

STRENGTHENING THE CONTRIBUTION OF AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION IN MAINSTREAMING AGROECOLOGY IN THE ASIA-PACIFIC



REGIONAL BRIEF 1

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BACKGROUND

Food systems transformation in the Asia-Pacific depends on the dissemination and mainstreaming of new approaches that foster sustainable agriculture. One such approach is agroecology. Agroecology is fundamentally different from other approaches to sustainable development due to its systemic and holistic nature and by its reliance on localized and bottom-up solutions, ensuring that farmers, their communities, and their local knowledge are fully integrated into improving agricultural sustainability (FAO 2018). This adaptable and flexible approach suggests ways to not only promote efficient and resilient agricultural systems, but

also to ensure food security and healthy diets, empowerment of family farmers and their organizations, so as to foster responsible governance and to support the conservation and restoration of biodiversity.

A succession of events and workshops across the region over the last year¹ emphasised the need for promoting agroecological approaches. Apart from these, many pilot experiments across the region have also revealed the benefits of promoting agroecological approaches. Throughout the Asia-Pacific, several agroecological practices – mainly aimed at enhancing soil fertility,

increasing resilience to climate change and other external shocks, promoting biodiversity, biocontrolling pests and diseases, etc., – have long been promoted. Currently, there is an increasing appetite for such practices among farmers and their organisations with an aim to replace the conventional chemical-intensive farming, especially given the rising cost of imported synthetic agro-inputs. However, mainstreaming agroecological approaches within the Agricultural Innovation Systems (AIS) necessitates some fundamental changes in the way all actors in the AIS approach agricultural development.

¹ These include the Regional virtual dialogue on Agroecology (12 May 2022); Regional virtual consultation on 'Promoting Healthy, Sustainable and Inclusive Food Systems in Response to COVID-19 in South Asia' (29-30 March 2022), Regional consultation on 'Engaging with Academia and Research Institutions (ARIs) to Support Family Farmers and Food System Transformation during and post-COVID-19 Pandemic in Asia' (8-9 December 2021); Virtual regional conference on 'Agroecological and Safe Food Transitions for Green, Resilient and Inclusive Recovery in the ASEAN Region' (8-9 Nov 2021); Virtual regional experience sharing workshop about the use of the Tool for Agroecology Performance Evaluation (TAPE) across the different pilots in the Mekong region and East Asia (30 September 2021).

ADAPTING TO AGROECOLOGICAL TRANSITION

Many of the recent events mentioned above showcased the extensive challenges in promoting agroecology. The recent meeting of the working group on agroecology was organized under the [FAO's TAP-AIS Project](#) by the Asia Pacific Island Rural Advisory Services Network (APIRAS) and the Asia Pacific Association of Agricultural Research Institutions (APAARI) in close collaboration with the Food and Agricultural Organization of the United Nations (FAO). It identified four main challenges in mainstreaming agroecology in the Asia-Pacific region. These were related to policy (perception, policy and implementation), awareness (lack of awareness on the merits of agroecology at several levels), financing (especially for research and extension for agroecology), and curricula (lack of relevant content on agroecology for use by faculty in agricultural schools, universities and extension training centres).

Though global assessments on the performance of agroecology (Pretty et al. 2006; De Schutter 2011; Sinclair et al. 2019; Bezner Kerr et al. 2021; Snapp et al. 2021) have showed positive results, many decision makers continue to have poor or unfavorable perception of its performance. While more scientific evidence is needed, demonstrating how agroecological principles applied in different socio-ecological systems are better able to provide equity, productivity, economic and environmental benefits than alternatives,

including the status quo (Narjes et al. 2022), there is also a need for workable recommendations that enable the shift to agroecology. For mainstreaming agroecology, changes have to primarily start at the policy level where the emphasis needs to shift from simply increasing productivity to improving agricultural sustainability and resilience, so that farms can remain healthy and productive for the many years to come. This also means there is a need to have stronger political support, with policy makers convinced of the advantage of agroecology together with a willingness to fund initiatives that will promote, implement and help generate evidence and lessons on agroecological transition at regional and country levels.

