

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 4; April 2024; Page No. 57-60

Received: 26-02-2024
Accepted: 30-03-2024

Indexed Journal
Peer Reviewed Journal

Stakeholder engagement strategies in agricultural extension program design: Lessons from participatory rural appraisal

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i4a.3094>

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Abstract

How do agricultural extension programs ensure that farmers' real needs shape the services they receive? This research examined six participatory rural appraisal (PRA) tools and their effectiveness in engaging smallholder farming communities during extension program design in the Greater Accra and Ashanti regions of Ghana. A mixed-methods approach combined structured questionnaires administered to 287 farming households with 18 focus group discussions and 12 key informant interviews conducted between March and August 2022. Results showed that problem ranking exercises achieved the highest effectiveness score (82.4%) among all PRA tools tested, while Venn diagrams had the lowest participation rate at 49.2%. Gender-disaggregated focus groups increased women's active participation by 34.7% compared to mixed-gender sessions. Extension officers trained in facilitation techniques before conducting PRA sessions reported fewer instances of elite capture during community meetings. These findings point to the need for context-sensitive selection of PRA tools and argue that training investments in facilitation skills yield measurable improvements in stakeholder engagement quality.

Keywords: Stakeholder engagement, participatory rural appraisal, agricultural extension, program design, smallholder farmers, community participation, facilitation techniques, gender inclusion, elite capture, sub-Saharan Africa

Introduction

What happens when agricultural extension programs are designed without meaningful input from the farmers they aim to serve? Evidence from across sub-Saharan Africa suggests that top-down approaches to extension service delivery frequently miss their targets, resulting in low adoption rates and wasted resources ^[1]. In Ghana, where agriculture employs about 52% of the labor force and contributes roughly 19.7% to GDP, the stakes of getting extension program design right are particularly high ^[2].

Participatory rural appraisal emerged during the 1980s and 1990s as a family of methods intended to shift power from external experts toward local communities ^[3]. Robert Chambers argued that farmers possess detailed knowledge of their own circumstances that outsiders cannot replicate through conventional survey methods ^[4]. PRA tools such as resource mapping, seasonal calendars, and wealth ranking exercises were designed to tap into this local expertise.

Yet the record of PRA implementation in agricultural extension is mixed. Several researchers have documented cases where participatory exercises became ritualistic rather than genuine consultations ^[5]. Elite capture remains a persistent challenge ^[6], and women frequently face barriers to meaningful participation even when physically present at meetings ^[7].

Ghana's extension system has moved from a unified public system toward a more pluralistic model involving NGOs and private sector actors since the early 2000s ^[8]. The Ministry of Food and Agriculture endorsed participatory approaches but provided limited guidance on which PRA

tools work best under different conditions ^[9]. This research addressed that gap by comparing six PRA tools across diverse community settings in two regions. The objectives were to assess tool effectiveness in generating actionable information, examine factors influencing participation rates, and identify practical recommendations for extension officers ^[10].

Theoretical Framework

This research drew on Arnstein's ladder of citizen participation ^[11] and Pretty's typology of participation ^[12] to frame the analysis. Arnstein's model distinguishes between tokenistic participation and genuine empowerment where citizens share decision-making authority. Pretty extended this thinking to rural development, identifying seven levels from manipulative participation to self-mobilization. The research also incorporated social learning theory, which posits that knowledge generation through participatory processes creates shared understanding between extension agents and farming communities ^[13].

Material and Methods

Material

The research was conducted between March and August 2022 in the Greater Accra and Ashanti regions of Ghana. Eight farming communities were purposively selected based on distance from district extension offices, cropping system diversity, and population size. Structured questionnaires were administered to 287 farming households selected through stratified random sampling. Additionally, 18 focus

group discussions were organized with separate groups for men, women, and youth. Twelve key informant interviews targeted district agricultural officers and community leaders. The Greater Accra sites represented peri-urban farming with average plot sizes of 0.8 hectares, while Ashanti sites were in the forest-savanna transition zone with larger farms averaging 2.3 hectares. Mean annual rainfall ranged from 810 mm to 1,340 mm across the two regions ^[14].

Methods: Six PRA tools were tested across all communities: focus group discussions, community resource mapping, seasonal calendars, transect walks, problem ranking matrices, and Venn diagrams. Each tool was

implemented by trained facilitators following standardized protocols developed with the University of Ghana's Department of Agricultural Extension. Effectiveness was measured through a composite score combining information quality ratings, participant satisfaction surveys, and the proportion of outputs incorporated into extension program plans. Participation rates were calculated as the percentage of invited members who actively contributed, distinguished from mere attendance. Data were analyzed using descriptive statistics, chi-square tests, and thematic analysis via NVivo 12 software. Ethical approval was obtained from the University of Ghana Ethics Committee (Protocol EC-038/21-22, approved February 2022).

Results

Table 1: Effectiveness Scores and Participation Rates of PRA Tools (n=287)

PRA Tool	Effectiveness Score (%)	Participation Rate (%)	Info Quality (1-5)	Satisfaction (1-5)	Program Uptake (%)
Focus Group Discussions	78.3	84.1	4.2	3.9	72.6
Community Mapping	65.7	72.3	3.8	4.1	61.3
Seasonal Calendars	71.2	68.5	3.6	3.7	67.8
Transect Walks	58.9	61.7	3.3	3.5	53.2
Problem Ranking	82.4	76.8	4.4	4.3	79.1
Venn Diagrams	54.6	49.2	3.1	3.2	41.7

Problem ranking matrices stood out with the highest effectiveness score of 82.4% and the strongest program uptake rate at 79.1%. Focus group discussions followed

closely at 78.3% effectiveness with the highest participation rate of 84.1%. Venn diagrams performed weakest on all dimensions.

