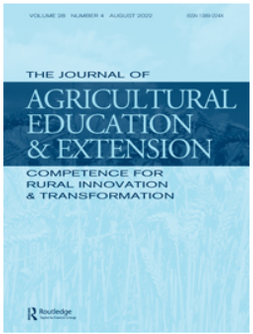

Routledge
Taylor & Francis Group

The Journal of Agricultural Education and Extension

Competence for Rural Innovation and Transformation

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/raee20

Taking a snapshot of Extension and Advisory Systems performance and outcomes: insights on a semi-quantitative evaluation approach

Johan Blockeel, Delgermaa Chuluunbaatar, Aiden Holley, Rasheed Sulaiman, Patrice Djamen & Christian Grovermann

To cite this article: Johan Blockeel, Delgermaa Chuluunbaatar, Aiden Holley, Rasheed Sulaiman, Patrice Djamen & Christian Grovermann (2022): Taking a snapshot of Extension and Advisory Systems performance and outcomes: insights on a semi-quantitative evaluation approach, The Journal of Agricultural Education and Extension, DOI: 10.1080/1389224X.2022.2089178

To link to this article: https://doi.org/10.1080/1389224X.2022.2089178

Published online: 22 Jun 2022.

THE JOURNAL OF AGRICULTURAL EDUCATION AND EXTENSION
https://doi.org/10.1080/1389224X.2022.2089178

Routledge
Taylor & Francis Group

Taking a snapshot of Extension and Advisory Systems performance and outcomes: insights on a semi-quantitative evaluation approach

Johan Blockeel [a], Delgermaa Chuluunbaatar[b], Aiden Holley[b], Rasheed Sulaiman[c], Patrice Djamen[d] and Christian Grovermann[a]

[a]Research Institute of Organic Agriculture, Frick, Switzerland; [b]Food and Agriculture Organisation of the United Nations, Rome, Italy; [c]Centre for Research on Innovation and Science Policy, Hyderabad, India; [d]Cirad – La recherche agronomique pour le développement, Montpellier, France

ABSTRACT

Purpose: To evaluate pluralistic Extension and Advisory Services (EAS) systems performance and outcomes, and share the experiences made with applying a participatory semi-quantitative approach allowing for cross-country comparability.

Design/methodology/approach: The Food and Agriculture Organization of the United Nations (FAO) developed the '*Extension and Advisory Services (EAS) System – Yardstick*' (EAS-Y), a semi-quantitative assessment approach relying on expert-based scores to evaluate the EAS system performance on the one hand, and users' scores to measure the system outcomes on the other. The tool was applied in three countries, Costa Rica, Ecuador, and Peru.

Findings: Results revealed an overall weak performance on most assessed criteria. Experts pointed out a lack of adequate policies addressing agricultural extension, insufficient funding, and poor infrastructure. On the other hand, the increased focus on sustainability, increased inclusiveness levels, and steady uptake of digitalization technologies are areas where progress was recently made. On the outcomes side, users perceived EAS contributed mainly to acquiring technical skills, while less to entrepreneurial and social skills.

Practical Implications: EAS-Y represented a user-friendly and cost-effective solution to identify performance gaps and assess outcomes in a semi-quantitative way. Therefore, we consider the latter has the potential to be applied to prioritize areas for intervention and guide decision-making processes.

Theoretical implications: The commonly existing data gap not allowing for a quantitative evaluation of pluralistic EAS systems can be overcome using a participatory evaluation tool that relies on expert and user's judgments.

Originality/Value: We used an innovative evaluation approach to assess pluralistic extension systems in three Latin American countries.

ARTICLE HISTORY
Received 28 October 2021
Accepted 31 May 2022

KEYWORDS
Pluralistic extension and advisory systems; participatory evaluation; semiquanitative approach; Latin America

CONTACT Johan Blockeel johan.blockeel@fibl.org

Introduction

The need for a global transition towards more inclusive, resilient, and sustainable food systems is increasingly recognized worldwide (IFPRI 2021). Meeting this need involves addressing a complex set of interrelated environmental (e.g. soil degradation, climate change, biodiversity loss) and socio-economic (e.g. price volatility, rural-urban migration, poverty, hunger) challenges linked to current agricultural and food production systems. Even though efforts in this regard have started (SAPEA 2020), the way ahead is still long (UN 2020).

Extension and Advisory Services (EAS) are expected to play an important role in the transformation process (Cristóvão, Koutsouris, and Kügler 2012; Piñeiro et al. 2020) by performing a set of increasingly diverse functions (Swanson 2008; Davis, Babu, and Ragasa 2020) that go beyond the mere promotion of productivity-boosting technologies. Functions such as promoting agro-ecological practices, linking up farmers with other services (e.g. credit, input, and output markets), empowering marginalized groups, promoting collective action, and facilitating innovation processes, are now considered domain of both public and private EAS providers (Blum, Cofini, and Sulaiman 2020). EAS are defined as

> consisting of all the different activities that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organisational, and management skills and practices so as to improve their livelihoods and well-being. (Christoplos 2010)

Moreover, the EAS system fulfils an important bridging function in the wider agricultural innovation system, by facilitating knowledge flows between research and education on the one hand and between farming and value chains on the other hand. Because of this extended functional scope, EAS provision is deemed more relevant today than ever (Cristóvão, Koutsouris, and Kügler 2012). Its importance is even higher in developing countries, where agriculture is becoming increasingly knowledge-intensive (FAO 2017) and millions of resource-scarce smallholders lack access to relevant information, skills, and technologies.

Nevertheless, concerns have been raised on the extent to which pluralistic EAS are effectively fulfilling their mandate. Recent studies highlighted the limited uptake of innovations (Kassam, Friedrich, and Derpsch 2019) as well as the limited outreach and inclusiveness levels of current EAS systems. For instance, (Barrantes-Bravo, Salinas-Flores, and Yagüe-Blanco 2017) found that only 10% of producers in Peru received advisory services. Similar figures are found in other studies (e.g. Cunguara 2011; Arias, Leguía, and Sy 2013). On the same note, the quality of the services provided is questioned. In particular, several studies revealed that users were dissatisfied with the reliability and timeliness of services (Babu et al. 2012; Azikiwe Agholor et al. 2013).

Concerns on EAS effectiveness are fueled by the lack of evidence on their performance, especially at the system level (Faure, Davis, and Ragasa 2016; Davis, Babu, and Ragasa 2020), defined here as the overall performance of all different actors involved in the provision of EAS. In fact, most past studies focused on the evaluation of single organizations, programs (Maffioli et al. 2013; Buehren et al. 2019; Jara-Rojas et al. 2020; Knook et al. 2020) or specific extension methods (Feder, Murgai, and Quizon

2003; Davis et al. 2012; Prager and Creaney 2017), while few efforts have been made to assess EAS performance and outcomes from a system perspective. For instance, Ragasa et al. 2016 applied the best-fit framework (Faure, Davis, and Ragasa 2016) to assess EAS performance at the national level in the Democratic Republic of Congo. The same approach was also implemented in other countries (Davis, Babu, and Ragasa 2020). On a similar note, Prager, Creaney, and Lorenzo-Arribas (2017) derived criterias based on the best-fit framework to evaluate advisory systems at the national level (Prager, Creaney, and Lorenzo-Arribas 2017). Nevertheless, such comprehensive analysis of EAS systems is still scarce and, for the most part, relies only on anecdotal evidence. Overall, there is little robust information available. Thus, filling this evidence gap by systematically assessing the extent to which pluralistic EAS systems are supporting the food systems transformation is of primary importance to guide further policy development and ultimately foster sustainable development.

In response to the lack of comprehensive and comparable evidence on EAS performance and outcomes and suitable evaluation tools, the Food and Agriculture Organisation of the United Nations (FAO) developed the 'Extension and Advisory Services (EAS) – Yardstick', a holistic semi-quantitative assessment approach accounting for key functional characteristics and elements of changing EAS systems. The newly developed Tool (EAS-Y) – relying on expert opinion to evaluate EAS performance as well as on user perceptions to measure outcomes – was applied within three country pilots, respectively Costa Rica (CR), Ecuador (EC), and Peru (PE). This paper used descriptive statistics to analyze how the three EAS systems performed against the comprehensive set of performance and outcome metrics included in the EAS-Y Tool. Secondly, we discussed the feasibility of the approach based on the experiences with its application.

