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Agricultural Extension and Advisory Services in Low and Lower-Middle-Income Countries

Knowledge Review

What are Agricultural Extension and Advisory Services (EAS)?

Agricultural extension and advisory services (EAS) are critical in enabling actors in agriculture to acquire capacities to address the challenges of climate change, achieve sustainable production systems, improve their livelihoods, and contribute to national food security [23] [26].

EAS are institutions and activities to assist farmers in accessing knowledge, information, capacities and technologies. These services aim to develop farmers' technical, organisational, and management skills and practices, as well as enhance their interactions with markets, research, and education. EAS also include functional elements such as communication, facilitation, and empowerment. These services encompass a broad range of activities, including training, technology transfer, marketing support, and partnership development with various service providers [3] [8]. EAS provide the critical link from generation of agricultural innovations to durable improvements at scale. This is achieved as farmers and other actors in the rural economy learn, adapt, and innovate with new technologies and practices [2] [3] [5].

Looking at EAS in the context of an agricultural knowledge and innovation system (AKIS) opens new prospects. AKIS can serve as a useful framework to diagnose innovation capacity, plan investments, and organise interventions that are more likely to promote responsible agricultural innovation and equitable growth [3] [26]. This involves strategies such as networking, brokerage, interactiveness, co-creation, advocacy, coordination, transparency, and partnerships to achieve common goals. These strategies may encompass a mix of public, private, and civil society services to support sustainable agriculture and farmers' livelihoods [2] [3] [20] [26] and can be applied at country, sector, or project/intervention level [3] [26]. This new understanding of EAS in the context of an AKIS is only slowly gaining acceptance [2] [3] [50]. However, despite high-level political support for the AKIS concept, the institutional and financial infrastructure, and the funding and design of EAS programmes are often largely fixed, leaving little scope for new approaches [50].

KEY KNOWLEDGE

- Agricultural extension and advisory services (EAS) provide information and support for producers and actors of value chains to make informed decisions for adopting innovations and improving their livelihoods.
- Considering EAS within the framework of a Knowledge and Innovation System (AKIS) presents new opportunities for their improvements and highlights the need to strengthen innovation capacities.
- Monitoring and evaluation systems (M&E) are necessary tools to improve the performance of EAS systems. They provide evidence to justify investments, identify reform needs, ensure accountability and quality assurance and offer learning opportunities.
- In addition to the public EAS, there is a growing number of service providers, such as private value chain actors (input dealers, private companies), farmer-based organisations, and civil society organisations.
- Private EAS providers offer tailored services to their clients and are complementary to public and farmer-based services (however their services might remain constrained by their return).
- The role of the state remains pivotal for the creation of an enabling environment for pluralistic and decentralised EAS, that are inclusive, promote innovation, and support sustainable rural development.
- Different financial models are necessary to ensure that the services are available and accessible to different groups and to ensure good quality services.
- Decentralised and pluralistic structures for providing services facilitate demand-driven approaches but need good coordination.
- Community-based approaches and interactive methods in network settings can better reach women, youth, vulnerable groups, and people in remote areas.
- Group-based holistic learning approaches, such as Farmer Field Schools are well-suited for promoting complex practices (organic agriculture, agroecology, etc.).
- Digital tools can help to overcome the "last mile" and to reach women and people in remote areas provided that digital infrastructure (networks, electricity) is available and accessible (devices) and usable (digital literacy).

AKIS is the combined organisation and knowledge flows between individuals, organisations, and institutions who use and produce knowledge and innovation for agriculture and interrelated fields.

Governance of EAS

Governance of EAS systems includes the institutional options for structuring, organising, and financing the provision of services to end-users and evaluating their impact [5]. In most countries, the public sector – usually the Ministry of Agriculture, Food, or Rural Development – is responsible for the overall coordination and regulation of extension services.

Coordination mechanisms have been established in some countries (Brazil, Malawi), but linkages between extension services, research, and farmer feedback mechanisms remain weak in many developing countries [24].

Successive Reforms of EAS systems

Worldwide, EAS systems have undergone changes since the 1990s [2] [3] [23].

Decentralisation of public EAS involves the transfer of advisory services, authority, and responsibilities from central to intermediate and local governments [49] to improve access to services for different groups. Decentralised EAS will also enhance accountability, especially if planning, management, and co-financing are also devolved to local authorities. However, funding mechanisms are often weak [2] [5].

