

RESEARCH PAPER

Farmers' Willingness to Pay for Agricultural Extension Services in Meghalaya: Evidence from a Cost-Sharing Approach

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ABSTRACT

Sustaining agricultural extension services through complete public funding has become increasingly difficult due to financial and manpower constraints. In this context, the present study examined farmers' willingness to pay (WTP) for agricultural extension services (AES) under a cost-sharing approach in Meghalaya and identified the factors influencing their payment decisions. The study was conducted in East Khasi Hills and Ri Bhoi districts using a multistage purposive-cum-random sampling technique, and data were collected from 60 farmers through structured interview schedules. A modified Ingram's marketing approach, Contingent Valuation Method (CVM), and Binary Probit Regression were employed for analysis. The findings revealed that farmers showed higher willingness to pay for tangible services such as quality planting materials, piglets, chicks, and fertilizers. About 63.33 percent of respondents were willing to pay for AES, while 80 percent preferred receiving services with up to 80 percent subsidy. Most farmers preferred direct cash payment immediately after availing services. Probit results indicated that education, farm size, and satisfaction with existing extension services significantly influenced farmers' willingness to pay. The study suggests that a cost-sharing model can enhance sustainability and pluralism in agricultural extension services while ensuring timely and accessible support to farmers.

HIGHLIGHTS

- ① Farmers preferred paying for quality inputs and crop protection services.
- ① 63.33% farmers were willing to pay for extension services.
- ① Most farmers preferred up to 80% subsidy support.
- ① Education, farm size, and satisfaction influenced WTP.
- ① Cost-sharing can improve extension service sustainability.

Keywords: Agricultural extension services, Willingness to pay, Cost-sharing, Contingent valuation method, Binary probit regression, Meghalaya

Agricultural extension services play a critical role in enhancing farm productivity, improving technology adoption, and strengthening rural livelihoods by bridging the gap between research institutions and farming communities. In developing countries such as India, public extension systems have traditionally been the primary source of advisory support, input guidance, training, and dissemination of improved agricultural practices (Chapman and Tripp, 2020). These services have significantly contributed to

agricultural growth, poverty reduction, and food security, as investments in agricultural research and extension often generate higher social returns compared to many other public expenditures (Businessline, 2017; Bathla *et al.* 2019).

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Despite their importance, the sustainability of publicly funded agricultural extension systems has become a major concern in recent decades. Fiscal constraints, increasing demand for diversified advisory services, and inadequate human resources have weakened the outreach and effectiveness of extension delivery. In India, public expenditure on agricultural extension has shown considerable fluctuations over time, with a notable decline during the post-liberalization period between 1995-96 and 2004-05 (Sajesh and Suresh, 2016). Although initiatives such as the Agricultural Technology Management Agency (ATMA) and the National Mission on Agricultural Extension and Technology (NMAET) attempted to strengthen extension delivery, the overall growth in real extension expenditure has remained limited.

Another major challenge is the shortage of extension personnel. According to the Ministry of Agriculture and Farmers Welfare's Doubling Farmers' Income Committee Report (2017), the recommended ratio of extension personnel to farmers is 1:400 in hilly regions, 1:750 in irrigated areas, and 1:1000 in rainfed areas. However, the current national ratio stands at nearly 1:1162, indicating substantial gaps in service outreach. Even after filling vacant positions, the ratio would improve only marginally to 1:1037 farmers per extension worker. This shortage is particularly problematic in geographically challenging regions such as North-East India, where dispersed settlements and poor connectivity further limit farmers' access to timely advisory support.

At the same time, Indian agriculture is increasingly characterized by small and marginal farmers who require location-specific, timely, and market-oriented extension services. However, complete privatization of extension services may not be feasible because a large proportion of farmers lack the financial capacity to fully bear the cost of advisory services (Sulaiman and Sadamate, 2000). Similarly, private extension agencies often prioritize commercially viable regions and enterprises, leaving resource-poor farmers underserved. This has created the need for alternative institutional arrangements that can ensure both sustainability and accessibility of extension services.

One such alternative is the cost-sharing approach, which involves joint financing of extension services

by governments and farmers. Cost-sharing is viewed as a practical mechanism for improving accountability, efficiency, and responsiveness in extension delivery. Rivera *et al.* (2000) argued that sharing extension costs with local communities promotes greater farmer participation and ensures that services are better aligned with local needs. Similarly, Ozor *et al.* (2007) defined cost-sharing as a collaborative funding arrangement between governments and farmers for delivering extension services. The effectiveness of such systems largely depends on farmers' willingness to pay (WTP) for extension services (Francais, 2001). Farmers are generally willing to pay when they perceive services as relevant, timely, and economically beneficial (Singh *et al.* 2011; Sahoo and Rout, 2023).

