Causes and Impacts of Various Agricultural Extension Service Strategies in Bangladesh

Abstract

Purpose: The success factors of agricultural extension are not well known. In addition, extension services are often treated as homogeneous actors in agricultural research. We intend to show the impact of different strategies in agricultural extension.

Methodology: A survey of 396 extension officers asking, for example, about the officer's strategies and the perceptions of their clients revealed important differences within the sampleand explained both the strategies and their perceived success among farmers, according to a structural equation model.

Findings: The analysis showed that extension officers who considered the knowledge of their clients to be good tended to focus on the environmental problems in agriculture and that this was taken up positively by their clients. A higher education of officers led to a stronger observance of farmers' interests. Both the institutional environment and the sociodemographic factors also influenced the choice of strategies. Younger extension workers, for example, had a stronger environmental focus than older workers.

Practical implications: A focus on environmental issues in agricultural extension seems to benefit farmers which indicates that more attention in extension should be given to ecological questions.

Theoretical implications: These findings call for a thorough exploration of different agricultural extension strategies and their success.

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Originality: According to our knowledge, this is the first distinction between the success of different extension strategies.

Keywords: extension work; Bangladesh; agriculture; strategies, success factors

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1. Introduction

Worldwide, agricultural extension workers play a crucial role in the advice of farm managers. Despite their actual and potential role in transforming agricultural systems, research on agricultural extension services remains underdeveloped, and the refinementof existing research holds significant potential. Many authors simply emphasize the important role of extension services in transferring knowledge (VanclayandLawrence 2014) and technology (Wang et al. 2020; Osumba et al. 2021), claiming that the “agricultural extension service is the fundamental guarantee of the sustainable development of agriculture” (Wang et al. 2021). This treats extension services more or less as a monolithic block, which also applies to another strain of the literature that criticises extension services as inefficient(Al-Sharafat et al. 2012; Prabhakar et al. 2019), exclusive (OfuokuandEkorhi-Robinson 2018), or non-ecological (Hayati andRezaei-Moghaddam 2006).

This paper builds on the few contributions that consider variations within extension services, such as Monfared’s(2014) study within the context of adoption studies, and Kingiri’s (2021) qualitative study. Using the well-documented case of the public agricultural extension service in Bangladesh (Afrad et al. 2019), we aim to explain variations at two different levels: the strategy chosen by a single extension worker and the perceived satisfaction of the farmer client. We aim to identify both factors that influence the strategical mix by an extension officer

and how, in turn, this strategy will impact on the satisfaction experienced by the farming client.

For this purpose, the next section lays out the theoretical framework of the studyto explain both the causes and the impacts of different extension strategies. Section 3 introduces the scope and scale of the survey and the methods used to interpret the data. Section 4 presents the results, and Section 5 concludes the paper.

2. Theoretical framework

Figure 1 summarises the underlying thought model that describes the hypothesised causal chain towards the perceived success of the extension activity. The grey middle axis dwells on two distinct bodies of literature that so far have not been interrelated. The first stream of research on which the framework builds is the literature on knowledgein agricultural consultancy work. Costa et al. (2020) highlighted the importance of understanding clients in addition to professionalism, competence, and credibility. Lopes da Costa et al. (2022) specified that it is crucial for consultants to know the competence of their clients. Mosonyi et al. (2020) considered knowledge, together with identity and power, as one of the overarching themes in management consulting. The second streamof literaturehighlights the importance of the emotional component for business-to-business relationships in general (Gillani et al. 2021; Fantinelli et al. 2023) and for consulting in particular (Handy et al. 2020). In this literature, the image of an (unwritten) psychological contract that cannot be broken without seriously damaging professional relationships is often cited.

Both bodies of literature, in a way, emphasise the relational component of consultancy. Farm managers usually have assembled an enormous body of knowledge, and any consultancy work will benefit from tapping this knowledge. The acknowledgement of the farmer's

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competencies through the consultant will be an important pre-condition for its utilisation in the consulting process. The process of consulting may follow two different patterns: consulting can be considered a mere strategy for knowledge transfer (Jacobson et al. 2005; Costa et al. 2021). In such a process, the consultant attempts to transfer theirown agenda to the farm manager. Alternatively, consulting may be understood as a process of coaching (Newton et al. 2006; Lowman 2007), in which the clients' own priorities become the goals of the consulting process (Potvin et al. 2022).

