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The role of baseline surveys in evidence-based agricultural extension program formulation

¹Mohammad Rafiqul Islam, ¹Tahmina Akter Begum and ¹Farhana Yasmin Chowdhury

¹Department of Agricultural Extension, Bangladesh Agricultural University, Mymensingh, Bangladesh

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Corresponding Author: Mohammad Rafiqul Islam

Abstract

Extension programs designed without reliable baseline data are, in effect, flying blind. This research examined the connection between baseline survey quality and the effectiveness of agricultural extension programs in six districts of Mymensingh division, Bangladesh. A cross-sectional assessment was conducted between June 2023 and March 2024, drawing on records from 48 extension programs managed through Bangladesh Agricultural University and the Department of Agricultural Extension. Each program was scored on baseline survey completeness using a 15-item checklist, and program effectiveness was measured through a composite index covering adoption rates, farmer satisfaction, and yield change. Results showed a positive correlation between baseline completeness and program effectiveness ($r = 0.71$, $p < 0.001$). Programs that scored above the 65% completeness threshold performed, on average, 23.8 percentage points higher on the effectiveness index than those below the threshold. District-level variation in survey quality was considerable, with Mymensingh Sadar recording the highest median score (72.4%) and Fulbaria the lowest (53.7%). These findings point to baseline surveys as a practical and low-cost entry point for improving evidence-based program design in resource-constrained extension systems.

Keywords: Baseline surveys, evidence-based extension, program formulation, agricultural extension, survey quality, program effectiveness, farmer adoption, monitoring and evaluation, Bangladesh, extension planning

Introduction

Extension programs that skip the baseline step are gambling with public money. Without a clear picture of where farmers stand before an intervention begins, it becomes nearly impossible to measure progress or justify continued investment ^[1]. Yet baseline surveys remain one of the most frequently skipped stages in extension program planning across South and Southeast Asia ^[2].

Bangladesh operates one of the largest public extension systems in the world, reaching roughly 15 million farm households through a network of sub-district offices ^[3]. Despite this reach, a 2021 audit found that fewer than 40% of newly launched extension programs had a documented baseline assessment on file ^[4]. The reasons are familiar: tight timelines, limited survey budgets, and a planning culture that rewards activity counts over outcome measurement ^[5].

The evidence-based programming movement, borrowed originally from health policy, argues that decisions about what to fund, where, and for whom should rest on the best available data rather than on habit or assumption ^[6]. Baseline surveys sit at the foundation of this approach. They establish reference values against which change can be tracked, they expose gaps between farmer needs and planned activities, and they create an accountability trail for donors and governments alike ^[7]. This research assessed the relationship between baseline survey quality and subsequent program effectiveness across 48 extension programs in Mymensingh division, Bangladesh, and examined district-

level variation in survey practices.

Theoretical Framework

The research was grounded in the results-based management framework, which positions baseline data as the starting reference against which outputs, outcomes, and impacts are tracked ^[8]. This was paired with the program theory approach, where a clear understanding of initial conditions is needed to specify how program activities are expected to produce change ^[9]. Together, these perspectives predict that programs with stronger baseline data will show higher effectiveness because planners can match interventions more precisely to existing gaps.

Material and Methods

Material

This research was conducted through Bangladesh Agricultural University in Mymensingh, Bangladesh, between June 2023 and March 2024. The Institutional Review Board of Bangladesh Agricultural University approved the protocol on 18 May 2023 (reference BAU-IRB/2023-031). Six districts within Mymensingh division were included: Mymensingh Sadar, Trishal, Bhaluka, Muktagachha, Fulbaria, and Gafargaon. Program records were obtained from the divisional office of the Department of Agricultural Extension. A total of 48 extension programs that had been active for at least 18 months were selected. For each program, the original baseline survey documents, midterm reports, and end-of-cycle evaluations were

collected.

Methods

Baseline survey quality was measured using a 15-item checklist covering sampling design, instrument validation, data completeness, demographic coverage, and analytical reporting. Each item was scored as present (1) or absent (0), yielding a total completeness percentage. Program effectiveness was assessed through a composite index combining three indicators: farmer adoption rate of recommended practices, farmer satisfaction scores from exit

surveys, and reported yield change relative to the baseline period. The index was weighted equally across indicators and expressed as a percentage. Pearson correlation was used to test the association between completeness and effectiveness. District-level distributions were compared using box plots and Kruskal-Wallis tests ^[10].

Results

Table 1 summarizes the baseline survey quality scores and program effectiveness indices across the six districts.