The paper is structured as follows. First, we briefly outline the main methodological characteristics of EAS-Y and other methodological aspects related to selecting the case studies, the sampling of respondents, the data collection, and the analytical processes implemented. Then, the results of the assessment are presented systematically by topic and metric. Finally, reflections on the methodology are summarized.

Materials and methods

EAS-Y in a nutshell

Developed through an iterative process of tool development, expert feedback, and field-testing by an interdisciplinary team of experts (FAO 2022), the EAS-Y Tool is organized into two modules. Module A aims to assess the performance of the EAS system on a comprehensive set of eleven performance metrics. These are grouped into three main topics: enabling environment, scope and provision, and coordination and learning. The existence and effectiveness of agricultural extension policies, the availability and sustainability of EAS funding mechanisms, the presence of adequate infrastructure and resources, and the implementation of monitoring and evaluation schemes are assessed within the first topic. The second topic evaluates the functional scope of the system, the degree of inclusiveness, the quality of services, and the use of Information and Communication Technologies (ICTs). In the third topic, the presence and effectiveness of coordination

mechanisms, participatory processes, and learning opportunities are also taken into account. An overview of the metrics is provided in Figure 1.

Module B aims to measure nine metrics grouped into immediate, intermediate, and long-term outcomes of the EAS system among its clients. Immediate outcome metrics relate to the acquisition of different knowledge and skills (e.g. technical, entrepreneurial, and social). Intermediate outcome metrics look at the extent to which EAS contributed to applying acquired skills or knowledge (behavioral changes) such as the adoption of innovations, access to other related services (e.g. inputs or credit), and increased empowerment. Finally, the long-term outcome metrics verify whether EAS contributed to positive economic, social, and environmental transformations.

Given the different aims of the modules, the target groups in terms of respondents for the two modules differ. Module A relies on the expertise of a representative group of EAS stakeholders (e.g. extensions agents both in a public and private organization, researchers in the field of EAS, policy makers, representatives of farmer organizations). Preferably, participants should represent all relevant stakeholder groups within the National EAS system, thus covering the diversity of interests to support the relevance and validity of results. Module B, designed to capture outcomes among EAS clients, targets producers and representatives of producers' organizations.

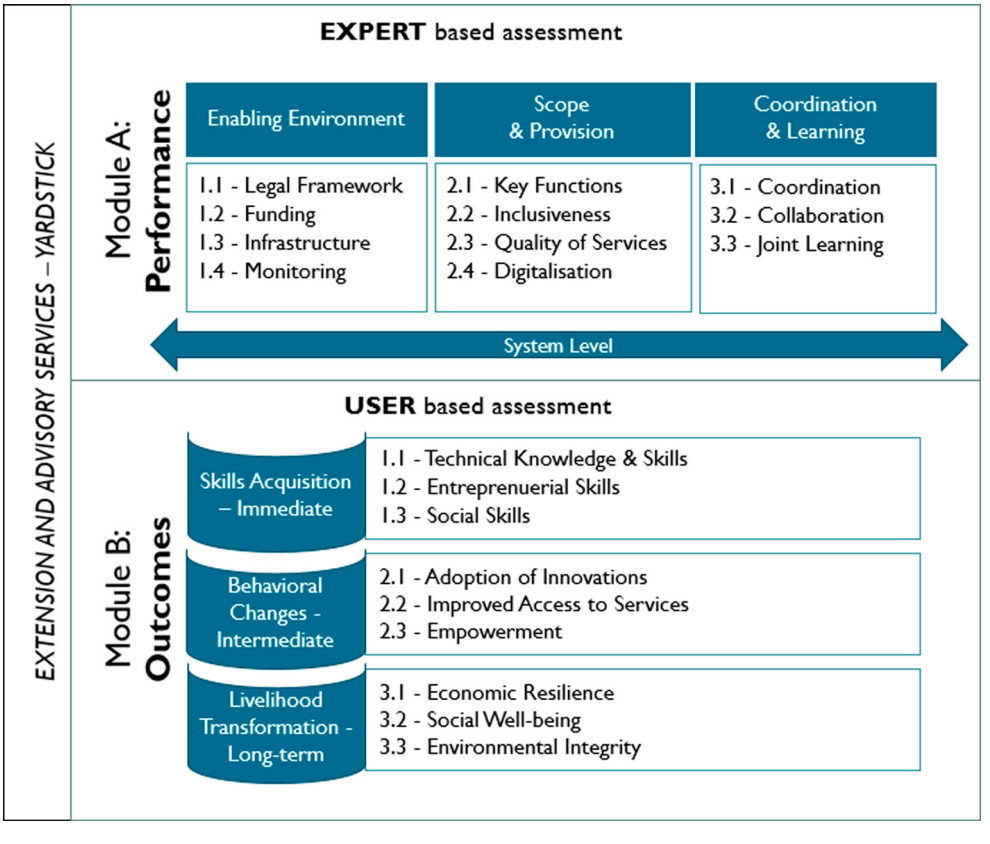

Figure 1. Overview of performance (Module A) and outcome (Module B) metrics.

All performance and outcome metrics scores are determined by the average rating for a specific set of questions (the questionnaires are publicly accessible, see FAO (2022)). Respondents rated these on a Likert scale, ranging from 0 (indicating poor performance) to 3 (indicating good performance). Thus, the average metric score across all respondents determines the EAS system performance or outcome on a certain metric. Notably, respondents are asked to justify the ratings given to the different questions. This information is then used to support the interpretation of the scores.

The *EAS-Y* scoring questionnaires were implemented using the KoboToolBox, an online data collection tool. This tool allows for the easy sharing of questionnaires with respondents through different online or offline modalities. For instance, the link to the questionnaire can be shared with respondents in a live or virtual workshop, or an enumerator can collect information in the field from multiple respondents without needing an internet connection.

Case studies and sampling

The three aforementioned countries were primarily selected because having pluralistic extension systems, with public and private actors providing EAS. Details on the extension systems of these countries can be found on the Worldwide Extension Study database hosted by the Global Forum for Rural Advisory Services (GFRAS). Additionally, in the case of Costa Rica, the extension system is best characterized by a report on good extension practices released by the Latin American Rural Extension Services Network (RELASER) in 2016. Furthermore, (Ortiz 2006) provided an overview of the historical evolution of extension services in Peru and recognized the role of private companies (e.g. agrochemical companies) and international non-government organizations in providing services. Similary, (Alvarado J. (2015) described the plurastic nature of extension services in Ecuador and its importance for family farms. Additionally, the presence of RELASER also determined the choice of countries to coordinate the various project activities.

In all three case studies, the sampling for Module A started with mapping EAS system actors (e.g. public and private EAS providers, EAS platforms, NGO's or producer organizations involved in extension activities). The outcome was then used to compile a list of relevant actors to be involved in the evaluation. Key criteria for selecting institutions were their involvement in extension and advisory activities as a service provider and policy-making or capacity development related to agricultural extension. In the next step, individual respondents were selected from the chosen actors. Notably, the latter were selected based on their level of experience and knowledge concerning the national EAS system as a whole. Ultimately, the final sample of individual respondents was screened to ensure that a diversity of views and interests was covered to support the results' relevance and validity.

For module B, the representation of various geographic locations and value chains was ensured through the sampling process. In the case of Costa Rica, several producer organizations were contacted and asked to share the contact details of their producers prior consent. Similarly, in the case of Ecuador, a sub-sample of producer organizations was selected from a broader database of around 180 producer organizations. In the case of Peru, several geographic units were identified, and within each of these, producers

were randomly selected. In each country, a sample of 50 producers participated in the evaluation. Importantly, the outlined sampling strategy for Module B makes it clear that it is not possible to generalize the results at the national level. An overview of the participants profile in each country for both module A and B is presented in Table 1.