In the first case—the transfer of knowledge from the consultant to the farm manager—the agenda followed by the extension officer is also crucial. Perspectives about the different world-views between aproductivist and a multifunctional agriculture are extensive (Rønningen et al. 2012; Roche and Argent 2015; Swiergiel et al. 2018). Consultants may either approach the farm system from an economic angle orattempt to improve economic efficiency, or they may emphasise the environmental component of agricultural production to maintain the long-term productivity of the land. These are all different strategies that are partly, but not solely, influenced by the perceptions of the extension officer's clients.

The fact that the institutional environment also influences strategies is not new and has primarily been discussed in the management (DicksenandWeaver 2008; Yaibuateth et al. 2008; Ouyang et al. 2019) and marketing (Guo 2013; Wang et al. 2016) literature. However, a pertinent questionremains: Which realm of the institutional environment matters most in agricultural extension? If the researchers'strategy focus remains with the tension between a productivist and a multifunctional agriculture, then the interplay between institutional and social environments becomes important. For example, Henisz (2004) described the political impact up to radicalisations that representatives of interest groups may have on businesspersons. It can be hypothesised that contact with, for example, agricultural non-governmental organisations (NGOs) or agro-input companies has an impact on agricultural extension officers.

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Lastly, the literature is full of examples of how sociodemographic variables also have an impact on strategies, particularly in family businesses. Intergenerational commonalities and differencesin strategic approaches, for example, were identified by Matricano (2018), Sternberg (2019), and Perez-Encinas et al. (2021). Buratti et al. (2017) and Iffländer et al. (2018) identified strategic differences between female and male entrepreneurs.Peters and Brijlal (2011), Jiménez et al. (2020), and Xuan et al. (2020) showed that educational level has a measurable impact on entrepreneurs' strategyand success. These valuable insights flow into the model for extension work in agriculture (Figure 1).

Although private extension companies measure their success by profit (Mirzei et al. 2017), the most important target variable of public extension work is the success of the farm. This success, however, is not only difficult to measure (Parker 2003), but it is often mainly due to factors independent from the consultation by the extension officer. Thus far, adoption rates of certain technologies (Price et al. 2009), a general self-evaluation (Situmorang et al. 2023), or clients' satisfaction (Zare et al. 2020) with the service have been suggested. This last concept of client satisfaction is taken up in the present framework, and it is hypothesised that the choice of a particular strategy will influence this level of satisfaction. In turn, the perception of the farmer by the extension worker influences their strategy: if, for example, the farmer is considered a competent entrepreneur rather than an ignorant worker, the farmer's priorities are more likely to flow into the extension strategy.

As discussed above, this process isinfluenced by both the extension worker's own sociodemographic characteristics and the institutional environment in whichhe or she resides. The operationalisation of this framework is further discussed in the next section.

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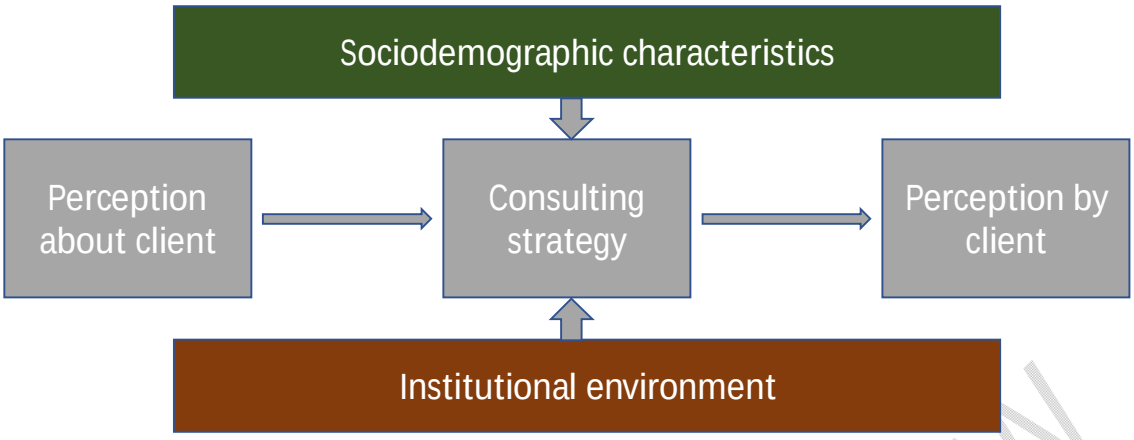