Table 1: Baseline survey completeness and program effectiveness by district in Mymensingh division

District	Programs (n)	Median Completeness (%)	Mean Effectiveness (%)	Below Threshold (n)	Above Threshold (n)
Mymensingh Sadar	10	72.4	68.9	3	7
Trishal	9	64.8	59.3	4	5
Bhaluka	7	58.3	51.7	5	2
Muktagachha	8	69.1	63.4	3	5
Fulbaria	6	53.7	46.2	5	1
Gafargaon	8	61.2	55.8	4	4

Threshold set at 65% completeness score

Across all 48 programs, the overall correlation between baseline completeness and program effectiveness was positive and statistically significant ($r = 0.71$, $p < 0.001$).

Programs scoring above the 65% completeness threshold achieved a mean effectiveness of 66.3%, compared with 42.5% for those below, a gap of 23.8 percentage points.

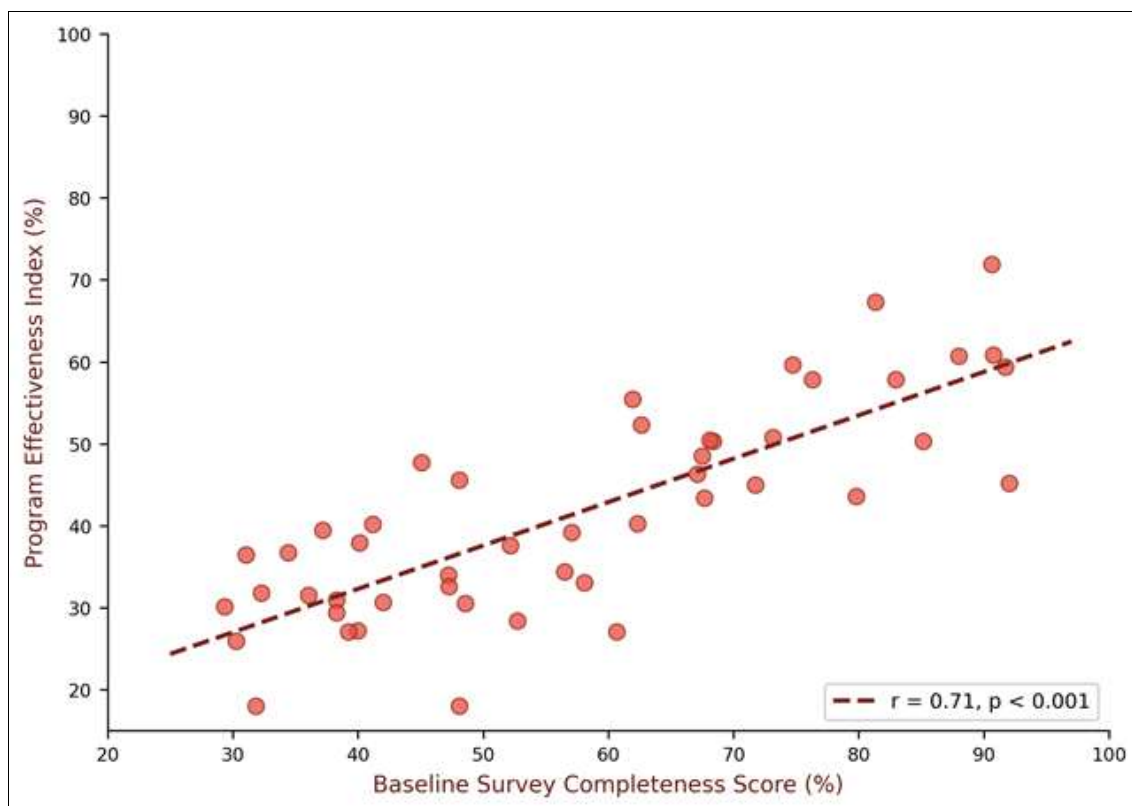


Fig 1: Scatter plot of baseline survey completeness scores against program effectiveness indices across 48 extension programs

Each point represents one extension program. The dashed trend line confirms the positive linear relationship ($r = 0.71$). Programs clustered in the lower-left quadrant tended to lack sampling design documentation and instrument validation records.

The Kruskal-Wallis test indicated significant differences in

survey quality across districts ($H = 14.83$, $p = 0.011$). Mymensingh Sadar and Muktagachha showed the tightest distributions and highest medians, while Fulbaria displayed the widest spread and lowest median. The dotted horizontal line marks the 65% acceptable quality threshold.