Data collection and analysis

Firstly, to establish trust among respondents, an official letter explaining the aims of the evaluation was shared with all selected participants. For both modules, data collection was planned in the form of a workshop-based facilitated self-assessment, where a facilitator guides the participants through rating the different questions, which each participant must rate individually. In this context, the facilitator has the role to ensure a harmonized understanding of the questions by all participants and clarify any questions that come up. The responses are still individual and thus comparable to the responses from interviews with individuals. However, given the national authorities' restrictions during the covid-19 pandemic, data collection had to be undertaken virtually. For module A the following approaches were used by the implementing teams. In the case of Peru, four focus group discussions covering 17 respondents were carried out. The remaining respondents were interviewed individually by phone. In the case of Ecuador, one single online workshop with a total of 20 selected participants was carried out. The duration of the workshops varied between 1.5 and 2 h. In Costa Rica, the implementing team opted for a different strategy. First, participants were contacted by phone and introduced to the project. Then, the implementation of the scoring exercise was undertaken according to the participant's preference (i.e. e-mail, WhatsApp, or phone call). Participants who opted to receive the questionnaire via e-mail were provided with an instruction manual. Completing the exercise took approximately 30 min for each

Table 1. Overview of respondents for both Module A and B by country.

	Costa Rica (CR)	Ecuador (EC)	Peru (PE)
Module A			
General			
Number of participants	24	20	30
Male (%)	71%	74%	70%
Female (%)	29%	26%	30%
Stakeholder group			
Public (%)	45%	20%	43%
Private (%)	45%	20%	17%
NGO/PO (%)	16%	20%	13%
Research (%)	8%	25%	13%
Other(%)	16%	25%	13%
Module B			
General			
Number of participants	50	50	50
Male (%)	66%	60%	82%
Female (%)	34%	40%	18%
Part of a PO	70%	78%	46%
Primary EAS provider			
Public (%)	60%	74%	56%
Producer Org. (%)	22%	4%	20%
Input Dealer (%)	8%	10%	/
Private Advisor (%)	4%	6%	18%
Certification officer	2%	/	/

participant. The data collection for Module B was conducted through individual phone interviews in all countries. Around 40–50 min were required to complete each interview. The information collected through Kobo was then downloaded and fed into a pre-configured excel workbook that computes the metric scores and other relevant statistics. For each country, median and average scores were computed at the metric level. To allow a more intuitive graphical representation of the metric score distribution, the latter are grouped into five clusters and given a coloring scheme ranging from red (bad performance) to green (good performance) based on the following rules (Table 2):

The standard deviation was also computed as it represents a proxy for the extent to which respondents agreed on a particular rating. At the question level, frequency tables displaying the distributions of ratings across respondents were developed (see Appendix 1, Table A3 and A4). Moreover, a systematic screening of the experts' qualitative information was undertaken to complement metric ratings with additional contextual information.

Results

EAS system performance

The expert-based evaluation revealed some strengths and a range of weaknesses in the performance of national EAS in all three countries. Median scores (see Appendix 1, Table A1) higher than 1.5 points were rarely achieved, indicating that the assessed criteria were fulfilled to a relatively low extent according to the majority of respondents. When comparing median scores across countries, the EAS system of Costa Rica achieved slightly higher median scores for most metrics. On the other hand, the Peruvian system consistently performed poorest, achieving a median score higher than 1 point only for the metric '*Key Functions*'. Looking at the metrics scores distribution (Figure 2), performance evaluations varied across respondents. Consistently lower standard deviation values (see Appendix 1, Table A4) are observed in the case of Peru for all metrics, while higher ones are found for most metrics in the case of Ecuador.

In the following three sub-sections, the metric scores and the influencing factors – defined here as the questions that determine a specific metric – are discussed. Qualitative

Table 2. Metric score clustering rules.

Metric score range	Sign	Color
$X <= 0.5$	Very Low	
$0.5 < X \leq 1$	Low	
$1 < X \leq 1.5$	Moderate	
$1.5 < X \leq 2$	High	
$X > 2$	Very High	

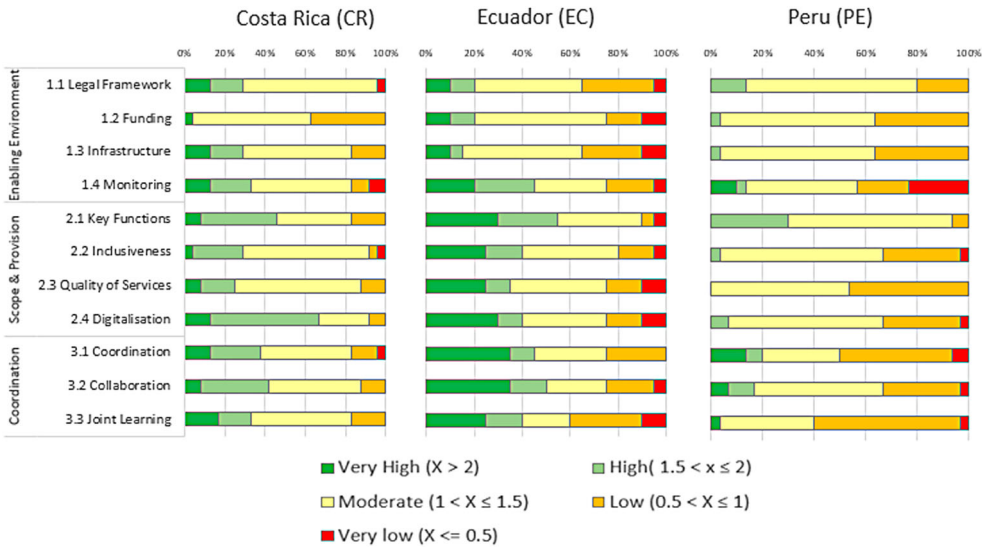

Figure 2. Overview of performance metric scores for all countries.

Note: The average metric scores ranging from 0 to 3 are clustered into five clusters as described in Table 2.

information is also reported in order to attach valuable information to the scores. The rating distributions at the question level are reported in Appendix 1, Tables A3 and A4.

Enabling environment

All three countries appear to have weaknesses concerning the 'Legal Framework' metric, achieving median scores between 1 and 1.3 points (CR: 1.3; EC: 1.15; PE: 1). Such poor performance is driven by the fact that most respondents (CR: 45%, EC: 38%, PE: 60%) considered that policies addressing agricultural extension only exist to a limited extent. Furthermore, according to the experts, when policies are in place, these are often not fully implemented, nor are they well-suited to respond to the various challenges threatening the systems' performance, e.g. coordination, sufficient funding. As described by one expert: '*An agricultural extension policy exists, but it only promotes the supply of inputs. It is insufficient to address the problems of the agricultural sector* (PE#03)'.

For the metric '*Funding*', all three systems achieved a median score of 1 point. In this case, the relatively low score is explained by the lack of long-term funding schemes. According to the experts, the latter are mostly short term as they are linked to political cycles. On the same note, insufficient public funding to cover the diverse needs of the actors in the system was recognized by the majority of respondents in all three cases. One respondent explained the funding deficiency as follows: '*Public funds are limited, while needs are unlimited. Fixing priorities makes it impossible to meet all needs*' (CR#18). Moreover, the widespread lack of co-financing schemes among public and private actors, as well as the overall limited financial contribution by users, are two more factors explaining the weak performance of the EAS systems in this regard.

The metric 'Infrastructure' also received a poor score, as shown by the low median score values (CR: 1.3; EC: 1; PE: 1). The inadequacy of the physical infrastructure (e.g. roads, electricity), especially in the rural areas, was pointed out by many respondents

(CR: 62%, EC: 93%, PE: 100%). Additionally, respondents highlighted the widespread lack of means among service providers to reach out to their clients. Experts in this case, however, pointed out differences among public and private service providers. As one expert argued: '*Different from private providers, public ones lack the means to ensure mobility, communication and information management (*PE#16)'. Additionally, most respondents considered that the human resources required for a pluralistic EAS system to function successfully are rarely available. For this reason, several respondents recommended the introduction of dedicated capacity development programs for EAS service providers.

The 'Monitoring' metric scores are also relatively low (CR: 1.3; EC: 1.3; PE: 1). Most respondents indicated that monitoring mechanisms are mainly informal, often partly implemented (e.g. data is collected but not analyzed), and that the outcomes are rarely used to guide decision-making. The qualitative information provided by the respondents revealed that evaluations are mainly carried out to monitor outputs. One expert explained: '*Most of the data collected focuses on the number of user's that attended and number activities accomplished. No efforts are done to measure impacts* (CR#04)'.