Figure 1: Conceptual framework for agricultural extension officers

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3. Methods

The availability of data about extension workers is limited, necessitating the use of a survey to collect information about the items developed above. Due to the heterogeneous literacy situation among extension workers, the survey was carried out face-to-face with a paper questionnaire during the summer months of 2023. The questionnaire had been pre-tested with five extension workers beforehand and adapted. A total of 396 extension officers were then surveyed, sampled from different regions, but all of them from the public service that strongly dominates agricultural extension services in Bangladesh (Afrad et al., 2019). Their sociodemographic characteristics, as well as the relevant information they provided, are summarised in Table 1.

The results contained in Table 1 display the composition of the variables used to operationalise the framework above. Whereas choosing the most relevant sociodemographic information was straightforward, the perception of the farmers' knowledge level required more effort.The interview schedule evaluated the following 12 items on a five-point Likert scale:

- Farmers are aware of their cultivation practices.
- They are familiar with modern varieties.
- They always maintain timely sowing and planting.
- They are familiar with soil fertility/soil health.
- They are very much eager to learn new ideas.
- They are aware of the good qualities of seeds.
- They always come to us for appropriate advice.
- They always harvest crops at the proper time.
- Farmers inform abouttheir problems regularly
- They are aware of the harmful effects of pesticides.
- They know the beneficial and harmful insects.
- They use irrigation water rationally.

Simpler indexes were used to the embeddedness in networks of agricultural extension services, including

-officers' links with the most important stakeholders in Bangladesh's agricultural system,
- officers' contact with input companies, and
- officers' intensity of exchanging with NGOs.

For the former, extension officers were asked whether they exchanged with the dealers about the proper doses of inputs, knew the farmers' problems regarding inputs, or informed themselves about new fertilisers, pesticides, and seeds.Regarding their relationships with NGOs, farmers were asked whether they visited NGO offices and whether they obtained information about NGO activities.These five items were also measured on a five-point rating scale ranging from "regularly" to "not at all".

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One of the main conceptual problems was that “perceptionby farmers,” which was identified as a crucial variable of success in extension work, could not really be measured when approaching only extension officers themselves. Therefore, an indirect measurement was chosen, asking extension officers – with the variable “Appreciate advice” – about their perception if farmers appreciated their advice.

A structural equation model was constructed that, through a series of regressions, built the framework depicted in Figure 1 with the variables displayed in Table 1. STATAversion 17 was used for this purpose.

4. Results

The descriptive statistics in Table 1 already point to a few interesting findings, including the sociodemographic profile of the extension officers. Given the fact that they should have a clear advantage in terms of knowledge if compared to the farmers they consult, they have a rather low degree of education. The share of women is still relatively low.

Table 1. Sociodemographic and other information about the respondent extension workers

Variable	Meaning	Measurement	Mean	Minimum	Maximum
Age	Officer’s age	Years	38.7	14	59
Gender	Officer’s gender	1 = male; 2 = female	1.22	1	2
Education	Officer’s level of education	1 = Basic 2 = Diploma 3 = B.A. level	1.45	1	3

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Perceptions and strategies					
Farmer perception	Perception on the farmer's knowledge level	Index based on twelve knowledge questions	39.3	16	92
Appreciate advice	Agreement on "Farmers usually appreciate my advice."	1 = strongly disagree; 5 = strongly agree	4.28	1	5
Farmers' priorities	Agreement on "In decision-making, I always consider the farmer's priorities."	1 = strongly disagree; 5 = strongly agree	4.17	1	5
Cost cutting	Agreement on "Cutting farmers' costs is my top priority."	1 = strongly disagree; 5 = strongly agree	3.70	1	5
Environmental	Agreement on "I am quite aware of environmental problems on farms and try to resolve them."	1 = strongly disagree; 5 = strongly agree	3.42	1	5
Institutional environment					
NGO interaction	Intensity of interaction with NGOs	Index based on two questions	3.69	0	8
Input dealer interaction	Intensity of interaction with	Index based on three	9.77	0	12