Demand-driven approaches are services tailored to clients' demands and schedules [2]. This represents a shift from approaches where the content was dictated and scheduled by the providers and promises greater accountability [3] [9]. However, demand-driven approaches also require government support (policies) as they involve new financing mechanisms and coordination [3] [9].

Privatisation of EAS has developed in recent years. Private actors operating along the value chain increasingly provide services to farmers. Privatisation can range in scope from leaving the provision of services entirely to the free operation of the market, to "public-private partnerships" in which government and the private sector cooperate to provide services or infrastructure [2]. This raises the question of payment for services. Various models (see Table 1) have emerged in recent years [2] [3] [5] [23].

Market-oriented services aim to link farmers to the market to improve their incomes. This includes providing additional services (e.g. information on market prices, and quality standards) and reaching out to other actors in the value chain [2].

Providers of EAS

In almost all countries – yet to different extents –, in addition to the traditional public provision of services different types of actors are active in providing advisory services (pluralistic advisory service provision), including public, private, farmers' organisations, and civil society, offering various types of services

Their range of services, target clientele, geographical scope and contractual arrangements vary [5], as do their financial resources, access and use of knowledge sources, technologies, know-how, and information [2] [3]. However, coordination of all extension service providers is key to avoiding duplications in serving all clients [3] [41].

The public EAS will continue to remain important in some situations [2 [23]] and are still the most important in some countries, e.g. Ethiopia [42], Nigeria [46].

However, in many countries, the capacity to deliver services, in general, was assessed as low for the following reasons: rigid hierarchical structures, lack of flexibility, understaffing, poor mobility, poor (transport) infrastructure, low salaries, lack of operating budget for carrying out extension services (dilapidated office equipment, unusable or broken extension material), inadequate and untimely funding, and lack of recognition. The training of extension staff is limited to technical topics mainly [2] [3] [23] [33] [24] [42] [46]. The linkages to research are weak. Newer content, especially about climate change, has so far been given little consideration [6]. Finally, the M&E systems of public EAS are often weak [8].

Specifically in pluralistic and decentralised systems EAS systems, the government has an important role to play [2] [3] [23].

THE ROLE OF THE PUBLIC SECTOR IN A PLURALISTIC EAS [2] [3] [23]

In pluralistic and decentralised agricultural extension systems, the state plays a crucial role as a facilitator, regulator, and coordinator:

- Establish policies, standards, and regulations for extension services that promote pluralism and decentralisation to encourage diverse service providers and community participation.
- Provide funding, technical support, and capacity-building to strengthen the capabilities of various extension actors, including government agencies, NGOs, private sector entities, and farmer organisations.
- Foster collaboration and coordination among different actors to ensure coherence, avoid duplication of efforts, and maximise resource utilisation.
- Engage in monitoring and evaluation activities to assess the performance and impact of extension services, guiding future interventions and investments.

Given the limitations of state EAS, private providers have gained a foothold. These are primarily agro-dealers who sell inputs (seeds, fertilisers, pesticides, equipment) and advise their clients on how to use the products [4] [30]. They are responsive to customer demand [2] but are unlikely to provide services that do not offer a reasonable return [48], as they operate on a commercial basis [23]. They may even promote excessive consumption of inputs [56] and also fail to adequately address environmental and health concerns associated with their products [3].

In partnership with international companies and donors, private agricultural input shops (e.g. Farmer Hubs, Boutiques d'intrants) were established to provide inputs, advice, training, and marketing outlets for products and thus close an important knowledge gap for farmers [1] [2].

Other private actors are marketing or processing companies along the value chains (breweries, mills) which, for example in contract farming schemes, offer advice and training to their contracted farmers - in addition to other services such as credit for seeds and other inputs - and are responsive to farmers demands [2] [3] [4] [5] [37]. However, their services are mostly limited to specific commodities [3].

FARMERS' HUBS KENYA

Source: Syngenta Foundation

Inclusive contract farming – a farmer's voice

"Thanks to the contract we have a secure market and access to other services. The contract facilitates our access to loans from the credit union to buy seed and fertiliser. This allows us to respect the agreed cultivation calendar. This year, we obtained 3 million CFA francs [about 4,500 EUR] in campaign credit. … The partnership with NAFASO is a long-term relationship and gives us stability. We have access to markets, the banks trust us and we can make investments. In addition, we benefit from training in the technologies for producing basic seeds." (Odette Millogo, female farmer producing seed under contract for NAFASO, a seed company with a distribution network in 11 W-African countries from Burkina Faso).