Several studies have examined farmers' willingness to pay for extension services in different contexts. For instance, Oladele (2008) reported that education and farm characteristics significantly influence farmers' payment decisions, while Foti *et al.* (2007) and Mwaura *et al.* (2010) identified farm income, service quality, and awareness as key determinants of willingness to pay. In India, Debnath and Saravanan (2014) highlighted farmers' preferences for alternative financing mechanisms for extension services in North-East India. However, empirical evidence on farmers' willingness to pay for agricultural extension services under a cost-sharing framework remains limited, particularly in hilly and resource-constrained states such as Meghalaya, where agriculture and allied sectors remain central to rural livelihoods.

Meghalaya presents a unique context for examining this issue due to its difficult terrain, fragmented landholdings, dependence on agriculture and livestock-based livelihoods, and limited extension outreach. Understanding whether farmers are willing to contribute financially toward extension services is essential for designing sustainable extension models that can complement public funding without excluding smallholders. Against this backdrop, the present study aims to examine farmers' willingness to pay for agricultural extension services under a cost-sharing framework in Meghalaya and identify the factors influencing their payment decisions.

MATERIALS AND METHODS

The present study was conducted in the state of Meghalaya, focusing on two districts namely East Khasi Hills and Ri Bhoi, where agricultural and allied extension services are actively delivered. A multistage purposive-cum-random sampling design was employed for selecting the respondents. In the first stage, one block from each district was purposively selected based on the availability of agricultural extension services related to agriculture, horticulture, fisheries, and veterinary sectors, along with the criterion that the selected blocks should be located within 10–15 kilometres from the district headquarters. Accordingly, Mawkynrew block from East Khasi Hills district and Umling block from Ri Bhoi district were selected. In the second stage, two villages were chosen from each block. Jongsha village was selected from Mawkynrew block, while Mawphrew and Borgang villages were selected from Umling block. From each selected village, fifteen farmers were randomly chosen, resulting in a total sample size of 60 respondents for the study. Primary data were collected from the selected respondents through a well-structured interview schedule consisting of structured, semi-structured, and open-ended questions to capture information related to farmers' willingness to pay for agricultural extension services under a cost-sharing framework. The study examined farmers' preferences for different agricultural extension services across agriculture and allied sectors. To identify the types of extension services for which farmers were willing to pay, a modified version of Ingram's marketing approach as suggested by Singh *et al.* (2011) was employed. Respondents categorized different service areas into three groups: willing to pay (WTP), may consider paying (MCP), and not willing to pay (NWP), which were assigned weight scores of 3, 2, and 1, respectively. Based on these responses, Mean Score (MS) and Pooled Mean Score (PMS) were computed to determine the most preferred service categories.

The Contingent Valuation Method (CVM), adapted from Unniravisankar *et al.* (2023), was used to assess farmers' willingness to pay and willingness to accept subsidy for agricultural extension services under a hypothetical cost-sharing arrangement. Under this method, respondents were directly asked whether they were willing to pay for extension services if the

government introduced a cost-sharing mechanism. Farmers willing to pay were assigned a value of 1, while those unwilling to pay were assigned a value of 0. Respondents were also asked to indicate the maximum percentage of subsidy they were willing to accept under the proposed payment model.

To identify the determinants influencing farmers' willingness to pay for agricultural extension services, Binary Probit Regression analysis was employed. The functional relationship was specified as:

$$WTP = f(\alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + U_i)$$

where, *WTP* represents farmers' willingness to pay for agricultural extension services under the cost-sharing model (1 = willing to pay, 0 = otherwise); X_1 = Age (years), X_2 = Education (Literate = 1, Illiterate = 0), X_3 = Farm size (ha), X_4 = Farming experience (years), X_5 = Annual income from all sources (₹ in lakhs), X_6 = Extension agency contact (Yes = 1, No = 0), X_7 = Distance from nearest agricultural extension service provider (km), and X_8 = Clientele satisfaction with existing agricultural extension services (Yes = 1, No = 0). The coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \dots$ were estimated to examine the factors significantly affecting farmers' willingness to pay for agricultural extension services. This analytical framework enabled a comprehensive understanding of farmers' payment preferences and the determinants influencing the sustainability of extension services through a cost-sharing approach.