Scope & provision

Compared to the other analyzed metrics, the systems performed relatively better on the 'Key Functions' metric (CR: 1.5; EC: 1.5; PE: 1.3). This performance is driven by the relatively high share of experts (CR: 60%, EC: 62%, PE: 53%) who considered that EAS providers promote sustainable natural resource management practices to a good extent. Nevertheless, several respondents highlighted that even though formally part of programs, such effort is often not effectively implemented on the field. Likewise, a consistent share of experts (CR: 52%, EC: 75%, PE: 65%) considered EAS supported the formation or strengthening of producer group organizations to a good extent. Experts reported that both public and private initiatives are making efforts in this area. On the other hand, relatively few respondents (CR: 25%, EC: 37%, PE: 20%) considered that EAS providers provided linkages to other services such as credit, insurance schemes, new buyers etc. One expert commented that linkages to other services are not guided by any policy or authority. Whether or not such functions are covered largely depends on the individual extension agent's willingness or interest. Related to this aspect, several respondents also pointed out that the dominant focus of the services is still on technical assistance rather than on market issues.

On the 'Inclusiveness' metric, all three national systems performed relatively weak, with scores ranging from 1 to 1.3 points (CR: 1.3; EC: 1; PE: 1). Efforts to respond to the needs of marginalized groups, women, and youth, are considered to be lacking by most respondents. Especially in Peru, there is a very high consensus among experts that none or very few initiatives addressed the needs of the aforementioned groups. One respondent explained the fact as follows: 'Little attention is given to the needs of small-scale producers. They are considered not to have any productive potential. In this sense, they are not seen as a worthy investment' (PE#13). On the other hand, in the cases of Costa Rica and Ecuador, a substantial share of experts highlighted that increased attention has been given to the needs of women and youth, and that some initiatives were recently started. Nevertheless, another expert questioned the real

impact of such initiatives: '*There is a gender element within extension programs. However this is more declarative than operational*' (PE#14*)*.

Considering the metric 'Quality of Services', whose median scores are closely aligned with the previous metrics (CR: 1.25; EC: 2; PE: 1), the following trends emerged. In all three countries, most experts (CR: 68%, EC: 78%, PE: 100%) considered that the training needs among extension agents are not assessed, or that very few providers do so. In the case of Costa Rica, few respondents suggested such a process takes place annually but that no programs are then implemented in response. Respondents also mentioned on this point that private service providers are more likely to be responsive to training needs demands. Regarding the technical skills of extension agents (e.g. related to agronomic practices), differences are observed across countries. In Costa Rica, most experts (up to 75%) suggested that the level of technical skills is adequate or very good. In contrast to this, in the case of Peru, 62% of the respondents considered that extension agents' skills and capacities are relatively poor. On the other hand, there is a widespread perception among experts that improved soft skills must be developed across all three countries. Moreover, most respondents (CR: 77%, EC: 78%, PE: 90%) indicated that rewards to extension agents to incentivize high-quality services are non-existent or existing just among very few service providers. Regarding the timeliness of service provision, most respondents highlighted that this is rarely the case in Peru and Costa Rica. In the case of Ecuador, 50% of respondents believed that services are often provided promptly. Again, experts raised the point that relevant differences are observed between public and private EAS providers in this regard. Especially the high level of bureaucracy is considered a significant barrier to the timely provision of services by the public sector.

For the metric 'Digitalisation', scores varied between countries (CR: 1.8; EC: 1.5; PE: 1). In the case of Costa Rica and Ecuador, even though Information and Communication Technologies (ITCs) are not yet widely used, experts suggested that their use (mainly directed towards increased outreach) has increased considerably recently. An evaluator of the Costa Rican system explained: '*Nowadays digital tools are being used very often, the covid-19 pandemic pushed the increased use of such technologies*' (CR#05*)*. Nevertheless, in the case of Peru, the digitalization process appears to be hindered by the lack of the required infrastructure. As an expert explained: '*It is very difficult to talk about digitalisation in a country where access to the net is a privilege. This was demonstrated during the pandemic*' (PE#10). Finally, the promotion of digital tools and solutions among users is considered rather rare, especially in Ecuador and Peru. On the other hand, several experts in Costa Rica considered that EAS providers are promoting the latter technologies to a good extent.

Coordination & learning

The relatively low median scores for the metric '*Coordination*' (CR: 1.3; EC: 1.15; PE; 08), indicate that current efforts in this regard have mostly been insufficient according to the expert opinions. In the case of Costa Rica and Ecuador, most experts (CR: 54%; EC: 40%) suggested that coordination mechanisms existed to some extent. On the contrary, in the case of Peru, the majority of the respondents (87%) agreed there are no coordination mechanisms in place or only on rare occasions. One expert explained the lack of coordination as follows*: 'There are no specific funds allocated for coordination activities*' (EC#10). This view was also confirmed by the large share of ratings pointing out the

widespread lack of funds to support coordination activities. Moreover, when coordination mechanisms are in place, their effectiveness is questioned. One expert raised the concern: *'Coordination mechanisms are formal and mandatory for the actors, but they consist of meetings which do not bring real change*' (PE#13). In terms of stakeholder representation within existing coordination efforts, shortcomings were highlighted. Several respondents considered that coordination efforts existed only among public, private or civil society organizations separately and not between the actors from different sectors.

Similar median scores across countries are observed for the metric '*Collaboration*' (CR: 1.3; EC: 1; PE: 1). Most experts (CR: 60%, EC: 68%, PE: 92%) considered that service providers collaborate to a low extent. One respondent explained his rating by stating: '*There is no culture of working together*' (PE#01). Another respondent highlighted that cooperation only occurs when funds require joint applications. Differences across countries are observed when considering the extent to which service providers collaborate with research institutions. In the case of Costa Rica and Ecuador, respectively, 47% and 42% of respondents indicated that arrangements are in place to a good extent. In the case of Peru, up to 90% of the respondents considered that no cooperation with research institutions existed. A similar trend is observed when considering the extent of collaboration between EAS providers and other relevant actors related to financial service provision and market information.

For the metric 'Joint learning', the median scores showed a similar pattern to the previous metrics (CR: 1.3; EC: 1; PE: 0.8). The majority of respondents (CR: 61%, EC: 62%, PE: 96%) agreed that dialogue among service providers does not occur at all or only rarely. Moreover, there seems to be a general agreement that providers rarely change their activities based on previous reflections. On the same note, the extent to which arrangements are in place that allow users to articulate their demands is considered

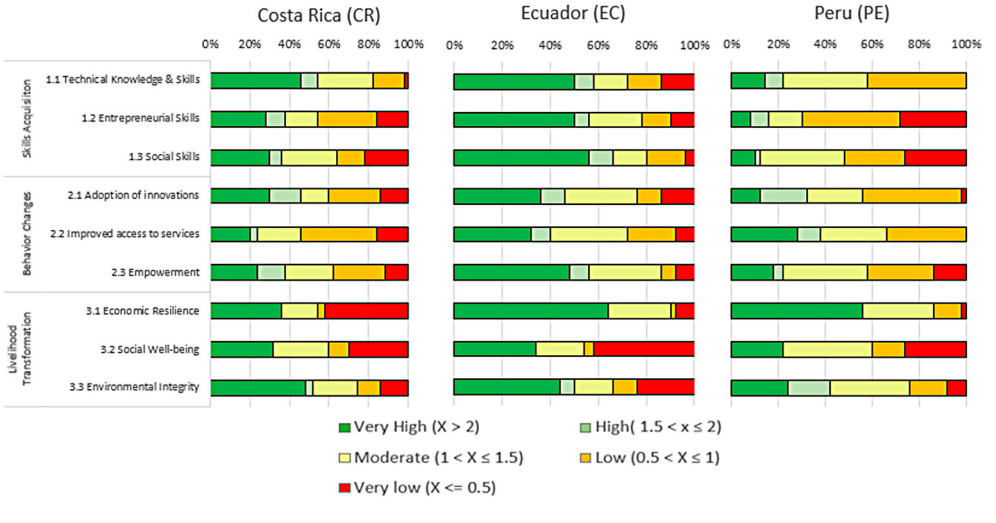

Figure 3. Overview of outcome metric scores distribution.

Note: The average metric scores ranging from 0 to 3 are clustered into five clusters as described in Table 2.

low by most respondents. Similarly, most experts considered that users are not able to influence the content of the services provided.

EAS system outcomes

EAS users in all three countries revealed diverse perceptions on the extent to which EAS contributed to immediate, intermediate, and long-term outcomes. For all assessed metrics, even though user's perceived both positive and negative effects of EAS, we noted that respondents having a negative perception prevailed in most cases (Figure 3).

In the next three sub-sections, the above results are discussed in detail for each metric.