Source: [37 p.16]

The private sector is often active in developing smallholder capacities restricted to certain topics (e.g. Syngenta trains farmers on the use of crop protection products) that align with their business interests. Despite the limitations, private advisory providers are an important complement to public EAS, but not a substitute [4] [14].

Private advisory companies have not yet been able to establish themselves in the countries of the Global South. Recently, there have been some discussions of how young, well-trained people can establish themselves as private consultants. However, this can only happen if farmers are also prepared to pay for EAS [14] [20].

Different types of farmer-based organisations (FBOs): farmer groups, cooperatives, and farmers' associations at local, district, and national levels are important partners in demand-driven services systems [2]. They offer multiple services among which extension and education are core (see the example of the COLACTEOS cooperative) [14]. They seem to bridge the services gap between public and private providers [20] [21] [34] [55]. These services are however limited to their respective members.

Poorer farmers are less likely to participate in FBOs due to limited financial resources to cover the fees [55]. To better fulfil their role, FBOs need to strengthen their management capacity and internal accountability mechanisms to overcome problems of elite capture and social exclusion [2]. NASFAM, Malawi, is an FBO that developed a broad range of services for its members during the past years [47].

COLACTEOS Dairy Cooperative Colombia

The mission of the dairy cooperative is to contribute to the economic development of members by providing services to producers, buying milk, processing, distributing, and selling high-quality dairy products nationally. It employs a team of advisers: veterinarians, agronomists, and animal health specialists whose services are brought in through short-term contracts. The producers are strongly engaged in defining and evaluating the services, as they are the owners of the cooperative. The services are also market oriented and there is a strong connection between the technical and financial services. COLACTEOS is thus an example of cooperative-based services financed through membership fees and the processing and marketing activities of the cooperative.

Source: [14, p.2]

The National Smallholder Farmers' Association of Malawi (NASFAM)

Formed in 1997 as an organisation to support market access for smallholder growers of cash crops, NASFAM has evolved into a complex conglomerate of service provision, programme implementation, commercial enterprises, and associations. It spans both developmental and commercial activities across several value chains, including ground nuts, rice, tobacco, soybean, pigeon pea, and sunflower.

NASFAM's institutional framework is anchored by farmer clubs of 10 to 15 members, with a total membership of about 100,000 smallholder farmers.

Clubs combine to form action groups, which serve as nodes in NASFAM's network both for the dissemination of extension information to members and for the bulking of members' crops.

NASFAM's activities are funded by a mix of different sources (public, donors, and own funds).

Action groups combine to form NASFAM's associations, of which there are currently 54 nationally. NASFAM associations are legally registered entities, member-owned and managed by annually elected farmer boards. The associations are grouped by geographical location under 14 Innovation and Productivity Centres. These IPCs provide the associations with management and operational support for production, marketing, and community development activities. The IPCs are in turn supported and managed by the NASFAM head office.

Source: [47, p.23] and [59]

Civil society organisations and NGOs often work closely with farmers [6] or with specific, often marginalised groups, such as women, and youth [15] and are therefore also important providers of EAS [2]. They partially rely on public EAS staff and often have limited scope [23] due to unsustainable funding [3] 23].

Table 1: Matrix of Options for Providing and Financing Pluralistic Agricultural Advisory Services

Provider of the service	Source of finance for the service: Public sector	Farmers	Private companies	Nongovernmental organisations (NGOs)	Farmer-based organisations (FBOs)
Public sector	Public sector extension services with different degrees	Public sector extension with farmers paying fees	Public sector extension agents hired by private companies	Public sector extension agents hired by NGOs	Public sector extension agents hired by FBOs
Private companies	Publicly funded contracts or subsidies to private service providers	Private service providers hired and paid for by farmers	Information provided with the sale of inputs	Private service providers hired and paid for by NGOs	Private service providers hired and paid for by FBOs
Nongovernmental organisations (NGOs)	Publicly funded contracts or subsidies to NGO providers	Extension agents hired by NGOs with farmers paying fees		Extension agents hired by NGOs as a free service to farmers	
Farmer-based organisations (FBOs)	Publicly funded contracts or subsidies to FBO providers	Extension agents hired by FBOs, with farmers paying fees		Extension agents hired by NGOs and paid for by FBOs	Extension agents hired by FBOs as a free service to farmers

Source: [2, p.28]

Skills and competencies of EAS staff

The competencies of extension agents and EAS managers determine to a large extent the success of the EAS [2] [3] [28]. They must possess process skills and functional competencies on which the organisation bases its primary operation or services. These are basic sets of knowledge, skills, abilities, and behaviours that agricultural extension professionals require to perform their tasks effectively [29] and should also be included in university curricula [33].