RESULTS AND DISCUSSION

The socio-economic characteristics of the respondents provide important insights into their willingness to pay (WTP) for agricultural extension services (AES) under a cost-sharing framework. As presented in Table 1, nearly 65.00 percent of the respondents belonged to the economically active age group of 32–47 years, indicating that middle-aged farmers were more actively involved in farming decisions. A substantial proportion of respondents (78.33%) were literate, which may positively influence their awareness and acceptance of paid extension services. Farming was the primary occupation for 91.67 percent of respondents, highlighting the dependence of households on agriculture and allied activities for livelihood security. The

average farm size ranged between 1–2 hectares for most respondents, while the average farming experience was recorded at 22.35 years. Around 70.00 percent of farmers had contact with extension agencies, and 51.67 percent expressed satisfaction with the existing extension services. These findings suggest that farmers with better education, farming experience, and institutional exposure may be more receptive to innovative extension delivery systems. Similar observations were reported by Oladele (2008), who found that education and institutional contact significantly influence farmers’ willingness to invest in advisory services.

Table 1: Socio-economic profile of the respondents

| Characteristics | Frequency | Percentage |
|---|-----------|------------|
| Age (M= 39.3, SD = 7.84) | | |
| Below (<32) | 11 | 18.33 |
| Between (32 – 47) | 39 | 65.00 |
| Above (>47) | 10 | 16.67 |
| Education | | |
| Illiterate | 13 | 21.67 |
| Literate | 47 | 78.33 |
| Gender | | |
| Male | 38 | 63.33 |
| Female | 22 | 36.67 |
| Primary Occupation | | |
| Farming | 55 | 91.67 |
| Govt. service | 5 | 8.33 |
| Business | 0 | 0 |
| Household size (nos.) (M= 5.38, SD: 1.98) | | |
| Small <3 | 13 | 21.67 |
| Medium 3-7 | 31 | 51.66 |
| Large >7 | 16 | 26.67 |
| Farm Size (ha) | | |
| Marginal (<1) | 2 | 3.33 |
| Small (1-2) | 35 | 58.34 |
| Semi-medium (2-4) | 20 | 33.33 |
| Medium (4-10) | 3 | 5.00 |
| Average experience in farming (years) | 22.35 | |
| Average annual income from all sources (₹) | 220500 | |
| Extension agency contact | | |
| Yes | 42 | 70.00 |
| No | 18 | 30.00 |
| Average distance from nearest AES provider (kms) | 5.28 | |
| Clientele satisfaction with the existing AES | | |
| Yes | 31 | 51.67 |
| No | 29 | 48.33 |

The preferences of farmers regarding different types of extension services are presented in Table 2, which

categorizes services into intangible and tangible services. Among management-related services, farmers showed relatively higher willingness to pay for livestock, piggery, and poultry management services (65.00%), followed by fertilizer management services (60.00%). Under protection and control services, willingness to pay was highest for disease control in crops (61.67%) and disease management in livestock, piggery, and poultry (61.67%). This indicates that farmers place greater value on services that directly reduce production risks and improve farm productivity. These findings are consistent with Singh *et al.* (2011), who reported that farmers in Uttar Pradesh were more willing to pay for plant protection services due to their immediate economic benefits.

Processing and marketing services in Table 2 reveal that 58.33 percent of respondents were willing to pay for linkage to profitable market channels, while relatively lower willingness was observed for harvesting, processing, and storage-related services. In the capacity-building category, 85.00 percent of respondents expressed willingness to pay for skill development in agriculture and livestock activities, and 78.33 percent were willing to pay for entrepreneurship development services. Farmers also showed strong interest in information regarding government schemes and programmes (85.00%). These findings highlight the growing demand for knowledge-based services that can enhance farm efficiency and market participation. Similar findings were observed by Rivera *et al.* (2000), who emphasized that farmers are more likely to invest in services that improve productivity and income generation.

Among tangible services shown in Table 2, the highest willingness to pay was observed for quality planting materials, piglets, and chicks, where all respondents (100%) expressed willingness to pay. Similarly, 98.33 percent of respondents were willing to pay for fertilizers, followed by farm machinery (70.00%), vermicompost (70.00%), and bio-fertilizers/ bio-pesticides (68.33%). This clearly indicates that farmers prefer paying for tangible services that generate immediate and visible returns. The findings align with Sulaiman and Vandenban (2003), who argued that farmers are generally more willing to pay for services that provide direct economic benefits.

