and peer-to-peer learning of smallholder farmers, resulting in a significant enhancement in the sustainability of their production.

However, MAIP actors are often constrained in specific ways and the synergy among them tends to be undermined; agricultural universities or colleges often lack guidelines for establishing and operating MAIPs in a standardized way, competent authorities struggle to provide certification, programme managers receive little continuous follow-up support, and local governments lack capacities to scale up MAIPs. Additionally, the working mechanisms to scale up MAIPs at the regional level remain weak. Last but not least, there is a lack of clarity regarding

the monitoring and evaluation (M&E) for MAIP operations, particularly in terms of defining clear indicators for their performance. These challenges hinder the widespread adoption of the MAIP model, preventing it from giving a full play to its potential in promoting sustainable agrifood value chain development at the regional or national levels. As a result, the institutionalization of MAIPs is largely challenged due to poor standardization, a lack of certification, ineffective organizational structure, and overly ambitious or unworkable M&E.

Currently, MAIPs have been operating with success in some FAO member countries and FAO field projects, such as STBs in China and MAIPs in Azerbaijan, and African countries like Ethiopia, Kenya, and Malawi. Their effectiveness is increasingly acknowledged, and thus their scale-up is now on the agenda.

Figure 2. MAIP facilitator at a training session on co-learning on a MAIP training course



Therefore, there is an urgent need for an effective approach to institutionalizing them as integral agencies to contribute to agrifood system transformation towards sustainability. This approach should aim to achieve the following objectives:

- standardizing MAIPs, systematically encompassing their establishment and operation;
- enhancing the synergy among the key MAIPs actors while overcoming their constraints;
- developing methodologies for scaling up MAIPs for accelerating agrifood system transformation towards sustainability; and
- establishing an effective M&E system to assess the innovation performance of MAIPs.

Figure 3. Group dynamic in the MAIP facilitator training course



Figure 4. Poster display at the MAIP training base



Key messages

To promote field-level agricultural innovation systems (AIS) and better leverage MAIPs' potential to drive the agrifood system transformation towards sustainability, the following are the key areas of action to institutionalize MAIPs:

- 1. Tailored standards:** Agricultural universities or research institutes, in collaboration with agricultural associations, develop MAIPs standards with a user-centric approach, carefully balancing the need for both mandatory and adaptable components. These standards should be universally applicable while also accommodating local conditions.
- 2. Integrated certification:** Public competent authorities develop the certification system and certify the legitimacy and key components of MAIPs, including services, personnel, and managerial system, taking into full consideration the universal operative principles and adaptable elements of MAIPs.
- 3. Capacity building:** Agricultural universities or colleges, competent public authorities, and social organizations strengthen the capacities of MAIP facilitators according to their specific requirements and strengths. On this basis, build the capacities of the key actors in a continued way.
- 4. Transformative partnerships:** Leading MAIP actors, together with public extension agencies and local governments, foster transformative partnerships that maximize resource integration while strengthening synergistic relationships among all actors throughout MAIP establishment, operation, and functionality.
- 5. Enabling environment:** Local governments create a supportive environment by providing favourable policies and securing infrastructure and investment, while leveraging the innovation potential of farming communities.
- 6. Effective monitoring and evaluation:** MAIP programme managers, in collaboration with universities and farming communities, develop an efficient and user-friendly monitoring and evaluation system for self-assessment and continuous improvement of MAIP performance.

Agricultural universities or research institutes, in collaboration with agricultural associations, develop MAIP standards with a user-centric approach, carefully balancing the need for both mandatory and adaptable elements to be universally applicable while also accommodating local conditions.

Standards are important for MAIP managers to adeptly establish and manage MAIPs in alignment with local prerequisites. They also lay the foundation for the regional upscaling of MAIPs and underpin their potential to spur grassroots collaborative innovation. Standardizing the MAIPs in a way that incorporates both mandatory and adaptable elements represents a fundamental step towards its widespread adoption at the regional level. On the one hand, by establishing uniformity across their hardware, software, and operational mechanisms, the structure and operation of MAIPs can be standardized and regulated, thus securing their functionality. On the other hand, adapting the universal standards to local contexts will contribute to the anchoring of MAIPs within local communities and thereby make them more responsive to local needs. Such a standardized approach enhances the efficacy of MAIPs in supporting different users. The standardization process facilitates the accumulation of knowledge for proficient MAIP operation. Moreover, the standards can facilitate the users to monitor MAIP set-up and operation, thereby pinpointing crucial aspects for necessary adjustment or improvement. The following are some key considerations for defining the standards:

- **Making standards that are user-led, collaborative, and location-specific:** Agricultural

universities or research institutes may spearhead the establishment of working committees to engage different stakeholders and lay down foundational MAIP standards. Representatives from public extension and research systems, enterprises, and farming communities partake in this collaborative effort. Adherence to local conditions is paramount.