Th competencies include the technical subject-matter areas across several value chains. But equally important are functional skills including facilitation, coaching, group development, effective communication and listening skills, instructional and knowledge-sharing, and digital skills. Agents also need managerial skills which include project planning, the administration and operation of extension service delivery, knowledge management, and evaluation. Gender analysis, the dynamics of human resource management, and leadership are other core competencies [9] [28]. Due to the increased pluralism in EAS, skills in partnering, alliance building, coordination, and joint monitoring and evaluation become more and more important [28].

Systems approaches, such as applying an AKIS perspective, and sustainable agricultural approaches (agroecology, regenerative agriculture, climate-smart agriculture, etc.) are not sufficiently considered in professional training at universities and colleges, and some approaches are more recent (AKIS) [28]. Decision-making on programmes often follows seniority in organisations. Older professionals, as e.g. leaders in research organisations and senior extension managers are not trained in the more recent approaches and feel uncomfortable in facilitating platforms, networks, and other interactive ways of working and therefore opt for more traditional transfer approaches [50]. On the other hand, the objectives of the organisation determine the approach that is applied in providing EAS [57].

The training methodology of advisors and managers itself needs to be adapted to the topic and avoid one-way delivery; it should be interactive, including practical examples and exercises [29], using experiential and transformative learning approaches [54].

Financing of EAS

Financing extension services is a permanent challenge. Investments in extension can yield high returns especially when coupled with other investments, such as in education and infrastructure (transport, digital infrastructure) [5]. For many years, public EAS were free of charge for clients. Financial cuts and the reduction of services have opened up new opportunities. It is now acknowledged that funding and delivery of EAS can be understood separately [2].

Services for better-off clients can be offered on a partial or full payment basis [2] [6]; other services will still require public financial support (e.g. ecological sustainability, and services for resource-poor farmers for whom services still may be free of charge) [2]

In fully demand-driven systems, new models of financing mechanisms have been identified [3]:

- Farmer organisation-owned advisory systems/services with public subsidies combined with farmer payments;
- Decentralised services with public financing of demand-driven processes and services;
- Public sector-driven privatisation of services through competitive grants and contracts
- Producer cooperative-based embedded services fully financed by own processing and marketing revenue.
- Levies on (mainly export) crops [2]

The matrix below offers a variety of modes of providing and financing options for EAS [2].

Monitoring and evaluation of EAS

Monitoring and evaluation (M&E) systems of EAS are crucial for generating evidence for informed policy and investment decisions (macro-level decision-making); informing actors in planning for a successful transition of systems, ensuring the effectiveness and efficiency of the public EAS system, and strengthening capacity, at national and grassroots levels [8] [11].

EXAMPLES OF A MIXED-METHOD APPROACH FOR M&E

Ogueri (2013) used participatory methods including interviews, focus group discussions (FGDs), and questionnaires to evaluate agricultural EAS messages that support the adoption of improved cassava production technologies in Nigeria.

USAID (2018) used a mixed methods approach of a literature review and 53 in-person and remote interviews conducted with key EAS stakeholders and actors in Mali. The literature review included reports from Malian governmental agencies, foreign governments, donor agencies, donor-financed projects, non-governmental organisations (NGOs), international organisations, and universities. This information was supplemented with in-person and telephone interviews with selected key informants in Mali in September 2017.

Kamruzzaman and others (2021) used surveys and interviews from farmers affiliated with DAE (Department of Agricultural Extension) (150 DAE farmers) and farmers independent of DAE (150 non-DAE farmers) to assess the role of EAS in strengthening farmers' innovation networks to adapt to climate extremes in Bangladesh.

[11, p.7]

There are several shortcomings in the implementation of M&E systems, such as poorly defined operational processes, lack of measurable performance indicators, insufficient attention to end-users of EAS, adoption of overly ambitious or impractical methodologies, and sometimes a complete lack of M&E efforts. Also, there is a lack of understanding of the principles and the practical aspects of programme development and evaluation among policymakers and extension managers [8].

