

## IMPACT EVALUATION AS A LEARNING AND ACCOUNTABILITY TOOL FOR AGRICULTURAL EXTENSION PROGRAMMES: CHALLENGES AND PROSPECTS

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### ABSTRACT

Based on an analysis of impact evaluation studies conducted in sub-Saharan Africa, this paper attempts to identify challenges and future prospects for impact evaluation of agricultural extension. The results show that most of the evaluations reported positive impacts. This positive finding is not in line with mixed reports on agricultural productivity in general and conflicting reports on extension performance. There are various reasons for the contradictory results. These may be because of poor impact evaluation methodologies or a lack of baseline and reliable data and insufficient capacity. Due to these challenges and the shift in agricultural research and extension approaches, it is recommended that rather than investing effort in trying to prove impact,

greater attention should be given to improving impact as well as using other innovative monitoring and evaluation and learning tools that consider the dynamic nature of agricultural development.

**KEY WORDS:** *BASELINE DATA, CONTRADICTION RESULTS, INNOVATIVE M&E, METHODOLOGIES, POSITIVE*

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## INTRODUCTION AND OBJECTIVES

Agricultural extension has long been seen as a key element for enabling farmers to obtain information and technologies that can improve their livelihoods (Purcell and Anderson, 1997) and is recognised as an important factor in promoting agricultural development (Birkhaeuser *et al.*, 1991; Anderson and Feder, 2007). From a development policy perspective, investments in extension services are considered as potentially important tools for improving agricultural productivity and increasing farmers' incomes (Anderson, 2007). Consequently, sub-Saharan African (SSA) countries have been implementing various agricultural extension programmes to improve agricultural production and productivity, farm income and rural livelihoods. Agricultural extension theories have shown changes over time based on changes in agricultural development paradigms.

Impact evaluation is an attempt to establish a causal relationship between an intervention and a change in outcomes. It serves two purposes: accountability and learning. It helps to identify whether programmes have brought the intended impact or not, and improve programme effectiveness by learning from successes and failures. However, if impact evaluations are not conducted appropriately, it could lead to wrong conclusions, which may lead to wrong decisions.

Tracing the causal relationship between extension input and its impact is difficult

(Anderson, 2007; Anandajayasekeram *et al.*, 2008; Davis, 2008). Despite this, several evaluations have been conducted on agricultural extension programmes in SSA by various parties. This paper, based on analysis of some impact evaluation studies conducted in SSA, attempts to identify challenges and future prospects of impact evaluation of agricultural extension programmes in the region.

## MATERIALS, METHODS AND DATA SOURCES

A total of 21 impact evaluation results from 10 countries were collected from various websites for the analysis. In addition, agricultural productivity trends reported by various authors were sourced from the internet. This study is mainly based on qualitative analysis. The quantitative data are analysed using simple descriptive statistics such as percentages.

## RESULTS AND DISCUSSION

### Agricultural production and productivity in SSA

Most researchers agree that the performance of the agricultural sector in SSA has been disappointing. Its annual growth rate was only 1.9% during 1965–80 and fell to 1.7% during 1980–92. Per capita cereal production consistently declined from 169 kg in 1970, to 140 in 1993 (Kahan and Kahan, 1995). Haggblade and Hazell (2010) reported that per capita agricultural production has been declining in Africa over the

past 45 years. The continent has changed from a food exporter to a net food importer. It is reported that yields per ha are stagnant, particularly for cereals, in contrast to substantial yield increases in other regions of the world in the period 1960 to 2005 (Staatz and Dembele, 2007). If yield per ha is stagnant then the yield production growth is mainly due to area expansion, and there is limited technological change in the agriculture sector.

### Agricultural extension impact evaluations

Despite the fact that agricultural productivity in SSA is lagging behind the rest of the world, the majority of impact evaluations conducted in the region have reported a positive impact of agricultural extension programmes. From the 21 impact evaluation results analysed, 15 (71%) impact evaluation studies reported a positive impact (Table 1). Similar findings are reported in other reviews. For instance, from 48 studies of extension reviewed by Birkhaeuser *et al.* (1991), 36 (75%) showed significantly positive results. In addition, high rates of return to extension in the range of 13–500% were reported in various impact evaluation studies including Birkhaeuser *et al.* (1991).