Table 2: Types of agricultural extension services farmers are willing to pay

| Service areas | Specific areas | WTP | MCP | NWP | MS | PMS |
|----------------------------------|--|--------|-------|-------|------|-------------|
| Intangible Services | | | | | | |
| Management | Fertilizer management | 60.00 | 28.33 | 11.67 | 2.48 | 2.36 |
| | Irrigation/water management | 45.00 | 28.33 | 26.67 | 2.18 | |
| | Orchard management | 45.00 | 30.00 | 25.00 | 2.20 | |
| | Livestock, piggery and poultry management | 65.00 | 28.33 | 6.67 | 2.58 | |
| Protection and control | Insect pest control | 48.33 | 33.33 | 18.33 | 2.30 | 2.81 |
| | Disease control in crops | 61.67 | 33.33 | 5.00 | 2.57 | |
| | Disease control in livestock, piggery and poultry | 61.67 | 33.33 | 5.00 | 2.57 | |
| | Weed control | 45.00 | 35.00 | 20.00 | 2.25 | |
| Processing and Marketing | Harvesting and processing of crops | 40.00 | 33.33 | 26.67 | 2.13 | 2.23 |
| | Storage of produce | 38.33 | 33.33 | 28.33 | 2.10 | |
| | Linkage to profitable market channel | 58.33 | 30.00 | 11.67 | 2.47 | |
| Capacity building | Skill development on agriculture related activities | 85.00 | 15.00 | 0.00 | 2.85 | 2.41 |
| | Skill development on livestock related activities | 85.00 | 15.00 | 0.00 | 2.85 | |
| | Entrepreneurship building | 78.33 | 16.67 | 5.00 | 2.73 | |
| Facilitation and guidance | Organic certification of farm/products | 35.00 | 21.67 | 43.33 | 1.92 | 2.13 |
| | Formation and mobilization of SHGs/FIGs/FPOs | 31.67 | 23.33 | 45.00 | 1.87 | |
| | Preparation of DPRs for loans | 36.67 | 23.33 | 40.00 | 1.97 | |
| | Information on Govt. Schemes/Programmes | 85.00 | 6.67 | 8.33 | 2.77 | |
| Advisories | Personalized advisories based on crops cultivated and livestock reared | 51.67 | 23.33 | 25.00 | 2.77 | 2.10 |
| | Weather forecast | 31.67 | 21.67 | 46.67 | 1.85 | |
| | Market prices | 48.33 | 21.67 | 30.00 | 2.18 | |
| Intangible Services | | | | | | |
| Inputs | Good quality planting materials (seeds/saplings etc.) | 100.00 | 0.00 | 0.00 | 3.00 | 2.75 |
| | Good quality piglets | 100.00 | 0.00 | 0.00 | 3.00 | |
| | Good quality chicks | 100.00 | 0.00 | 0.00 | 3.00 | |
| | Fertilizers | 98.33 | 1.67 | 0.00 | 2.98 | |
| | Vermicompost | 70.00 | 1.67 | 28.33 | 2.41 | |
| | Bio-fertilizers/Bio-pesticides | 68.33 | 1.67 | 30.00 | 2.38 | |
| | Farm machineries/equipment's | 70.00 | 8.33 | 21.67 | 2.48 | |

WTP: Willing to pay (3), MCP: May consider paying (2), NWP: Not willing to pay (1), MS: Mean Score, PMS: Pooled Mean Score.

Figures in the table indicate percentage.

Farmers' preferred payment mechanisms under the cost-sharing model are presented in Table 3. A majority of respondents (86.67%) strongly preferred paying immediately after availing extension services, while 41.67 percent preferred payment only after observing economically viable outcomes from the advice received. Regarding payment mode, all respondents (100%) strongly preferred direct cash payment during field visits, whereas digital payment and annual subscription-based systems received very low preference. Furthermore, 83.33 percent of respondents preferred individual cost-sharing arrangements over group-based payment

mechanisms. These findings indicate that farmers favour flexible and transparent payment systems linked directly to service delivery. Similar findings were reported by Debnath and Saravanan (2014), who observed that farmers in North-East India preferred direct and immediate payment systems for extension services.