The use of participatory and mixed methods, as well as capacity building in M&E, are seen as critical to strengthening M&E systems [11] and conducting self-evaluation [8]. Involving farmers and their organisations in the design of M&E systems is a powerful tool to improve the performance of EAS systems [11]. It allows users to influence the process and eventually increase relevance and ownership of services [2].

Approaches and methods

Extension approaches describe the concepts that direct the organisation of the EAS and include methods (a particular way of doing something, a systematic procedure), techniques, and tools. They belong together and must be harmonised. They can be divided into rather "transfer of technology" or "capacity strengthening" approaches [57].

Both can take place in individual settings (one-on-one advisory services either face-to-face, by telephone, or via the Internet) or group settings. Group approaches are considered more cost-effective than individual ones. However, many farmers do need individual advice [3]. Mass extension

approaches include campaigns, field days, fairs, and some forms of digital extension [2] [3] [32].

Community-based approaches (CBA) or farmer-to-farmer approaches involve the selection of members of a community to act as village agents, lead or contact farmers [36], farmer teachers or community knowledge workers [3]. They receive training and then train other farmers in the community [3] [25]. In this way, multiplier effects can be achieved and networks established [20] [25] [26]. Their impact is even higher when they are digitally enabled and provided by a private actor [5] and when female staff address women farmers [13] [18] [38] [39]. The outreach of CBA varies depending on the reputation, social status, and motivation of lead farmers/volunteers/farmer trainers) [5] [18]. It is, however, important to recognise that these approaches complement rather than replace traditional extension services [2] [5].

Farmer Field Schools (FFSs) are evolving, and have been adapted to many countries, crops, and topics. They have proven to enhance the human, social, natural, and financial capital of rural communities [52]. A group of farmers work on complex issues, such as agroecology or organic farming during one growing season, and the topics can be adapted to the specific problems of the FFS group [3] [10]. Women farmers, in particular, can be reached [2] [13] [25] [51] [55] taking into account their daily schedules [18]. FFSs are participatory and build on common "learning by doing" and build participants' capacities to observe, analyse, and make conscious decisions [3].

They can contribute to the agroecological transition process and have positive effects on smallholder farmers [13] [25] [27]. However, their success depends on the availability of long-term finance and skilled facilitators in sufficient numbers [13]. Political commitment is therefore needed, as seen in the example of Rwanda, where FFSs are integrated into the national agricultural extension system [27].

Farmer-Field-Schools in the decentralised EAS, Rwanda [27]

Twigire Muhinzi is Rwanda's decentralised farmer-oriented national system for delivering agricultural extension and advisory services. One key pillar is the FFS approach.

FFSs are permanently integrated into the national agricultural research and extension system as a means for technology dissemination, empowerment and capacity building among rural communities.

The Ministry of Agriculture (MINAGRI) provides strategic guidance and oversight. Various national departments, universities and NGOs collaborate to develop content and materials. Services are coordinated and provided by the district government. FFS facilitators are organised in a cooperative and work as professional service providers under a performance-based contract.

FBS (Farmer Business Schools) and MAFF (Management Advice for Family Farms) are practice-oriented training events (a few days) to strengthen farmers' business and management skills. Based on participatory methods, participants acquire skills for self-analysis and decision-making based on technical and economic records and in this way build their managerial capacities. These approaches are mainly promoted in the context of development cooperation. Like the FFS they require well-trained facilitators and for now, depend on external finance [45] [58].

Household Methodologies are a set of tools applied to understand intra-household gender relations to strengthen overall smallholder agency and efficacy as economic agents and development actors. They include visioning, gendered SWOT analysis, task profiles etc. [60].

Farm trials can serve as learning tools to explore different agricultural practices under a given situation in a village. They are considered to provide an interactive space for mutual learning and co-creation also in the context of FFSs and are well-suited for agroecology topics [26].

Demonstrations can be used to illustrate new practices and allow participants to try them out. They are even more effective when they take place on the farmers' fields and involve the owners [3] [5] [40].

Different methods can reach different objectives. To change the mindset of participants (e.g. acquire business thinking, gain self-confidence in decision-making, explore markets) it is necessary to involve participatory practice-oriented and face-to-face methods. They can address participants more holistically, raise their interest and curiosity and keep them motivated as the example of the SHEP approach in Kenya shows. This approach was upscaled to more than 30 countries in different continents [15] mainly Africa).