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	input dealers	questions			

More importantly, the descriptive results also indicate a high degree of self-confidence that extension officers possess with respect to the perceived attitude farmers have regarding their advice. On a scale of 1 and 5, the average was above 4. This also applied to the degree to which farmers' priorities played a role in the design of the extension service. It seems that extension officers usually prioritise the concepts of the farm managers him/herself over their own agendas, such as cost-cutting or environmental conservation. Another finding reflected by the descriptive results was the high engagement with input companies that the extension officers had, particularly compared to the moderate interaction with NGOs.

Figure 2, the entire structural equation model, shows both unexpected and expected results. Among the latter, it was clear that extension officerswho perceived a high level of knowledge among their clients were more careful to prioritise the objectives of farm managers.A less expected finding, however, was that officers with a high opinion of their farmers' level of knowledge also cared about resolving environmental problems.

The three different strategies identified in the survey did not all translate into more or less appreciation by the client farmers. There was, for example, no significance between the prioritisation of farmers' objectives in the extension process and perceived success. However, there was a strongly significant correlation between the emphasis on solving environmental problems and the success of the extension service.

The intensity of extension officers' interactions with input-related companies has a significantly positive impact on all three strategies. Extension officers who had many contacts with the input-trading enterprises emphasised cost-cutting, the environment, and the prioritising farmers' own wants more strongly than others. For extension officers who

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regularlywere in contact with NGOs, the impacts were more selective; theytypically had slightly less interest in a focus on production costs.

The three chosen sociodemographic characteristicsexhibited specific implications. The extension officer's age was significantly negatively correlated with environmental impact—that is, younger officers prioritised the environmental impacts of farming more strongly. Female extension officers seemed to perceive a problem having their work appreciated by (often male) farm managers. The most difficult connection arose from the different degrees of the extension officer's education. Extension officers with a high level of education were prone to adapt to the priorities of their clients.However, they were also sceptical regarding their clients' appreciationof their advice.