Skills acquisition

Relatively high median scores for the outcome metric 'Technical Knowledge & Skills' were observed (CR: 1.7; EC: 2; PE: 1). In all three countries, more than 70% of interviewed users perceived that EAS contributed to acquiring relevant technical knowledge to a good extent. For example, pest management, soil fertility, and irrigation practices were among the most frequently cited technical competencies EAS contributed to. On the other hand, significantly lower shares of producers perceived that EAS contributed to improving their knowledge related to value addition processes, especially in the case of Peru, where 72% of respondents experienced no benefit in this regard. On the same note, improved knowledge on digital skills was relatively rarely perceived by users in Costa Rica (32%) and Ecuador (44%), and very rarely in the case of Peru (only 12% of users). Those few users who perceived having acquired knowledge in this regard stated they were provided with guidance on how to access online information and work with different digital platforms, e.g. WhatsApp, and how to access e-commerce platforms.

Compared to the previous metric, users perceived a relatively lower contribution by EAS in terms of 'Entrepreneurial Skills', as indicated by the lower median scores (CR: 1; EC: 1.85; PE: 0.4). For the specific influencing factors, perceived contributions vary across countries to a more considerable extent. In the case of Peru, around 80% of respondents argued EAS did not contribute at all or only to a minimal extent to improve their negotiation, business, and marketing skills. Differently, more than half of interviewed users in Costa Rica stated they perceived EAS contributed to a good extent in this regard, while in Ecuador, the highest share of producers perceiving a positive contribution for all three factors was observed. Overall, respondents providing negative ratings argued that extension agents do not possess the required experience and knowledge of these topics.

Similar median scores were observed for the '*Social Skills*' metric (CR: 1; EC: 1.85; PE: 0.7). In the case of Ecuador, higher shares of respondents perceived a good contribution in terms of leadership, networking, and conflict resolution, while substantially lower shares perceived positive contributions in these aspects in the case of Costa Rica and especially Peru. Various reasons explain the limited contribution of EAS on the factors above. Several respondents argued that extension agents do not possess experience and knowledge on these topics. One respondent explained: '*The work of the extension agents is oriented to work on the productive capacity of the crops*' (PE#14). Other respondents argued that public authorities are not involved in such activities or or may only be

involved on paper and not in practice. For instance: '*The ministry mentioned the development of these skills on paper, but it was never applied in practice because their main focus is on productivity*' (PE#07).

On the other hand, some respondents pointed out that NGOs and international organizations carried out work on this front. However, these efforts reach few producers within privileged value chains.

Behavioral changes

On the 'Adoption of Innovations' metric, median scores between 1 and 1.4 were achieved (CR: 1.4; EC: 1.32; PE: 1), reflecting a relatively limited capacity of EAS to trigger the implementation of newly acquired knowledge. According to the sampled users, changes of a technical nature (e.g. new irrigation system, new fertilizer) were most frequently adopted. In the case of Peru, up to 74% of users stated EAS largely contributed to the uptake of changes in their management practices. On the other hand, in line with the rating frequencies for the knowledge-related factors, value addition activities, and digital solutions were taken up by lower shares of users.

Median scores for the outcome metric 'Improved Access to Services' ranged from 0.7 to 1.3 points (CR: 0.7; EC: 1.3; PE: 1.15). Overall, users perceived EAS rarely contributed to establishing linkages with upstream, downstream, or other relevant actors in the value chain. However, in the case of Peru, a relatively high share of users considered that the EAS played a role in supporting linkages with downstream actors, i.e. input providers. Such linkages are either made directly or by connecting the producers to input dealers.

Considering the '*Empowerment*' metric, except for Ecuador, Costa Rica and Peru performed poorly (CR: 1; EC: 1.7; PE: 1). In both countries, the share of users perceiving EAS contributed to their ability to engage in collective action, make positive changes, and change the way decisions are made was relatively low. However, in the case of Ecuador, higher shares of users perceived a positive contribution by EAS regarding the latter.

Livelihood transformations

Relatively high median scores for the outcome metric '*Economic Resilience*' were observed for two countries, while a lower score was achieved by one country (CR: 1; EC: 2; PE: 2). In the latter case, only 32% of respondents considered that EAS contributed to increased incomes. In the other two cases, respectively 70% and 82% of users believed that EAS made a significant contribution. According to the qualitative information attached to the ratings, the latter was mainly linked to higher productivity levels and improved product quality. A similar trend among countries emerged in terms of income stability. One producer from Costa Rica stated: '*I now have a better income mainly through agricultural diversification'* (*CR#11)*.

For the 'Social Well-being' metric, all three countries achieved a median score of 1, indicating that overall EAS had a limited impact on the social well-being of the majority of interviewed producers. Household health improvements were perceived by more than 40% of respondents in all three cases. These are mostly related to improved pesticide management practices. One producer explained: 'With better inputs, illnesses associated with the toxicity of some products are prevented' (PE#13). However, improvements in household nutrition were rarely experienced by the majority of users, which argued that EAS does not deal with this topic. Only a minority of respondents (CR: 32%, EC:

28%, PE: 12%) experienced a contribution in this regard. For instance, one producer described the change triggered by EAS: 'We do not sell all the quinoa anymore, we keep one part to nourish the family. We are also implementing vegetable gardens so that we do not have to buy on the market what we can produce on our farm' (EC#31).

The median scores for the metric 'Environmental Integrity' ranged from 1.3 to 1.7 points (CR: 1.7; EC: 1.5; PE: 1.3). In all three countries, around 60% of the respondents perceived EAS contributed to a good extent to improved environmental performance. According to the rating justifications provided by the respondents, this is mainly due to the adoption of better pesticide and soil management practices. However, some participants highlighted that environmental aspects are not yet the central point of focus but that productivity remains the central one. EAS's positive contributions to improved biodiversity were experienced by around 50% of producers in Costa Rica and Ecuador, while only 14% in the case of Peru. Conversely, most users in Peru (74%) benefitted from improved water management practices, while in the other two countries, few users perceived EAS provided any significant support in this area.

Discussion and conclusion

The expert-based assessment of national EAS revealed a relatively weak performance in all three cases for most assessed criteria. This result is not surprising, considering that the metrics are strongly interrelated with each other. A suitable enabling environment is a prerequisite for a well-functioning EAS system. In our analysis, however, it emerged that enabling factors are often limited. Ineffective legal frameworks, overall funding deficiencies, infrastructural shortcomings, and the lack of monitoring and learning processes prevailed. On a more positive note, some experts suggested that key changes in particular domains are underway. For example, the increased focus on sustainability, increased inclusiveness, and steady uptake of digitalization technologies are areas where progress was recently made. However, there seems to be a broad agreement that major improvements still need to be also made in these areas. Based on the evaluation, progress was mainly made by a few actors within the system and often in an uncoordinated process. Indeed the results also showed room for improvement in coordination and collaboration among actors within the analyzed systems.

Additionally, for specific metrics, the qualitative information provided by respondents revealed that significant differences are likely to exist between public and private providers. For instance, when it comes to the availability of means to reach users and the responsiveness to agents' training needs. The extent of these differences could be further investigated by targeting the evaluation to single types of actors and then compare the evaluation results. Finally, the results of this study are largely aligned with findings from other studies. For instance, the lack of sufficient funding, the weak policy framework, and the lack of coordination were identified as significant performance constraints also by Ragasa et al. (2016). Moreover, we also found that generally, extension agents lack a wide range of required capacities. This finding is backed up by both the results of the performance and outcome assessment. In the first, experts suggested that extension agents lack the required soft skills, and according to the second, users hinted that most extension agents lack especially entrepreneurial and marketing related knowledge.

When looking at the results of both the performance and outcomes evaluation, a consistent picture is portrayed. In other words, the overall weak EAS systems performance is reflected in relatively limited outcomes among users. In particular, the performance assessment revealed that the primary focus of EAS still lies in productivity aspects. This finding is reinforced by the users' assessments, which stated that other relevant skills related to, e.g. value addition activities, entrepreneurial and social skills are rarely provided by EAS. Additionally, as suggested by the experts, an increased focus of extension services lies in promoting sustainable management practices. This trend is confirmed by the relatively high shares of users reporting having adopted a sustainable practice.