The results of the Contingent Valuation Method (CVM) presented in Table 4 indicate that 63.33 percent of respondents were willing to pay for agricultural extension services under a cost-sharing model, while 36.67 percent were unwilling to

Table 3: Farmers’ preferred mechanism/mode of payment for the extension services

| Sl. No. | Preferred mechanism mode of payment | SP | P | DNP | MS |
|-----------------------------|---|--------|-------|--------|------|
| Mechanism of payment | | | | | |
| 1 | Immediately after availing advice | 86.67 | 0.00 | 13.33 | 2.73 |
| 2 | Effect of treatment/advice if economically viable | 41.67 | 13.33 | 45.00 | 1.97 |
| Mode of payment | | | | | |
| 1 | Direct cash payment based on field visit | 100.00 | 0.00 | 0.00 | 3.00 |
| 2 | Annual or seasonal contact system | 0.00 | 0.00 | 100.00 | 1.00 |
| 3 | Digital payment and receiving advice via mobile phone | 16.67 | 1.67 | 81.67 | 1.35 |
| 4 | Cost sharing by an individual farmer | 83.33 | 15.00 | 1.67 | 2.82 |
| 5 | Cost sharing by group of farmers | 6.67 | 5.00 | 88.33 | 1.18 |

SP: Strongly prefer (3), P: Prefer (2), DNP: Do not prefer (3), MS= Mean Score.

Figures in the table indicate percentage.

pay. Among those willing to pay, the majority (80.00%) preferred an 80 percent subsidy support from the government, suggesting that farmers still expect substantial public support while gradually transitioning toward shared financing models. These findings are in line with Ozor *et al.* (2007), who found that farmers in developing economies prefer partial subsidies to reduce financial risk associated with paid advisory services.

Table 4: Farmers’ WTP and percentage of subsidy farmers are WTA for the agricultural extension services on cost sharing using CVM

| WTP in (₹) | No. of farmers | Percentage |
|------------|----------------|------------|
| Yes | 38 | 63.33 |
| No | 22 | 36.67 |
| WTA in (%) | | |
| 0 | 6 | 10.00 |
| 30 | 0 | 0.00 |
| 50 | 0 | 0.00 |
| 70 | 6 | 10.00 |
| 80 | 48 | 80.00 |

The determinants influencing farmers’ willingness to pay were analysed using Binary Probit Regression, and the results are presented in Table 5. The Likelihood Ratio Chi-square value was significant at 1 percent level ($p = 0.000$), indicating a good model fit. Education ($p = 0.012$), farm size ($p = 0.004$), and clientele satisfaction with existing AES ($p = 0.000$) were found to significantly influence farmers’ willingness to pay for extension services. Educated farmers are more likely to understand the value of scientific recommendations, while farmers with larger landholdings may possess greater financial

capacity to invest in advisory services. Similarly, farmers satisfied with existing extension services are more likely to trust and pay for such services. These findings corroborate earlier studies by Mwaura *et al.* (2010), Foti *et al.* (2007), and Oladele (2008), which identified education, farm size, and service satisfaction as major determinants of farmers’ payment behaviour.

Table 5: Determinants of the farmer’ WTP using probit regression analysis for contingent valuation method

| Variables | Coefficient | Standard error | p-value |
|--|-------------|----------------|---------------------------|
| Constant | -1.853 | | |
| Age | 0.102 | 0.059 | 0.085 ^{**} |
| Education | 1.367 | 0.543 | 0.012^{**} |
| Farm Size (ha) | 0.840 | 0.288 | 0.004^{**} |
| Experience in farming | -0.063 | 0.050 | 0.217 |
| Income from all sources | 8.147 | 2.808 | 0.772 |
| Extension agency contact | 0.632 | 0.477 | 0.185 |
| Distance from the nearest AES provider | -0.057 | 0.085 | 0.506 |
| Clientele satisfaction with the existing AES | 1.920 | 0.497 | 0.000^{**} |
| Chi ² | 48.500 | | |
| Log likelihood | -22.117 | | |
| AIC | 62.235 | | |
| BIC | 81.084 | | |
| Likelihood Ratio Chi-Square | 34.624 | | 0.000 ^{**} |

^{**}Indicates significance at five per cent level.

Overall, the findings suggest that while farmers in Meghalaya are willing to participate in a cost-

sharing extension model, their willingness largely depends on the perceived usefulness, affordability, and accessibility of services. A balanced extension financing strategy combining public support with farmer contributions could improve the sustainability, accountability, and effectiveness of agricultural extension systems in the region.

CONCLUSION

The study indicates that over 63.33 percent of crop farmers are willing to pay for AES with a subsidy of up to 80 percent, although some emphasize the necessity of ensuring the economic sustainability of these services, stating they will discontinue payment if viability is not maintained. Education, farm size and satisfaction with current AES were identified as significant factors influencing farmers' WTP. Among the services most demanded within the proposed cost-sharing model are crop protection, control measures, and subsidized inputs. Consequently, promoting cost-sharing or fee-based extension services could prolong the availability of agricultural advisory services and enhance diversity in extension options for farmers. A key condition for offering paid advisory services is understanding both the farmers' WTP and the factors that shape this willingness.

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