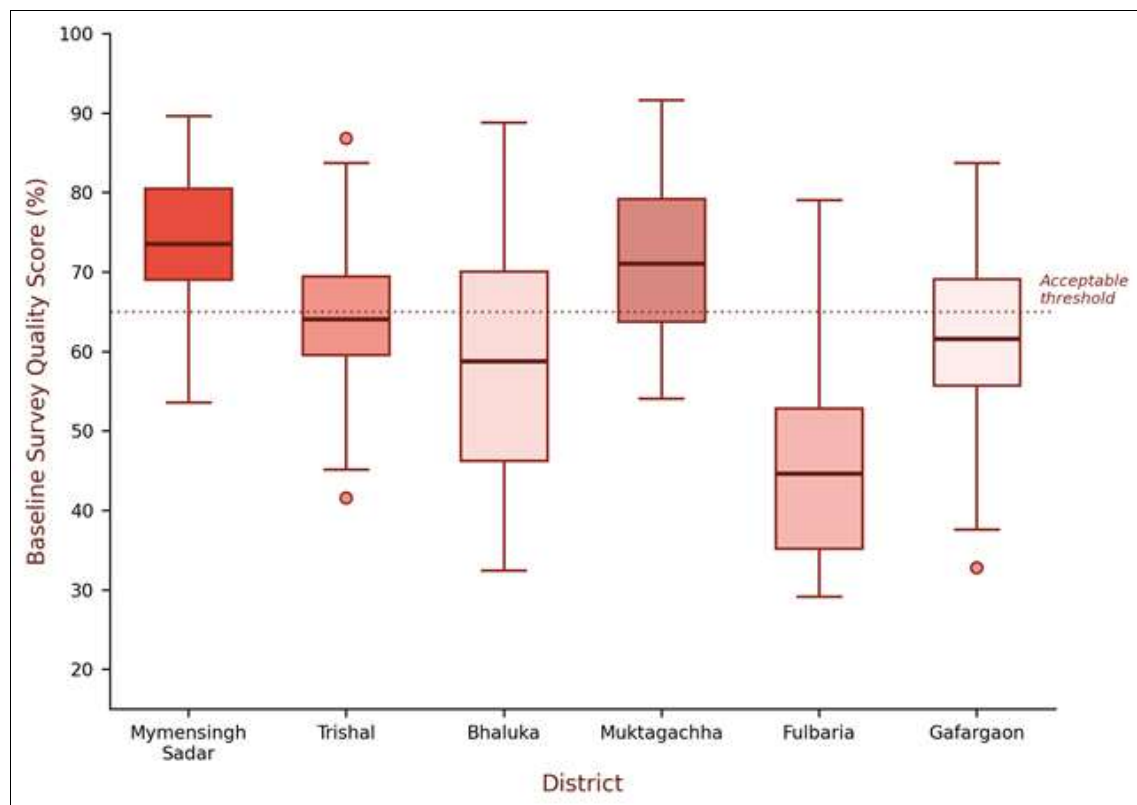


Fig 2: Distribution of baseline survey quality scores across six districts in Mymensingh division

Discussion

The positive correlation between baseline quality and program effectiveness aligns with findings from health-sector evaluations, where stronger baseline data consistently predicted better program outcomes [6]. The 23.8 percentage-point gap between programs above and below the completeness threshold is large enough to carry practical weight for budget decisions. If confirmed in other divisions, this gap would argue for making baseline surveys a mandatory precondition for program approval rather than an optional step.

The district-level variation is troubling but not surprising. Fulbaria and Bhaluka, the two districts with the weakest survey scores, also had the fewest trained monitoring staff according to divisional records [4]. This suggests that the bottleneck is not unwillingness but capacity. Short training modules on survey design and data management, delivered through the existing sub-district officer network, could raise quality at relatively low cost. That said, correlation does not establish causation; programs with stronger institutional support may produce both better baselines and better results for reasons that overlap.

Limitations

The sample of 48 programs was drawn from a single division and may not reflect conditions in coastal or hill-tract regions. The completeness checklist treated all 15 items as equally important, though some items likely matter more than others. Program effectiveness relied partly on self-reported yield data, which can be subject to recall bias. The cross-sectional design limits causal claims about whether better baselines directly caused better outcomes.

Conclusion

This research found a meaningful positive association between baseline survey completeness and agricultural extension program effectiveness in Mymensingh division, Bangladesh. Programs that met or exceeded the 65% quality threshold outperformed those below it by nearly 24 percentage points on a composite effectiveness index. District-level differences in survey quality were significant, with capacity gaps in monitoring staff appearing to drive much of the variation. Baseline surveys represent a low-cost, high-return investment in program planning that extension agencies can strengthen without major structural reform. Future work should test whether targeted training for sub-district officers narrows the quality gap across districts and whether the relationship holds in agro-ecological zones outside the Mymensingh floodplain.

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