As the conventional approaches to measuring farm productivity through yield or income from a single crop are not suited to measure impact of agroecological practices, there is a need to promote and apply tools such as [Tool for Agroecology Performance Evaluation \(TAPE\)](#), which helps to move beyond the sole assessment of yield/ha and considers the multi-dimensional performance of agricultural systems (FAO 2019). Another relevant tool here is the [Agroecology Criteria Tool \(ACT\)](#) developed by Biovision that enables users to analyze to what degree agricultural programmes, projects and policies support agroecological transition.

Enhancing funding in the Global South for agricultural innovation in general, and for agroecological transition in particular, is critical. So far only a handful of donors have recognized agroecology as a key solution for building sustainable food systems (Pavageau 2020). Though governments and private businesses invest billions of dollars every year in agrifood innovation for the Global South, a recent analysis showed that only 7% of funding had tangible environmental aims and only around half of that (4.5%) had both environmental and social aims (CoSAI 2021). In other words, there is an urgent need to review the current investments in agricultural innovation, and then prioritize and shift funding to development and promotion of agroecological approaches that can help achieve the economic, environmental and social dimensions of sustainable development. In contrast, in many countries, governments continue providing subsidies that support chemical-intensive farming which disincentivize farmers from pursuing agroecological approaches.

To meet the need for bio-inputs (bio fertilizers, bio pesticides, etc.) that are necessary for transitioning to agroecological approaches, producer organizations, communities, and government extension personnel need training on production and marketing of these products, including development of shorter value chains. Private sector businesses need to support farmers engaged in agroecology

by meeting their need for inputs and also support marketing of their produce (Biovision 2023). Policies that enable the emergence of successful agroecological businesses are needed to support producers pursuing agroecology.

Apart from these, the way research and extension services are run will need to change if they are to give farmers a greater say in how research questions and solutions are developed. Silici (2014) recommends pursuing a new approach to generating and disseminating knowledge – a shift is needed from top-down research and extension to bottom-up approaches and local innovation. Problem identification involving farmers and local communities should be an integral part of research,

especially for the development and implementation of agricultural interventions. This approach to research would imply supporting farmers to experiment locally with appropriate solutions in an adaptive research setting organized in more decentralized locations.

Similarly, extension and advisory services (EAS) should support farmers to find locally relevant solutions through the blending of local/traditional and institutional/scientific knowledge. Extension personnel often lack the required skills to support agroecological techniques that can replace or supplement the use of agrochemical techniques (Emeana et al. 2018). EAS should prioritize producers, and

empower them to experiment, exchange, and innovate in developing appropriate solutions (FAO 2022). Capacities to support farmers and their organizations for promoting agroecology are currently limited among both research and extension organizations. Thus, there is a need for 'integrating agroecological approaches into agricultural extension programmes, schools and college curricula and vocational education programmes' (Hodson et al. 2021).

All of this points to the need for strengthening advocacy, resource mobilization, and capacity development of varied stakeholders in supporting the transition to agroecology.

STRENGTHENING THE CONTRIBUTION OF AGRICULTURAL RESEARCH, EXTENSION AND EDUCATION

Conscious of the need to embed agroecology within local and regional socio-ecological realities, the first 'Multistakeholder Consultation on Agroecology for Asia and the Pacific' was held in Bangkok in November 2015. It assessed the contributions of agroecology in the context of climate change and the need to transform knowledge building and research, and made suggestions for policy change, including the creation of appropriate markets to expand agroecology in the region (Radha n.d.). These suggestions include:

- Create, in collaboration with all relevant stakeholders, platforms for the collection and the exchange of agroecological experiences and innovations, environmental monitoring, as well as funding at the level of the Asia and Pacific region as well as at national levels;
- Create a cross-cutting and intercultural education strategy as well as national training centres and dedicated certificates and degrees on agroecology;
- Integrate agroecology in the curricula of both formal and informal primary and higher education institutions, in vocational training centers for producers, including farmer field schools, school farms, farmers' trainings and school gardens. This should recognize and value the important agroecology work ongoing in government, civil society and social movements, and build on that foundation to further develop, strengthen and upscale agroecology. The content of the above should be derived from the knowledge generated by small-scale food producers themselves.