- **Defining comprehensive MAIP standards:** These standards encompass software, hardware, and the enabling environment, covering pivotal MAIP implementation stages from establishment to assessment. Both mandatory and adaptable components are to be incorporated into the standards, to guarantee both universality and flexibility.
- **Facilitating multi-stakeholder participation:** A consortium of stakeholders — scientists, policymakers, farmer delegates, and industry representatives — should be built up and contribute to support MAIP standard-setting. Their involvement spans every phase, from soliciting input to finalizing standards.
- **Highlighting approval and endorsement:** Ministries of education, agriculture, and relevant scientific associations should review and authenticate MAIP standards, aligning them with education, research, commercial, and socioecological

priorities of agrifood value chain development.

- **Providing support to standards implementation:** MAIPs standards should be accessible publicly and

presented in a user-friendly manner. A special committee at the national level could be established to guide the whole-process implementation of standards.

Public competent authorities develop the certification system and certify the legitimacy and key components of MAIPs, including services, personnel, and managerial system, taking into full consideration the universal operational principles and adaptable elements.

A certification system is very important for MAIP implementation by multiple actors in rural areas. On the one hand, certification ensures that MAIP facilitators comply with relevant standards and norms, enhancing the accountability and competitiveness of MAIPs. On the other hand, an efficient quality control system can be established within MAIPs through certification, making every element and operational step standardized. The following are some key considerations for building an efficient certification system:

- **Establishing government-led, multi-actors institutions to certify:** Under the leadership of the Ministry of Education and/or Ministry of Agriculture, a MAIP certification committee could be established jointly with agricultural universities or colleges. The committee members should include government officials, university administrators, and MAIP facilitators. The committee oversees the development of certification procedures and implementation.

- **Conducting systematic and flexible certification:** The committee should certify the hardware, software, security, feasibility, and ethics of MAIPs. However, the elements to be certified are subject to adaptation under tough circumstances, such as in remote or poverty-stricken areas. The committee should provide three types of certifications, i.e. professional certification, skill certification, and compliance certification. Certifications can be conducted both *in situ* and online.
- **Highlighting post-certification management:** The committee should promptly publish the list of certified well-operating MAIPs, while highlighting exemplary MAIPs. In contrast, poorly operating MAIPs should not be certified. The committee is encouraged to collaborate with major funding agencies so that the certification can be used as selection criteria. It is suggested to set up an ad hoc committee for random inspection. Each certified MAIP should develop a self-inspection system to ensure that its operation is on track.

Agricultural universities or colleges, competent public institutions, and social organizations strengthen the capacities of MAIP facilitators according to their specific requirements and strengths. On this basis, build the capacities of all the key MAIP actors in a continued way.

Facilitators play a crucial role in the effectiveness of MAIPs. Their primary responsibility lies in offering timely and essential services to smallholder farmers. Besides, all the MAIP actors from different sectors, each with different innate advantages, possess the potential to contribute to local AIS development. However, facilitators and key MAIP actors tend to have difficulty in giving full play to their potential. Therefore, their capacities need to be built up in a continued way. The following are some key areas of action:

- **Building a well-qualified facilitator team:** The team is ideally composed of diverse actors. EAS agents can serve as facilitators most times. But researchers, market actors, or other AIS actors, when well trained, may also play this role. Attention is to be paid to gender issues so that the facilitator team will be inclusive. A systematic and demand-driven curriculum for training MAIP facilitators should be designed, aiming to leverage their roles as connectors and central figures within MAIPs. Efforts are to be made

to maintain the stability and creativity of the team. Regular evaluations and the implementation of incentivizing measures are necessary.

- **Providing customized, continued, and inclusive training:** It is essential to tailor the MAIP training curriculum to align with local contexts and the specific needs of participants. A participatory approach is desirable to actively involve farmers and other related actors in designing the MAIP curriculum. It is vital to implement a systematic and continued training for farmers and other actors, considering emerging issues and innovations along the agrifood value chain. This should cater to their evolving demands and alignment to market demands.
- **Highlighting the role of lead farmers:** The role of lead farmers in innovation dissemination and uptake should be acknowledged in the MAIP training programme. Their training should be tailored in a way to bolster their ability to undertake PARs and provide valuable assistance to their peer farmers.

Leading MAIP actors together with public research and extension agencies and local governments foster transformative partnerships that maximize resource integration while strengthening synergistic relationships among all actors throughout MAIP establishment, operation, and functionality.

Robust partnerships, through which resources from various actors are integrated, are the foundation of MAIP effectiveness. They are pivotal for MAIP operation and functionality. To this end, several crucial considerations emerge:

- **Sticking to equitable treatment and respect for voices:** Every MAIP participant within the partnership should receive equal treatment and their opinions respected. This approach fosters an environment that encourages each actor to harness his or her potential in promoting sustainable agrifood value chain development through collaborative grassroots innovation.
- **Tailoring partnerships for local agrifood value chain:** Science-driven MAIP partnerships should be tailored to suit local agrifood value chain development demands. These MAIP partnerships might range from researcher–farmer collaborations to collaborations among cooperative leaders, lead farmers, common

farmers, extension agents, input suppliers, market actors, and MAIP personnel.