Apart from the impact evaluation results, which are inconsistent with the agricultural growth trend in the region, some of the impact evaluation studies are also contradictory. Bindlish and Evenson (1997) in their study of the T&V programme reported a high and significant rate of return to extension in



**TABLE 1: RESULTS OF IMPACT EVALUATIONS BY AGRICULTURAL EXTENSION MODELS/APPROACHES**

No.	Extension models/ approaches	Impact status	
		Significant/satisfactory impact	Non significant/ satisfactory impact
1	Training & visit (T&V)	5	3
2	National agricultural advisory services (NAADS)	2	1
3	Participatory demonstration and training extension system (PADETES)	1	1
4	FFS (farmer field schools)	2	1
5	Others	5	
6	<b>Total</b>	<b>15</b>	<b>6</b>

Kenya, while Gautam and Anderson (1999) stated that this finding was invalid and the rate of return was not significant. Similarly, while Ayele *et al.* (2005) and IFPRI (2008) reported a positive and significant effect of extension in Ethiopia, another study conducted by EEA/EEPRI (2006) asserted that the Ethiopian extension programme suffered from various problems and its impact on farm income, productivity, food security and poverty was not significant.

Due to exaggerations and contradictions of similar reports, some researchers are sceptical about the results of evaluation studies conducted in sub-Saharan Africa (Davis, 2008). We need to discover the reasons for such contradictions and exaggerations in impact evaluation studies conducted on agricultural extension programmes in the region.

### Challenges in agricultural extension impact evaluations

There are various challenges that affect the results of impact evaluation of agricultural extension programmes.

### The nature of agriculture

Agriculture, especially in sub-Saharan African countries, is highly dependent on nature and it is typically complex, diverse and risk-prone. Agricultural production and productivity depends on various natural factors, such as season, agro-ecology, climate, soil type, water availability, rainfall pattern, pests and diseases etc., which vary over time and space. The impact of agricultural extension programmes could be over or underestimated if these effects are not controlled.

### The nature of extension

Extension refers to the conscious use of communication of information to help people form sound opinions and make good decisions (van den Ban and Hawkins, 1996). The adoption of technologies and better practices is the core of extension interventions. Target farmers in extension must pass through a certain process before achieving their ultimate goal of improving productivity. The sequence includes awareness, knowledge, adoption of technology or practice and change in farmers' productivity (FAO, 1997). There are various extension methods used (extension contacts, meetings, mass media, demonstrations etc.) and informal networks where technologies, knowledge and practices diffuse to other farmers. The following are challenges of extension impact evaluations that emanate from these and related aspects of the nature of extension.

**Lack of comparable control group:** Agricultural extension programmes are usually run nationwide and it is difficult to establish control groups (or exclude some people from the benefits in order to establish a control group) from operational and ethical considerations. Furthermore, there is always spillover of technology, knowledge and information from programme beneficiaries to non-beneficiaries, making it hard to find an 'uncontaminated' counterfactual. Sometimes evaluators use non-



participants as a control group. This may lead evaluators to two types of erroneous conclusions.

- There is non-significant impact: as information, knowledge and technology diffuse from participant to non-participants, the difference in outcome between the two groups could be similar. This leads to a conclusion that there is small or non-significant impact of the intervention.
- There is significant impact: when selecting control groups for impact evaluation, they are expected to be comparable to the treatment group. This means both should be similar in other parameters, except in the use of the information, knowledge and technologies of the extension programme. Extension programmes don't usually have restrictions and are available to every farmer. Hence, if the technology is good, most farmers will adopt it, except those farmers known as 'laggards'. These segments of the population are not expected to perform well, even in the absence of extension programmes. That means there are other individual factors that differentiate the beneficiary and non-beneficiary groups other than the extension programme, which exaggerates the net impact.

**Selection bias:** Differences in the outcome due to pre-existing differences between the treatment and control groups that cannot be attributed to the intervention are known as selection bias. People's involvement in agricultural extension programmes is based on interest and resource availability.

Additionally, the ability to try new technology requires the capacity to take risks. The better-off and the educated generally have more information access and risk-taking capacity. These people are likely to be successful even without the extension programme intervention. This will exaggerate the impact of the intervention. There is also de-selection bias, which is the opposite of the above discussion.

**Endogeneity in extension–farmer interaction:** Extension contact, which plays a central role in the success of extension programmes, is affected by farmers' characteristics and actions. For instance, more productive farmers tend to seek more extension contacts and get more information and technologies than others. Similarly, extension agents also may seek contacts with model farmers who are good performers, even in the absence of extension contacts. In this case, estimating the impact of extension programmes could be biased upward, which is attributed to the superior characteristics and actions of farmers.