However, agricultural research, extension and education systems in Asia-Pacific have not yet made any substantial contribution towards mainstreaming agroecological principles and practices in the region beyond promoting the Integrated Pest Management and Farmer Field School (FFS) approach. Most of the interventions in the area of agroecology are led by farmer

organizations and Non-Governmental Organizations (NGOs), often with external funding. Exceptions are the Conservation Agriculture and Sustainable Intensification Consortium (CASIC) in Cambodia, and the Andhra Pradesh Community Managed Natural Farming (APCNF) in India, where the state has made investments to promote agroecology at a scale.

There is definitely a need for more funding for research on agroecology. But apart from funding, there is need for a new research agenda for agroecology. A research agenda for scaling up agroecology in European countries (Gascuel-Oudoux 2022), identified through a group exercise, is presented in Box 1 below for inspiration. Similar exercises are needed in Asia-Pacific at the regional and national level.

Box 1: A research agenda for scaling up agroecology in European Countries

Through an exercise performed at the National Research Institute for Agriculture, Food and the Environment (INRAE) France, a research agenda for agroecology was developed. It touched on six topics:

- For genetics, there is a need to study genetic aspects of complex systems (e.g., mixtures of genotypes) and to develop breeding methods for them;
- For landscapes, challenges lie in effects of heterogeneity at multiple scales, in multifunctionality and in the design of agroecological landscapes;
- Agricultural equipment and digital technologies show high potential for monitoring dynamics of agroecosystems;
- For modelling, challenges include approaches to complexity, consideration of spatial and temporal dimensions and representation of the cascade from cropping practices to ecosystem services. The agroecological transition of farms calls for modelling and observational approaches as well as for creating new design methods;
- Integration of agroecology into food systems raises the issues of product specificity, consumer behaviour and organization of markets, standards and public policies;
- In addition, transversal priorities were identified: (i) generating sets of biological data, through research and participatory mechanisms, that are appropriate for designing agroecological systems; and (ii) collecting and using coherent sets of data to enable assessment of vulnerability, resilience and risk in order to evaluate the performance of agroecological systems and to contribute to scaling up.

In the case of extension there is a need to address three other fundamental challenges that prevent EAS from promoting agroecology effectively (Sulaiman 2021a). First, EAS were originally designed to inform and educate farmers about new

technologies developed, especially by public agricultural research organizations, and help them adopt these. However, in the case of agroecology, the public sector in most cases is not the main source of knowledge on agroecology. Second, EAS

currently have a limited ability to generate context-specific and locally relevant solutions through the blending of local and institutional/expert knowledge. The way research and extension services are run will have to change if they are to give

farmers a greater say in how research questions and solutions are developed. Third, many of these new challenges can only be addressed with new forms of interaction, organization, and

agreement between a range of actors. In addition to equipping EAS providers with more political, financial and policy support, the institutions and governance of EAS require transformation so

that they can better respond to the needs of farmers and other stakeholders. The needed transitions in EAS to support agroecology are given in Table 1 below.

Table 1: Needed transitions in EAS to support agroecology

No.	Aspects	From	To
1	Mandate	Increasing productivity	Multiple objectives: better resilience, better nutrient recycling, and higher ecosystem functions
		Enhancing farm income in the short run by adopting a new technology/ practice	Redesigning the farming systems and productive landscape towards greater agrobiodiversity, resilience, and environmental and economic benefits for local communities and society as a whole over the long term
2	Knowledge	Transferring centrally produced expert knowledge for adoption by farmers	Facilitating participatory experimentation and learning by following the Farmer Field School (FFS) approach, blending farmer knowledge with expert knowledge
3	Knowledge promotion	Permanent staff recruited for extension work by EAS	Using community resource persons hired locally and accountable to farmer groups; Organise Participatory Action Research (PAR) and promote Farmer to Farmer (F-2-F) Extension
4	Content	Advice on crop/enterprise management among individual farmers	Mobilise farmers into groups and help them provide integrated services (across the value chain) through their groups
5	Financing	Government paid extension functionaries	Blended financing for community resource persons - costs shared by the government, the community, and business income by the farmer groups
6	Role of ICTs	Pushing advice generated centrally	Generate locally relevant data, including pest and disease dynamics, strengthen diagnostic services and generate and share locally relevant advisory for farmers