- **Establishing adaptable and transformative partnerships:** As MAIPs foresee different activities and priorities throughout their establishment and operation, partnerships co-evolve. Moreover, partnerships must change to adapt to an ever-changing and complex environment. Therefore, partnerships are to be flexibly adjusted to meet the needs of different MAIP activities, anticipate changing value chain scenarios, and better integrate the resources of all parties.
- **Mediating possible conflicts of interest:** As MAIP actors are from different sectors along the agrifood value chain, they often hold different concerns, demands, and interests. Therefore, to avoid possible disagreements and disputes, measures are to be taken to mediate conflicts of interest.

Local governments create a supportive environment by providing favourable policies and securing infrastructure and investment, while leveraging the innovation potential of farming communities.

Creating an enabling environment is crucial for the functionality and effectiveness of MAIPs, providing essential infrastructure, favourable policies, and human and financial resources. It will create a positive narrative to encourage broader participation in MAIP operations, fully unleashing the innovative potential of various actors. To achieve this objective, it is crucial for the government and public institutions to undertake the following:

- **Improving soft and hard infrastructure:** Local governments should guarantee favourable policies, efficient institutions, and adequate funding are in place. They should also provide training spaces,

training facilities, and vehicles, among others, to MAIP programmes. The farming communities are encouraged to contribute both residential and working spaces such as demonstration fields.

- **Making flexible and compatible institutional arrangements:** Establishing adaptable and compatible institutions is vital for MAIP implementation. Key considerations encompass effective coordination mechanisms to integrate new knowledge, best practices, clear guidelines and regulations for each participant, and inclusive engagement so that all participants' perspectives and expertise are considered.

Figure 5. Participants visiting MAIP infrastructure on a MAIP field day



Pioneering institutional reforms within universities and research institutes is necessary. Encouraging researchers to devote more attention to services for rural communities and channel their efforts into sustainable agrifood value chain development represents a strategic shift.

- **Promoting mixed governance:** An innovative governance mechanism, characterized by a combined bottom-up and top-down approach, is desirable to foster coordination and participation. Such a mechanism facilitates the harmonization of interests among all MAIP stakeholders while promoting engagement from rural communities and civil society.
- **Providing policy support:** Governments should provide comprehensive policy support, including economic incentives and motivations, to leverage the innovation

potential of MAIP actors while promoting the adoption of MAIPs in rural communities.

- **Securing diversified and continued financial support:** Garnering financial backing from multiple sources is crucial. Budget allocation should be managed with flexibility and efficiency in mind.
- **Nurturing an innovation environment:** Fostering an environment that nurtures smallholder-led innovation and entrepreneurial ventures is crucial for promoting sustainable agrifood value chain development. This includes incentivizing and supporting rural youth and women in start-up undertakings, building up MAIP networks and partnerships, communicating the MAIP impact results to the broader public and so on.

Figure 6. Participants visiting participatory action research fields on a MAIP field day



MAIP programme managers, in collaboration with agricultural universities or colleges and farming communities, develop an efficient and user-friendly monitoring and evaluation system for self-assessment and continuous improvement of the MAIP innovation performance.

The establishment of a robust monitoring and evaluation (M&E) system is crucial for the successful integration and scale-up of MAIPs. This system serves a dual purpose: Firstly, it allows for the assessment of MAIP performance and identifies critical bottlenecks at each operation stage. Secondly, it contributes to an effective communication of the MAIP performance to policymakers and decision-makers for gaining their support to create an enabling environment. Several key considerations are as follows:

- **Building a comprehensive self-M&E mechanism.** The mechanism should cover such key components as institutional arrangement, funding, capacity building, operation, and dissemination. It should guarantee continued monitoring and regular evaluation, taking into consideration the unique concerns and advantages of various MAIP actors and stakeholders. Identify internal evaluators, to whom specialized training is to be provided. Train MAIP facilitators responsible for overseeing the M&E.
- **Developing an adaptable and user-friendly indicator framework.** This framework should cater to the dynamic requirements of agrifood value chain development and account for the diverse demands and operational methods of MAIPs in rural settings. It should be sector-specific, covering agronomy, animal husbandry,

aquaculture, and agromachinery, examining not only the structure, functions, enabling environment and capacities of MAIPs, but also their inputs, activities, key outputs, and outcomes.

- **Adopting combined data collection and analytical methods.** Use both qualitative and quantitative methods including key informant interviews, focus group discussions, questionnaire surveys, field observations, secondary data collection, literature review, and so on. Adopt an integrated approach to analyse the collected data to generate comprehensive information on the structural, functional, capacity, and enabling environment aspects.
- **Establishing an annual M&E group to assess the state of MAIPs.** This group should take on such responsibilities as; (1) guiding end-users to accurately evaluate their MAIPs; (2) providing timely assistance to individual MAIPs as needed; (3) validating M&E reports; and (4) presenting comprehensive reports on the status of MAIPs to decision-makers.
- **Utilizing M&E results effectively.** Disseminate M&E results to relevant stakeholders. Ensure that they can inform decision-making and policymaking. Collect and profile good practices for possible scale-up of MAIPs. Enhance and follow up the application of M&E results to enable learning and improve practices.



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