Evaluating EAS performance taking a systems approach, thus accounting for the diversity of actors and their goals, operational structures, activities, and outreach, poses serious methodological challenges (Christoplos, Sandison, and Chipeta 2012). At the same time, this complexity of EAS systems makes the reliance on quantitative indicators for evaluation purposes less suitable, as consistent information from different sources (e.g. public and private providers) is often not readily available or might require substantial data collection efforts. In this setting, we implemented an evaluation approach, relying on the involvement of experts and users to obtain an overall picture of how the EAS system performs. To successfully implement such a participatory method, we consider that several methodological procedures must be rigorously followed. First, it is essential to undertake an extensive mapping of all actors playing a role in EAS and ensure their involvement in the performance evaluation process. In fact, even though selected experts are explicitly asked to evaluate the system and not individual organizations within the system, there remains a risk that their own personal EAS experience will bias expert ratings. Therefore, all relevant EAS stakeholder groups (e.g. public and private providers, producer group organizations, NGOs) must be represented for possible biases to balance out. Secondly, the generic phrasing of the questions to be rated requires a facilitator to set the scene and ensure a harmonized understanding among respondents. Third, the interpretation of the scores must be complemented by a careful analysis of the qualitative information provided by the respondents to justify their ratings. The latter allows developing a much better understanding of the factors influencing a particular aspect. Finally, disaggregated analysis of the results by actor types is also recommended to identify possible biases.

Similar to the performance evaluation, the evaluation of outcomes and impacts within a pluralistic EAS system is challenging. In particular, attributing the effect to a specific EAS provider, given that users are exposed to multiple sources of service provision. To ensure appropriate attribution, ideally, randomized control trials (RCTs) are designed in order to deliver high-quality evidence on outcomes and impacts (Faure et al. 2019). However, conducting an RCT in the context of a system-level evaluation might be very costly or even not possible within a given setting. EAS-Y relies on the users' assessment to verify the extent to which EAS supports the achievement of a specific outcome. Therefore, it does not aim to attribute effects but to measure the overall contribution of EAS to certain factors. This attribute is aligned with the school of thought that believes evaluation involves value judgments and, thus, absolute accuracy is neither necessary nor attainable (Suvedi 2016). In this sense, the tool rather fulfills a learning purpose.

Logically, the extent to which the outcome assessment results are representative of a certain service provider within the system, region, or production system heavily depends on the sampling strategy applied. In our study, given the aim of testing the tool, no measures were taken to ensure adequate representation of users. However, the sampling process can be adapted to respond to different evaluation goals. Once applied, the tool gives an overall picture of which knowledge categories (e.g. technical, entrepreneurial, and social skills) were acquired. Such information could be used to identify hotspots and prioritize areas where specific interventions are required. The tool can also undertake a comparative analysis for different regions or production systems to identify areas and or value chains for which more support is required.

As mentioned, due to the covid-19 pandemic, data collection occurred virtually either through online focus group discussions or individually through phone interviews or e-mails. Even though the latter represents a cost-effective way to collect information from a broad audience, we consider face-to-face data collection more appropriate for this evaluation. Facilitators noticed that participants were not always attentive during the online discussions, as they tended to do other activities simultaneously. Moreover, we consider that physical meetings are better to foster the exchange and learning processes involved in this kind of participatory evaluation. Additionally, in the case of Module B, the virtual implementation automatically determines a biased pre-selection of producers. Therefore, we recommend the inclusion of other means, e.g. community-based focus group discussions, to involve a wider selection of users.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Johan Blockeel is an Agricultural Economist at the Research Institute of Organic Agriculture (FiBL) in Switzerland. His work focuses on evaluating the sustainability impacts of different types of interventions within the agricultural sector and the dynamics of agricultural innovation systems. He has an MSc degree in International Rural Development at the University of Ghent.

Delgerma Chuluunbaatar is an agricultural research officer at the Food and Agriculture Organisation of the United Nations. Her work focuses on the effectiveness of different extension models and their ability to contribute to sustainable development.

Aiden Holley is a consultant at the Food and Agriculture Organization of the United Nations. He undertakes research in international agricultural extension and advisory service systems. He has an MSc degree in Sustainable International Agriculture at the University of Göttingen.

Rasheed Sulaiman is Director of the Centre for Research on Innovation and Science Policy in India (since 2006). Prior to that, he worked as a Senior Scientist at the National Centre for Agricultural Economics and Policy Research at the Indian Council of Agricultural Research (ICAR). He has expertise in agricultural extension systems and has worked on applications of agricultural innovation systems. His research also covers the role of the private sector in extension, developing new approaches to reaching rural women and evaluation of ICTs in agriculture.

Patrice Djamen is a CIRAD researcher in the Innovation Unit where he conducts action-research, capacity development and expertise activities on the transformation of agricultural advisory services to facilitate agro-ecological transitions. Before joining CIRAD, he worked as a research developer and consultant. He has facilitated several innovation processes, capacity development, policy

reform and investment planning and management for sustainable agriculture. He is a board member of the African Forum for Agricultural Advisory Services Agricultural Advisory Services (AFAAS) and the Global Forum for Rural for Rural Advisory Services (GFRAS).

Christian Grovermann is an Agricultural Economist at the Research Institute of Organic Agriculture (FiBL) in Switzerland, where he coordinates impact evaluation work across different projects in Africa, Asia and Europe. His interests include the assessment of agri-environmental and rural development policies and innovations, the analysis of integrated production systems and the study of agricultural innovation systems. Before joining FiBL, he has worked as Agricultural Research Officer for the UN Food and Agriculture Organization. At FAO his tasks involved the development, piloting and implementation of instruments for evaluating agricultural research for development projects and agricultural innovation systems. Christian holds an MSc in Sustainable Resource Management from TU München and a PhD in Agricultural Economics from the University of Hohenheim, where he carried out research on the assessment of pesticide reduction strategies for upland agriculture in Southeast Asia.

ORCID

Johan Blockeel http://orcid.org/0000-0003-4650-3546

References

Alvarado, J. 2015. *Perspectivas de los servicios de extensión agrícola para las explotaciones familiares en Ecuador. Valor Agregado*. Quito: Revista para la Docencia de Ciencias Económicas y Administrativas en el Ecuador.

Arias, D., J. J. Leguía, and Abdoulaye. Sy. 2013. *Determinants of Agricultural Extension Services: The Case of Haiti*. Washington, DC: World Bank.

Azikiwe Agholor, I., N. Monde, A. Obi, and O. A. Sunday. 2013. "Quality of Extension Services: A Case Study of Farmers in Amathole." *Journal of Agricultural Science* 5: p204. doi:10.5539/jas.v5n2p204.

Babu, S. C., C. J. Glendenning, K. Asenso-Okyere, and S. K. Govindarajan. 2012. "Farmers' Information Needs and Search Behaviors: Case Study in Tamil Nadu, India." IFPRI Discussion Paper 01165.

Barrantes-Bravo, C., J. Salinas-Flores, and J. L. Yagüe-Blanco. 2017. "Factores que influencian el acceso a la extensión agropecuaria en Perú: buscando modelos más inclusivos." *Agricultura Sociedad y Desarrollo* 14: 205. doi:10.22231/asyd.v14i2.589.

Blum, M., F. Cofini, and R. Sulaiman. 2020. *Agricultural Extension in Transition Worldwide: Policies and Strategies for Reform*. FAO. doi:10.4060/ca8199en.

Buehren, N., M. Goldstein, E. Molina, and J. Vaillant. 2019. "The Impact of Strengthening Agricultural Extension Services: Evidence from Ethiopia." World Bank. Policy Research Working Paper 8169.

Christoplos, I. 2010. *Mobilizing the Potential of Rural and Agricultural Extension*. Rome: FAO.

Christoplos, I., P. Sandison, and S. Chipeta. 2012. *Guide to Evaluating Rural Extension*. Lindau: Global Forum for Rural Advisory Services (GFRAS).

Cristóvão, A., A. Koutsouris, and M. Kügler. 2012. "Extension Systems and Change Facilitation for Agricultural and Rural Development." In *Farming Systems Research Into the 21st Century: The New Dynamic*, edited by I. Darnhofer, D. Gibbon, and B. Dedieu, 201–227. Netherlands, Dordrecht: Springer. doi:10.1007/978-94-007-4503-2_10

Cunguara, B. 2011. "Is Agricultural Extension Helping the Poor? Evidence from Rural Mozambique." *Journal of African Economies* 20: 562–595. doi:10.1093/jae/ejr015.