(Source: Adapted from Sulaiman 2021b)

In the case of Education, there is need for a thorough reform in agriculture educational institutions where currently agroecological approaches play a minor role (DeLonge et al. 2016). To support the preparation of professionals in this field in the regions, agroecology should be popularized among young people by adopting agroecological curricula at colleges and universities and facilitating exchange between experienced and interested stakeholders (Niggli et al. 2021). A typical AE curriculum can include learning about agroforestry, organic agriculture, conservation agriculture, integrated pest management or integrated crop management, systems of rice intensification, and more (Nelles

and Ferrand 2021). In Thailand, the Maejo University which has an explicit aim to be a leading university in organic agriculture has 822 courses related to environment and sustainability (in 2021). In India, the Indo-German Global Academy for Agroecology, Research and Learning (IGGAARL) has been launched in Pulivendula constituency of Kadapa district, Andhra Pradesh. It is a joint initiative of the Federal Government of Germany and Government of India to boost research in natural farming and bring transition among farmers as 'farmer scientists' (Rangarajan 2022). The Indian Council of Agricultural Research (ICAR) has approved the syllabus for a new postgraduate course on organic

farming for implementation (ICAR 2021). In the United States of America, the University of Minnesota-Twin Cities has developed a course titled 'Ecology of Agricultural Systems' aimed at developing a concept of agriculture as the result of interactions between human social systems and agricultural systems. The University of Vermont is about to start the Institute for Agroecology (IFA) with an aim to mobilize knowledge on agroecology among different stakeholders in order to co-construct impactful research, learning and action within and outside the country (The UoV 2023). However, more efforts are needed for better integration of agroecology in universities in the Asia-Pacific.

RECOMMENDATIONS

The working group on agroecology organized by APIRAS, APAARI and FAO came up with the following recommendations for mainstreaming agroecology in research, extension and education in Asia Pacific.

RESEARCH

Advocate for more funding for Research on Agroecology:

- Conduct a study on the pattern of current investments in agricultural research in Asia-Pacific (similar to the [Biovision study in Africa](#)) to generate evidence on the limited funding support to agroecology and use such evidence on the funding gap to advocate for enhanced funding for agroecology;

- Undertake a mapping of actors involved, ongoing initiatives and funding opportunities in agroecology in the region;
- Promote new metrics to prioritize and evaluate research beyond productivity enhancement that will also include contribution to nutrition, rural employment, soil health, water use, adaptation to climate change, etc. (Eg: Tool for Agroecology Performance Evaluation [TAPE] developed by FAO);
- Develop macro-economic policies and initiatives that support agroecology (as those initiated in Vietnam or in Cambodia).

Generate more evidence on the performance of Agroecology

- Encourage/support more

- Social Science investigations on the contribution and performance of agroecology on multiple dimensions related to food systems transformation;
- Undertake more case studies and documentation of good practices in agroecology;
- Strengthen capacities of researchers to appreciate the importance of indigenous knowledge, integrating farmers' knowledge and scientific knowledge, support farmer experimentation and conduct problem solving research that addresses the needs and priorities of farmers;
- Conduct long term trials to assess the performance and contribution of agroecology vis-a vis conventional farming.

**Broaden the governance of
Agricultural Research**

- Include more varied stakeholders, especially farmer organizations in priority setting and oversight. Advocate for these reforms in the National Agricultural Research Systems, and APAARI could take a lead on this;
- Form public private partnerships to promote agroecology (similar to what CASIC platform in Cambodia is fostering).

EXTENSION**Strengthen capacities of EAS in
promoting Agroecology**

- Facilitate learning on agroecology. Promote more trials and evaluation of agroecological approaches to convince farmers of the merits of shifting to agroecology, through participatory and farmer-led processes (such as FFS or F2F learning);

- Organize training on agroecological transitions for food systems transformation instead of focusing on promoting a specific technology or practices;
- Develop a training manual on agroecology for extension and advisory staff which could then be adapted to the local context. Lessons could be drawn from the Promotion of Green Extension Approach in Laos in this regard.