**Other sources of information and technology:** There are other sources of information and technology apart from the extension programme, available to farmers. Farmers use various technologies from the market and/or information they get from other media to improve their productivity. It is not easy to differentiate between the impact of technologies disseminated by the extension programme and those from other sources. This is particularly difficult in SSA where

most farmers are uneducated and cannot easily identify the technology provider. Hence, the impact of the extension intervention under evaluation may be exaggerated.

**Effective support services:** The success of extension programmes depends on relevant and appropriate technology (research), timely provision of inputs, market outlets for agricultural produce, transportation facilities, credit services, etc. Success/failure of these services is related to the success/failure of extension programmes. Unless their effects are controlled, under or overestimation of the effects of investment in extension services may occur.

### **The nature of impact evaluation**

Impact evaluation is about attribution. Many suggest that it is difficult to attribute a change in outcomes to a specific intervention, since there are so many different factors involved (White, 2009). One of the challenges of impact evaluators is to control the extraneous and design effects for estimating the net impact, which could be attributed to the interventions.

The other inherent challenge in impact evaluation is estimating the counterfactual. This is what would have happened to those receiving the intervention if they had not received the programme. This requires control groups, which need to be exactly similar to the treatment group, except for the intervention.



### Methodological factors

**Indicators used to measure outcomes:** This is related to the definition of impact evaluation. There are two debating definitions given for impact evaluation. The first definition of 'impact' refers to the final level of the causal chain. On the other hand, others working in impact evaluation define impact as the difference in the indicator of interest ( $Y$ ) with the intervention ( $Y_1$ ) and without the intervention ( $Y_0$ ). That is,  $\text{impact} = Y_1 - Y_0$ . In this sense, impact evaluation is a study, which tackles the issue of attribution by identifying the counterfactual value of  $Y$  ( $Y_0$ ) in a rigorous manner. The two definitions could overlap if  $Y$  is an outcome indicator.

In agricultural extension programmes, the knowledge and information acquired is an output, adoption of technologies is an outcome and a change in productivity is the final impact. Most impact evaluation studies focus on one or two of these objectives, but not the whole process (FAO, 1997). However, according to White (2009) the job of a quality impact evaluation is to trace the causal chain, from inputs to outcomes and impacts. Hence, the final outcome in extension programmes should be measured in terms of productivity. Measuring extension impact by using change in knowledge and awareness (e.g., Oleru *et al.*, 2005) would exaggerate the impact of extension programmes. Other indicators are used that are not related to extension e.g., in Ethiopia extension

effectiveness is measured using input distributed (Spileman, 2008).

**Impact evaluation designs:** Experimental and quasi-experimental designs are termed as rigorous, even if the former is more rigorous. However, impact evaluations in SSA have shortfalls in using these evaluation designs, which lead to under or overestimation of real impacts.

**Sampling:** The sample should be random and large enough so that it represents the population and provides adequate statistical power. However, impact evaluation studies in SSA either concentrate in successful areas or the samples are not representative, are too small in size and don't have enough statistical power to give valid conclusions. For example, IFPRI (2008) reported a positive impact of extension in Ethiopia based on the analysis of 15 villages, from a country where there are thousands of villages.

**Statistical analysis:** Regression techniques are the preferred method for analysis in impact evaluations so that the effects of confounding factors could be controlled. But in some impact evaluations (EEA/EEPRI, 2006) simple mean and averages are used to estimate impacts, which will over or underestimate the impact of extension programmes.

**Research design and implementation:** Poor design and implementation of the evaluation process affects the results of impact evaluations. Design effects that include factors observed in the research process (such as errors of measurement,

sampling variations and inconsistency in data collection) could under or overestimate the results. In SSA, evaluations are carried out in a hurry using a tight schedule because of lack of skilled manpower, budget, time and logistics and this can pose a threat to the validity of the evaluation results.

### Data related factors

**Lack of baseline and reliable data:** In SSA it is reported that there is lack of baseline data for development projects in general and extension in particular. For example, impact evaluations conducted by EEA/EEPRI (2006) and Bindlish and Evenson (1997) haven't used baseline surveys because of absence of the same. This greatly affects the rigorousness of the impact evaluation. Besides, getting reliable data is a huge challenge in the region.