Davis, K., S. C. Babu, and C. Ragasa. 2020. *Agricultural Extension: Global Status and Performance in Selected Countries*. Washington, DC: International Food Policy Research Institute. doi:10.2499/9780896293755

Davis, K., E. Nkonya, E. Kato, D. A. Mekonnen, M. Odendo, R. Miiro, and J. Nkuba. 2012. "Impact of Farmer Field Schools on Agricultural Productivity and Poverty in East Africa." *World Development* 40: 402–413. doi:10.1016/j.worlddev.2011.05.019.

FAO. 2017. *The Future of Food and Agriculture – Trends and Challenges*. Rome: FAO.

Faure, G., K. Davis, and C. Ragasa. 2016. "Framework to Assess Performance and Impact of Pluralistic Agricultural Extension Systems." IFPRI Discussion Paper 01567.

Faure, G., A. Knierim, A. Koutsouris, H. T. Ndah, S. Audouin, E. Zarokosta, E. Wielinga, et al. 2019. "How to Strengthen Innovation Support Services in Agriculture with Regard to Multi-Stakeholder Approaches." *Journal of Innovation Economics & Management* n° 28: 145–169. doi:10.3917/jie.028.0145

Feder, G., R. Murgai, and J. B. Quizon. 2003. "Sending Farmers Back to School – The Impact of Farmer Field Schools in Indonesia." World Bank. Policy Research Working Paper 3022.

Grovermann, C., Chuluunbaatar, D., Blockeel, J., Sulaiman V, R., Djamen, P. and Holley, A. 2022. *The Extension and Advisory Service Systems Yardstick (EAS-Y)*. Rome: FAO.

IFPRI. 2021. *Global Food Policy Report: Transforming Food Systems After COVID-19*. Washington, DC: International Food Policy Research Institute. doi:10.2499/9780896293991

Jara-Rojas, R., R. Canales, J. M. Gil, A. Engler, B. Bravo-Ureta, and C. Bopp. 2020. "Technology Adoption and Extension Strategies in Mediterranean Agriculture: The Case of Family Farms in Chile." *Agronomy* 10: 692. doi:10.3390/agronomy10050692.

Kassam, A., T. Friedrich, and R. Derpsch. 2019. "Global Spread of Conservation Agriculture." *International Journal of Environmental Studies* 76: 29–51. doi:10.1080/00207233.2018.1494927.

Knook, J., V. Eory, M. Brander, and D. Moran. 2020. "The Evaluation of a Participatory Extension Programme Focused on Climate Friendly Farming." *Journal of Rural Studies* 76: 40–48. doi:10.1016/j.jrurstud.2020.03.010.

Maffioli, A., D. Ubfal, G. Vazquez-Bare, and P. Cerdan-Infantes. 2013. "Improving Technology Adoption in Agriculture Through Extension Services: Evidence from Uruguay." *Journal of Development Effectiveness* 5: 64–81. doi:10.1080/19439342.2013.764917.

Ortiz, O. 2006. "Evolution of Agricultural Extension and Information Dissemination in Peru: An Historical Perspective Focusing on Potato-Related Pest Control." *Agriculture and Human Values* 23: 477–489. doi:10.1007/s10460-006-9014-4.

Piñeiro, V., J. Arias, J. Dürr, P. Elverdin, A. M. Ibáñez, A. Kinengyere, C. M. Opazo, et al. 2020. "A Scoping Review on Incentives for Adoption of Sustainable Agricultural Practices and Their Outcomes." *Nature Sustainability* 3: 809–820. doi:10.1038/s41893-020-00617-y.

Prager, K., and R. Creaney. 2017. "Achieving on-Farm Practice Change Through Facilitated Group Learning: Evaluating the Effectiveness of Monitor Farms and Discussion Groups." *Journal of Rural Studies*. doi:10.1016/j.jrurstud.2017.09.002.

Prager, K., R. Creaney, and A. Lorenzo-Arribas. 2017. "Criteria for a System Level Evaluation of Farm Advisory Services." *Land Use Policy* 61: 86–98. doi:10.1016/j.landusepol.2016.11.003.

Ragasa, C., J. Ulimwengu, J. Randriamamonjy, and T. Badibanga. 2016. "Factors Affecting Performance of Agricultural Extension: Evidence from Democratic Republic of Congo." *The Journal of Agricultural Education and Extension* 22: 113–143. doi:10.1080/1389224X.2015.1026363.

SAPEA. 2020. *A Sustainable Food System for the European Union*. Berlin: SAPEA, DE. doi:10.26356/sustainablefood

Suvedi, M. 2016. "Improving the Monitoring and Evaluation of Agricultural Extension Programs." USAID. MEAS discussion paper 5.

Swanson, B. E. 2008. *Global Review of Good Agricultural Extension and Advisory Service Practices*. Rome: FAO.

UN. 2020. *The Sustainable Development Goals Report*. New York: United Nations.

Appendix 1

Table A1. Module A: Median, Mean and Standard deviation for all metrics.

Module A		Median Score			Mean Score			Standard Deviation		
Topic	Metric	CR	EC	PE	CR	EC	PE	CR	EC	PE
Enabling Environment	1.1 – LEGAL FRAMEWORK	1.30	1.15	1.00	1.36	1.21	1.13	0.50	0.72	0.34
	1.2 – FUNDING	1.00	1.00	1.00	1.05	0.94	0.97	0.47	0.49	0.33
	1.3 – INFRASTRUCTURE	1.30	1.00	1.00	1.44	1.08	1.04	0.60	0.65	0.28
	1.4 – MONITORING	1.30	1.30	1.00	1.27	1.29	0.73	0.66	0.73	0.53
Scope & Provision	2.1 – KEY FUNCTIONS	1.50	1.50	1.30	1.44	1.59	1.39	0.66	0.69	0.41
	2.2 – INCLUSIVENESS	1.30	1.00	1.00	1.35	1.33	0.98	0.52	0.84	0.35
	2.3 – QUALITY OF SERVICES	1.25	1.20	1.00	1.37	1.23	0.90	0.53	0.75	0.31
	2.4 – DIGITALISATION	1.80	1.30	1.00	1.59	1.41	1.08	0.51	0.93	0.41
Coordination	3.1 – COORDINATION	1.50	1.15	0.80	1.47	1.43	0.81	0.68	0.84	0.47
	3.2 – COLLABORATION	1.30	1.00	1.00	1.44	1.40	0.89	0.70	0.92	0.51
	3.3– JOINT LEARNING	1.30	1.00	0.80	1.45	1.21	0.80	0.70	0.95	0.36

Table A2. Module B: Median, Mean and Standard deviation for all metrics.

Module B		Median Score			Mean Score			Standard Deviation		
Topic	Metric	CR	EC	PE	CR	EC	PE	CR	EC	PE
Skills Acquisition – Immediate	1.1 – TECHNICAL KNOWLEDGE & SKILLS	1.70	2.00	1.00	1.63	1.80	1.08	0.85	0.88	0.64
	1.2 – ENTREPRENEURIAL SKILLS	1.00	1.85	0.40	1.15	1.67	0.70	0.92	1.07	0.75
	1.3 – SOCIAL SKILLS	1.00	1.85	0.70	1.19	1.67	0.73	0.96	0.97	0.67
Behavioral Changes – Intermediate	2.1 – ADOPTION OF INNOVATIONS	1.40	1.32	1.00	1.29	1.40	1.10	0.90	0.89	0.60
	2.2 – IMPROVED ACCESS TO SERVICES	0.70	1.30	1.15	0.97	1.37	1.29	0.88	0.83	0.70
	2.3 – EMPOWERMENT	1.00	1.70	1.00	1.20	1.64	1.01	0.87	0.84	0.71
Livelihood Transformations – Long-term	3.1 – ECONOMIC RESILIENCE	1.00	2.00	2.00	1.03	1.78	1.86	1.06	0.90	0.86
	3.2 – SOCIAL WELL-BEING	1.00	1.00	1.00	1.12	1.12	0.97	1.02	1.13	0.81
	3.3 – ENVIRONMENTAL INTEGRITY	1.70	1.50	1.30	1.58	1.42	1.35	1.00	1.06	0.72

Table A3. Module A: Overview of ratings for all questions.