**Recognize the role of Farmer
Organizations as the key driver
for transition to agroecology.**

- Mobilize farmers as learning groups and strengthen their capacities to support transition to agroecology;
- Promote entrepreneurship among farmers to develop and promote bio-inputs as well as agricultural products, especially fruits and vegetables developed through agroecological farming through premium pricing and dedicated market outlets.

EDUCATION**Mainstream Agroecology in
Agricultural Education**

- Integrate perspectives on sustainable food systems, environment and human health in the agricultural curricula at all levels. Need more transdisciplinary courses that promote holistic understanding of food systems in both education and training of agricultural professionals and also include these at the school level;
- Develop specific courses on agroecology in education and training (by integrating relevant content on agroecology that is currently scattered across different courses);
- Develop short courses, especially vocational courses, targeting rural youth who could emerge as agroecology champions and entrepreneurs.

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Working Group on Agroecology

The Asia-Pacific Islands and Rural Advisory Services Network (APIRAS), the Asia-Pacific Association of Agricultural Research Institutions (APAARI), in close collaboration with the Office of Innovation (OIN) of the Food and Agriculture Organization (FAO) of the United Nations are committed to strengthen agriculture innovation systems in Asia-Pacific for transforming agri-food systems.

The purpose of this working group on Agroecology is to deliberate upon the challenges in mainstreaming agroecology in the research, education and extension agencies in Asia-Pacific and identify ways of strengthening their capacities to promote agroecology which could then be supported by both Regional Research and Extension Organizations in Asia-Pacific (APAARI and APIRAS).



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Authors and Contributors

This regional brief was developed by Rasheed Sulaiman V (APIRAS), Nimisha Mittal (CRISP), Pierre Ferrand (FAO-RAP), Delgermaa Chuluunbaatar (OIN, FAO) and Sasireka Rajendran (APAARI) building upon the contributions from WG members during the 1st meeting of the AE WG held online on the 10th June 2022.

The WG included: ·Andrew Bartlett, The Lao Upland Rural Advisory Service (LURAS), Helvetas, Lao PDR ·Anni Mitin, The Malaysian Agroecology Society for Sustainable Resource Intensification (SRI-MAS), Malaysia ·Christian Grovermann, The Research Institute of Organic Agriculture (FiBL), Switzerland ·Dao The Anh, Vietnam Academy of Agricultural Science (VAAS), Vietnam ·Delgermaa Chuluunbaatar, Office of Innovation (OIN), FAO, Rome, Italy ·Fuatino Fatiaki, The Pacific Community (SPC), Fiji ·Ganga Dutta Acharya, SAARC Agriculture Center, Bangladesh ·Irish Baguilat, Asian Farmers' Association for Sustainable Rural Development (AFA), Philippines ·Mai Huong Nguyen, Institute for Policy and Strategy for Agriculture and Rural Development (IPSARD), Vietnam ·Marie-Aude Even, International Fund for Agricultural Development (IFAD), Asia and the Pacific region (APR), India ·Marion Tan, Department of Community Development, University of the Philippines Diliman and MASIPAG, Philippines ·Marut Jatiket, Thai Education Foundation, Thailand ·Ngo Tien Dung, The Center for Initiatives on Community Empowerment and Rural Development (ICERD), Vietnam ·Nimisha Mittal, Centre for Research on Innovation and Science Policy (CRISP), India ·Pham Van Hoi, Center for Agricultural Research and Ecological Studies (CARES), Vietnam ·Phy Chhin, DALAM, Cambodia ·Pierre Ferrand, FAO Regional Office for Asia and the Pacific (RAP), Bangkok, Thailand ·Rasheed Sulaiman V, APIRAS, India ·Ravi Khetarpal, APAARI, Thailand ·Sasireka Rajendran, APAARI, Thailand ·Sokharath Samnang, APAARI, Thailand ·Souvanthong Navmong, Department of Technical Extension and Agro-Processing – Ministry of Agriculture and Forestry (DTEAP), Lao PDR ·WADP Wanigasundera, Network of Agricultural Extension and Advisory Services in Sri Lanka (NAEASSL), Sri Lanka.