The Smallholder Horticulture Empowerment Promotion (SHEP)

The SHEP is a holistic strategy aimed at improving the livelihoods of smallholder farmers involved in horticulture. It focuses on empowering through capacity building, market access, and sustainable farming practices.

The concept is based on two pillars: promoting farming as a business and empowering and motivating farmers using a mixture of methods (group exchanges and discussions, demonstrations, FFSs), facilitating linkages to markets (local, supermarkets, export markets), and providing organisational development support (strengthen cooperatives and association for collective action, bargaining power, and pooling resources [15].

Campaigns can complement extension programmes to inform many farmers in a relatively short period about an agricultural topic of widespread concern or interest, e.g. plant health rallies to address pest and disease problems, or to promote nutritious vegetables and safe handling of pesticides [3] [22]. A variety of communication channels can be used, such as radio, TV, SMS, posters etc. Other mass events, such as agricultural fairs and field days, require more effort on the part of participants to come into direct contact with innovations [2].

Information and communication technology (ICT)-mediated methods and tools are becoming increasingly important to enhance accessibility, delivery, transparency, scope, and impacts of information and services for smallholder farmers, including rural women and youth [12] [19] [43]. They can provide access to timely, reliable, and accurate information [16] specifically in geographically remote areas [19] at low cost. They help to overcome information asymmetries [3] [16] [17] as the example from Ethiopia shows.

ICT can help build and strengthen social networks and business communities [43]. Digital extension tools include phone calls, SMS, videos, WhatsApp groups, and specialised smartphone applications used for agricultural knowledge brokering [2] [53]. With the new opportunities offered, a plethora of products, services, and projects have emerged that promise to revitalise agricultural extension [35] and constitute a good supplement to other advisory activities [3] [40]. However, not all ICT-enabled extension approaches are equally effective in improving adoption, productivity, income, or welfare outcomes [12] [35].

8028 Farmer Hotline, Ethiopia

8028 Farmer Hotline in Ethiopia is a platform that offers free advisory services via interactive voice response (IVR) and short message services (SMS). By using IVR and SMS rather than internet-based platforms the service can reach a much wider audience – particularly in rural areas. Through this hotline, farmers can ask for information about input selection and utilisation.

http://digitalagriculture.georgetown.domains/digital-agriculture-applications/

There is a need to consider the potential of each digital tool given their contributions to fulfilling certain extension functions (problem diagnosis, information collection, awareness creation, collecting feedback, sharing experiences, etc.) [2].

Opportunities of ICTs in EAS

- Continuous improvement of ICT infrastructure and penetration of high-end mobile phones;
- Multiple players in EAS provision using ICTs;
- Mobile bundle services i.e. applications that include market information, financial services, and advisory services.

Challenges of ICT in EAS

- Creating farmer-specific and relevant content;
- Language barriers;
- Low literacy of rural farmers;
- Conveying ICT skills to EAS stakeholders;
- Duplication and contradictory information flow;
- Sustainable business models;
- Enabling environment and multi-partner arrangements.

summarised from [3, 7, 12, 16, 19, 31, 32, 35, 43, 53]

Digital readiness of extension staff seems to be more with access to smartphones, better education, and younger staff and staff in the private sector– as opposed to the public sector [5] [44]. Successful digital EAS address user needs, offer bundle services, include multiple partnerships, and have robust business models and iterative learning processes. User involvement in performance feedback is a key success factor [7]. Principles on how to develop and scale up digital solutions exist [7] to avoid still existing weaknesses [53].

Selected Digital EAS tools

- Farmer hotlines: *dial 2028*
- SMS and videos via (smart) phones, e.g. provided by Digital Green
- Applications: *iCow*, *QualiTrace*, *Agrio*, *Farmer app*
- Social media
- Digital radio
- Platforms, web portals: e.g. *Plantwise* (led by the Centre for Agriculture and Bioscience International (CABI), *Rice Knowledge Bank* (International Rice Research Institute),

A broad range of methods and their advisory objectives are mentioned in Table 2.