### Capacity related factors

There are various capacity related issues in SSA related to M&E in general and impact evaluation in particular.

**Shortage of skilled manpower to conduct rigorous impact evaluation:** Conducting rigorous impact evaluation requires skilled manpower in impact evaluation methodologies and sophisticated statistical methods. However, in the region there is a severe shortage of qualified manpower in the area of M&E in general and impact evaluation in particular.



**Poor M&E system:** Impact data need to be continuously collected and available for use. However there is poor capacity to collect and store quality data in these countries. The M&E system in the region is reported to be poorly organised. For instance, in the Ethiopian extension programme (PADETES) the M&E system is poor (EEA/EEPRI, 2006) and the information system is non-existent for the Kenyan national extension programme (NEP) (Bindlish and Evenson, 1997).

**Budget constraints for impact evaluation studies:** Impact evaluation requires a large budget. However, as most SSA countries are poor, impact evaluation studies are under funded. Due to this, impact evaluators rush to finish the study using small samples, within short periods of time and using less than competent professionals.

The factors and challenges detailed previously affect the validity and reliability of agricultural extension impact evaluation results in SSA. Given the contemporary shift in agricultural extension paradigms, there is a need to re-examine the practice of impact evaluation on agricultural extension programmes.

### **Future prospects of impact evaluation of agricultural extension programmes**

Conventionally, agricultural extension has been considered as a 'linear model' of innovation, where agricultural innovations are developed by research centres, which are assumed to be

transferred to farmers by public agricultural extension organisations. Current understanding is that agricultural research and extension is not a linear process, but a dynamic and complex process with institutional pluralism. Hence, current trends and changes in agricultural research and extension processes require more dynamic and systemic M&E approaches which are characterised by: use of multiple sources of knowledge; viewing extension as a co-learning process; and institutional pluralism.

Such a paradigm shift in agricultural research and extension calls for a review of M&E approaches. Creating causal relationships between interventions and outcomes will not be easy due to the complex, dynamic and institutional pluralism nature of the new agricultural extension approaches. M&E approaches, which are participatory, qualitative and focused on learning would prove useful. Likewise, due to the challenges related to impact evaluation mentioned above, there is a tendency to move from 'proving impact' to 'improving impact'. The former aims at providing conclusive evidence for donors or policy-makers and the approach taken is likely to be externally led and biased towards collecting quantitative data for accountability purposes. The latter examines how to improve practice and develop internal learning systems, with a focus on qualitative data and use of participatory tools.

### **CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS**

Various extension programmes have been launched in sub-Saharan Africa with the aim of improving agricultural production and productivity. However, agricultural production and productivity is not growing as it should be. Despite this fact, most of the impact evaluation studies conducted on agricultural extension programmes in the region have reported positive and significant impacts. This not only contradicts the reality but the impact evaluation studies also report contradictory results in a given country. The reasons for such contradictions emanate from the nature of agriculture, extension, impact evaluation and factors related to the methodologies used for impact evaluation, data and capacity.

Attribution and estimating the counterfactual are the challenges that emanate from the nature of impact evaluation itself. The challenges related to the nature of agricultural extension programmes are: spillover effects, selection biases, endogeneity in farmers' extension interactions, differentiating the effect of extension programmes from other sources of technology or information and other complementary services such as research, and the difficulty of establishing a comparable control group due to ethical and political reasons.

The complex, diverse and risk-prone nature of agriculture in sub-Saharan Africa makes it difficult to disentangle the true impact of agricultural extension



services. The definition and indicators used to measure impact, application of appropriate impact evaluation design, sample size, statistical techniques used for analysis, availability of baseline data and adequate data, and capacity of staff and availability of other resources, are all factors that affect the validity and quality of impact evaluation results.

Agricultural extension has undergone a paradigm shift, from transfer of technology (ToT) approaches to innovation system approaches, which perceive the agricultural development process as complex and dynamic and with institutional pluralism against the conventional linear and unidirectional approaches. Hence, this new paradigm requires a shift in M&E methodologies. In line with this, impact evaluation objectives should shift from proving impact to improving impact.

Building evaluation capacity, establishing appropriate M&E systems, using impact evaluation approaches in line with the reality in SSA and a change in agricultural extension approaches, using easy, less costly and flexible tools, shifting the objective of impact evaluation from proving to improving impact would certainly improve the quality and validity of impact evaluation results in the region.

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