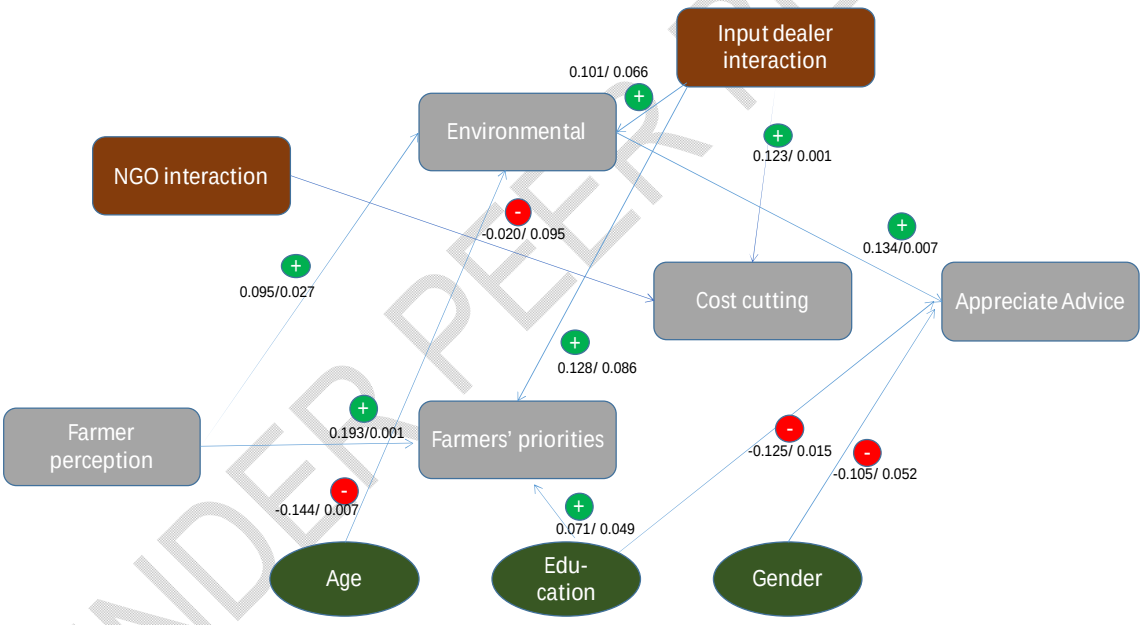

Figure 2: The structural equation model; figures display correlation coefficient/ probability of error

5. Discussion

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In general, the theoretical model developed in this study was validated. The notion that the extension officer chooses her strategy influenced, among others, by the perception she has about her clients, and that this strategy will then, in turn, influence the satisfaction of her clients, has proven to show in some empirical results.

Most visibly, the model works well regarding the issue of environmental concerns. Extension officers who perceived a high level of knowledge among their clients seemed to feel the need to direct their attention to the environmental impact of different farming practices. In turn, this seemed to be appreciated by their clients. This environmental component of the model was supported by the young age of the extension officer. This latter aspect corresponds to a streamof literature that emphasises the dominance of young people in the global environmental movement (Pickard 2019; Prendergast et al. 2021; Neas et al. 2022).

Other strategies seem to be a dead end—that is, they could be explained but did not have a measurable positive impact. Extension officers who believed in a high level of knowledge among their clients also appeared to attentively listen to their clients' priorities. However, this did not seem to be highly appreciated by their clients. Apparently, farmers also want to obtain new ideas from extension officers as they pursue their own goals. This aligns with the conclusions by Niekerk et al (2009) and Idris and Bawa (2023) that extension is not a symmetric procedure but a dissemination of knowledge.

An economic focus in the extension process could not be explained through the extension officers' perceptions of their clients. In this case, it is rather the institutional environment that comes into play. This also confirms the theoretical model developed in Section 2, confirming that the network an extension officer chooses will also have an impact on her strategy. Extension officers who were connected to input-trading companies rather than to NGOs seemed to focus primarily on cutting costs. This is another strategy that does not directly

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translate into success in spite of agricultural economists emphasizing the importance of cost control in agriculture (Hryshchuk et al., 2022).

Female officers were less positive about the appreciation of their services thanmale extension officers. This may be due to two different reasons: one is the strong gender role model, also documented in Bangladesh (Akhter et al. 2018; Begum 2021), which leads to higher scepticism by the (mostly male) world of farmers when being approached by women. Another reason is the different levels of self-confidence between genders and the dependence of thesuccess variable on self-evaluation. Many studies (e.g. Chachra and Kilgore 2009; Casale 2020; Haug et al. 2020) have confirmed a higher self-confidence among men compared to women; thus, the clients' appreciation bias may not exist in reality.

The least explicable finding was the negative impact of the extension officer's level of education on the perceived appreciation of advice. In this case, self-confidence is not an explanation,as it positivelycorrelates with the level of education (Mishra and Matilda 2015). The cultural distance between well-educated extension officers and farmers with only a basic education might be an obstacle.

6. Conclusion

This study, which aims to explain different strategies as potential success factors among farm extension workers in Bangladesh, has demonstrated unexpected results. Extension workers who consider the knowledge of their clients as good tend to focus on providing advice about environmental problems and, as a result, find their advice appreciated by their clients. This, as some others of the results presented above, underscores the caveat of considering extension services as a monolithic block in the agricultural sector. Extension workers have different value systems, beliefs, andstrategies, resulting in different outcomes.

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A beneficial endeavour would be to identify best-practice approaches in agricultural extension.In this respect, this study leaves a great deal of potential for future research, particularly with respect to environmental components that seem to be of importance for farmers, although we do not know their content or focus. In addition, the measure of success in agricultural extension relied on the officers' self-rating of their clients' appreciation of their work in our paper. Other reliable options, including direct feedback of farmer clients, could be operationalised to capture these important variables in future studies.

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