	Costa Rica				Ecuador				Peru			
Likert values	0	1	2	3	0	1	2	3	0	1	2	3
1.1 – Legal Framework												
Policies Challenges	5%	71%	19%	5%	6%	65%	24%	6%	7%	77%	17%	0%
Policies Existence	9%	45%	41%	5%	11%	39%	39%	11%	3%	60%	37%	0%
Policies Implemented	5%	68%	27%	0%	17%	61%	11%	11%	7%	79%	14%	0%
Policies Participation	4%	57%	26%	13%	32%	42%	21%	5%	14%	82%	4%	0%
1.2 – Funding												
Co-Financing	22%	48%	30%	0%	25%	50%	25%	0%	19%	57%	14%	10%
Funding Long-Term	24%	62%	10%	5%	35%	41%	18%	6%	21%	79%	0%	0%
Public Funding	4%	83%	9%	4%	29%	71%	0%	0%	14%	83%	3%	0%
User – Financing	26%	43%	30%	0%	20%	53%	20%	7%	19%	58%	19%	4%
1.3 – Infrastructure												
Access Information	4%	50%	33%	13%	12%	24%	59%	6%	0%	71%	25%	4%
Human Resources	4%	50%	33%	13%	19%	50%	13%	19%	20%	73%	7%	0%
Phisical Resources	21%	42%	29%	8%	56%	38%	6%	0%	17%	83%	0%	0%
Provider Means	5%	59%	32%	5%	28%	50%	22%	0%	0%	90%	10%	0%
1.4 – Monitoring												
Monitoring Existence	9%	36%	50%	5%	7%	43%	43%	7%	37%	44%	19%	0%
Monitoring Implemented	14%	67%	19%	0%	27%	53%	13%	7%	33%	63%	4%	0%
Monitoring Use	22%	43%	26%	9%	25%	31%	31%	13%	37%	59%	4%	0%
2.1 – Key Functions												
Empowering	23%	45%	32%	0%	13%	50%	31%	6%	13%	73%	13%	0%
Linkaging	4%	71%	17%	8%	13%	50%	25%	13%	7%	72%	21%	0%
Producer Group Strengthening	9%	39%	30%	22%	6%	19%	44%	31%	3%	31%	59%	7%
Sustainability Promotion	13%	26%	48%	13%	13%	25%	50%	13%	3%	43%	40%	13%
2.2 – Inclusiveness												
Diverse Needs	4%	58%	38%	0%	6%	63%	19%	13%	3%	86%	10%	0%
Vunerable Needs	9%	50%	36%	5%	27%	33%	27%	13%	17%	73%	10%	0%
Women Needs	4%	48%	39%	9%	13%	56%	13%	19%	27%	63%	10%	0%
Youth Needs	17%	52%	30%	0%	19%	44%	25%	13%	7%	83%	10%	0%
2.3 – Quality of Services												
Resilience	14%	48%	29%	10%	38%	19%	25%	19%	59%	41%	0%	0%
Rewards	45%	32%	18%	5%	50%	29%	21%	0%	27%	64%	9%	0%
Soft Skills	4%	58%	25%	13%	18%	47%	29%	6%	14%	79%	7%	0%
Technical Skills	0%	25%	63%	13%	18%	29%	35%	18%	7%	55%	38%	0%
Timeliness	0%	57%	39%	4%	25%	25%	44%	6%	7%	71%	21%	0%
Training Needs Evaluation	18%	50%	23%	9%	21%	57%	14%	7%	25%	75%	0%	0%
2.4 – Digitalisation												
ITC Access	0%	32%	64%	5%	24%	29%	29%	18%	7%	52%	38%	3%
ITC Collaboration	0%	32%	55%	14%	12%	29%	41%	18%	8%	65%	27%	0%
ITC Monitoring	10%	52%	38%	0%	18%	53%	6%	24%	34%	62%	3%	0%
ITC Promotion	4%	48%	43%	4%	27%	40%	20%	13%	7%	85%	7%	0%
3.1 – Coordination												
Coordination	8%	38%	42%	13%	0%	60%	33%	7%	25%	63%	13%	0%
Coordination Implemented	0%	41%	36%	23%	7%	57%	14%	21%	50%	42%	4%	4%
Coordination Platform	0%	64%	32%	5%	21%	43%	14%	21%	17%	65%	17%	0%
Coordination Sustainability	19%	52%	24%	5%	29%	29%	21%	21%	33%	58%	8%	0%
3.2 – Collaboration												
Other Collaboration	0%	65%	30%	4%	21%	36%	14%	29%	19%	62%	19%	0%
Providers Collaboration	13%	48%	30%	9%	19%	50%	13%	19%	21%	71%	7%	0%
Research Collaboration	10%	43%	43%	5%	14%	43%	29%	14%	31%	62%	8%	0%
3.3 – Joint Learning												
Demand Articulation	5%	57%	29%	10%	18%	59%	6%	18%	32%	57%	11%	0%
Dialogue	5%	57%	29%	10%	25%	38%	25%	13%	50%	46%	4%	0%
Joint Learning	5%	67%	14%	14%	29%	43%	7%	21%	50%	50%	0%	0%
User Influence Demand	9%	50%	27%	14%	38%	38%	13%	13%	7%	76%	17%	0%

Table A4. Module B: Overview of ratings for all questions.

	Costa Rica				Ecuador				Peru			
Likert scale	0	1	2	3	0	1	2	3	0	1	2	3
1.1. Technical Knowledge & Skills												
Technical Knowledge	6%	14%	28%	50%	6%	12%	32%	50%	2%	24%	54%	20%
Value Addition Knowledge	16%	26%	28%	28%	22%	10%	30%	38%	44%	28%	20%	8%
Digital Knowledge	52%	12%	20%	12%	34%	22%	26%	18%	76%	12%	6%	0%
1.2. Entrepreneurial Skills												
Business Skills	38%	24%	22%	12%	24%	20%	22%	34%	44%	32%	18%	4%
Marketing Skills	44%	30%	16%	10%	26%	22%	20%	32%	64%	20%	8%	4%
Negotiation Skills	22%	30%	26%	18%	22%	16%	26%	36%	46%	42%	12%	0%
1.3. Social Skills												
Leadership Skills	32%	20%	26%	20%	14%	20%	30%	34%	44%	38%	16%	2%
Networking Skills	30%	26%	26%	14%	22%	16%	28%	34%	46%	22%	12%	4%
Conflict Resolution Skills	46%	22%	18%	10%	28%	18%	28%	24%	48%	36%	6%	0%
2.1. Adoption of Innovations												
Adoption of Production Changes	20%	24%	32%	24%	24%	28%	22%	26%	2%	22%	48%	26%
Adoption of Processing Changes	32%	14%	26%	18%	26%	14%	28%	30%	44%	30%	18%	8%
Adoption of Digital Changes	52%	16%	18%	12%	38%	26%	22%	12%	72%	14%	6%	0%
2.2. Improved Access to Services												
Linkage to Downstream Actors	38%	30%	24%	8%	36%	22%	24%	18%	2%	30%	42%	24%
Linkage to Upstream Actors	52%	16%	16%	14%	32%	20%	22%	26%	58%	24%	12%	4%
Linkage to Other Services	40%	30%	20%	8%	24%	22%	34%	18%	24%	30%	36%	10%
2.3.Empowerment												
Collective Action	32%	20%	24%	24%	18%	18%	24%	38%	16%	32%	36%	12%
Decision Taking	64%	18%	6%	10%	48%	16%	24%	12%	54%	26%	12%	2%
Positive Change	26%	14%	24%	32%	8%	14%	36%	40%	34%	32%	20%	2%
3.1. Economic Resilience												
Income Increase	48%	18%	18%	14%	8%	20%	44%	26%	2%	16%	48%	34%
Income Stability	44%	14%	26%	12%	18%	18%	42%	20%	24%	20%	30%	22%
3.2. Environmental Integrity												
Environmental Performance	18%	20%	22%	40%	30%	10%	30%	30%	32%	16%	38%	12%
Biodiversity	28%	20%	30%	20%	36%	6%	28%	30%	62%	14%	10%	4%
Water Management	26%	26%	26%	22%	42%	18%	22%	18%	16%	8%	28%	48%
3.3. Social Well-Being												
Improved Health	36%	16%	22%	22%	42%	14%	28%	16%	28%	14%	40%	12%
Improved Nutrition	46%	22%	16%	12%	50%	12%	20%	18%	58%	26%	8%	4%