Table 2: Overview of advisory methods according to advisory objectives and type of service

ADVISORY OBJECTIVE	TYPE OF SERVICE	EXAMPLE OF SUITABLE METHODS
Expose farmers to new technologies or practices through direct contact with a professional rural advisor	Technology transfer	• Demonstrations • Field days • Study tours • Rural resource centres
Provide access to and share knowledge and information; problem diagnosis	Creating Awareness and providing access to knowledge	• Radio campaigns • Video viewing clubs • radio listening groups, • Mobile phone-centered approaches (e.g. SMS, Interactive voice response systems, E-kiosks, telecentres, etc.) • Radio and television programmes (e.g. documentaries, dramas) • Fairs, shows and rallies • Farmer-to-farmer approaches and learning • Plant clinics
Involve producers in the research process at different stages	Research focused	• Farmer research groups • On-farm trials • Participatory technology development and farmer participatory research
Provide inputs and technical advice	Technology transfer	• Agro-input centres • Village based self-employed agents • E-wallets
Change the relationships between household members, how they perceive each other and make decisions	Intra or inter-household dynamics and behaviour change	• Management Advice for Family Farms (MAFF) • Household Methodologies
Strengthen problem solving, empowerment, social capital/ collective action	Group based learning and action approaches	• Farmer field schools and related approaches • Study circles • Farmer learning groups • Innovation platforms
Innovation, experimentation	Creative learning	• Innovation platforms • Experimentation • Brokering among actors • Learning by doing • Farmer learning and research groups
Promote social capital and encourage development of groups/ organizations	Organizational development	• Organizational development approaches • Farmer field schools and related approaches • Farmbook
Link farmers to markets and services	Create linkages and promote networking	• Mobile phone based services • Radio programmes • Internet-based services • Fairs, shows, rallies
Promote learning through structured approaches	Structured learning	• Courses • Workshops

Source: [2, p.181]

Recommendations

Improving EAS governance

- Provide/strengthen the enabling environment for pluralistic and demand-driven approaches (policies, infrastructure, regulations, incentives, partnerships) [6] [23].
- Reorganise rigid hierarchical structures to make more room for approaches that require flexibility [2] [9].
- Strengthen multi-stakeholder coordination to advance the governance of pluralistic EAS systems [23].
- Strengthen FBOs to better articulate, coordinate, and negotiate the demands of farmers for advisory services and take part in the governance of the EAS system [2] [3] Develop a user-friendly M&E framework for a country's respective EAS system, designed to be systemic, holistic, and easily accessible, applicable to multiple scales, sectors, and dimensions, enabling self-monitoring and self-evaluation [11] [23].
- Institutionalise the M&E system as an integral component of the public EAS system and ensure proper capacity building [8].
- Ensure that essential public EAS are accessible to smallholder and vulnerable farmers [23] and hire more female extension staff to better reach women [9] [18] [13].

Competence development

- Strengthen human capital, infrastructure, and farmer education on digital literacy with the support of public policy and private actors [5] [12] [53]. Integrate digital literacy into EAS [12].
- Train advisory staff in "new" topics that are complex and need systems thinking (agroecology, organic farming, climate-smart farming); including functional skills related to interactive innovation support [4] [6] [9] [23].
- Introduce and sensitise EAS managers, research programme managers, politicians, and other decision-makers who have reached a certain seniority level to more recent EAS approaches [50] [54].

Funding of EAS

- Sustain adequate financial resources covering volume, availability, timeliness, and sustainability while providing sufficient incentives to public EAS personnel. This is critical to guarantee the efficiency, responsiveness, and sustainability of EAS systems while ensuring motivated and sustainable human resources [5] [23].
- Optimise resources when funds are limited by, for example, prioritise support for systems over programmes. This includes enhancing policy and coordination efforts, investing in training, research, and technical support services, upgrading communication systems, and improving monitoring and data collection capabilities [5].

Using appropriate advisory methods and approaches

- Prefer holistic approaches, such as SHEP and FFS, that go beyond technical aspects, allow farmer-level systemic thinking, develop managerial skills, and aim to empower local communities [6].
- Promote sensitive and inclusive approaches towards groups such as women, youth, elderly, disabled and people with different levels of education, ethnicities etc. [9]
- Enhance networking and peer to peer approaches among farmers and actors of the value chain, and in the territories [6].
- Invest in knowledge-sharing platforms that also include local, traditional knowledge [6].

Harnessing ICT/digital tools

- Utilise the potential of ICT given the level of digital literacy, and access of the target groups [5] [12].
- Strengthen policy, regulatory and incentive frameworks for better use of digital technologies, including incentives for the private sector to align with public development efforts and make necessary investments [43].
- Create alliances and enhance coordination with the participation of all key stakeholders, build partnerships between governments, donors, investors and digital business sectors, and strengthen digital human capital and infrastructure development in rural areas with more holistic approaches [12] [43].

List of documents analysed

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