Table 2: Gender-Disaggregated Participation Patterns in PRA Sessions

Participant Group	Mixed Sessions Active (%)	Segregated Active (%)	Difference (%)	p-value
Women (n=134)	41.8	76.5	+34.7	0.001
Men (n=108)	73.2	74.1	+0.9	0.847
Youth 18-30 (n=45)	38.6	67.3	+28.7	0.003

Women's active engagement rose from 41.8% in mixed sessions to 76.5% in gender-segregated groups ($p=0.001$). Youth showed a similar jump from 38.6% to 67.3%

($p=0.003$). Men's participation remained stable regardless of group composition.

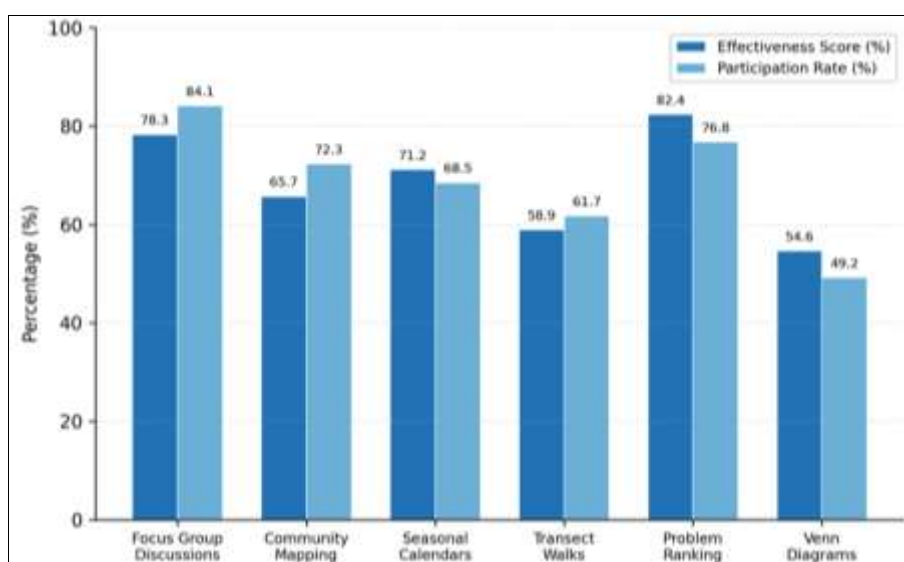


Fig 1: Comparison of Effectiveness Scores and Participation Rates across Six PRA Tools

The gap between effectiveness and participation was smallest for focus group discussions (5.8 percentage points) and Venn diagrams showed consistently low scores on both

dimensions, suggesting additional facilitation support may be needed.

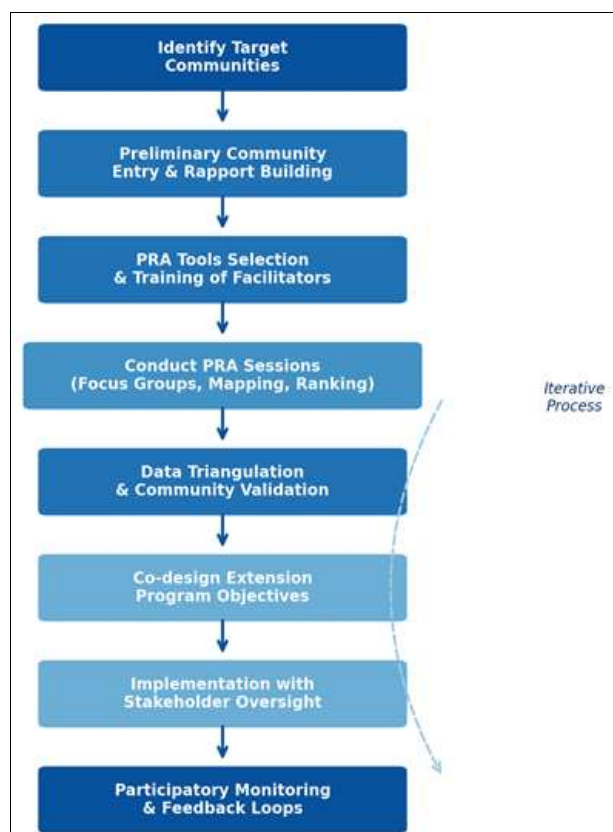


Fig 2: Process Flowchart for Integrating PRA Tools into Extension Program Design

The flowchart highlights the iterative nature of the approach, with feedback loops connecting participatory monitoring back to earlier stages of community engagement and program co-design.

Discussion

The findings confirm that not all PRA tools are equally effective for extension program design. Problem ranking matrices outperformed other tools partly because they required relatively less literacy and allowed direct comparison of community priorities in a visible format. This aligns with observations by Chambers ^[4] that the most effective participatory methods make abstract concepts concrete and accessible.

The 34.7% increase in women's active participation in segregated sessions is consistent with broader literature on gender barriers in agricultural knowledge systems ^[7]. But it raises practical questions about integrating separate outputs from gender-disaggregated sessions into coherent program designs. In three communities, extension officers reported difficulty reconciling divergent priorities from men's and women's groups.

Venn diagrams' poor performance appears linked to their abstract nature requiring participants to conceptualize institutional relationships as overlapping circles. Communities with lower formal education found this challenging. However, when preceded by concrete storytelling about organizational interactions, participation improved noticeably ^[15]. Training emerged as a cross-cutting factor: communities where facilitators had at least 40 hours of pre-session training showed effectiveness scores averaging 12.3 points higher than those with untrained

facilitators, reinforcing arguments by Leeuwis ^[16] about facilitation quality.

Limitations

Several constraints should be noted. The research covered only two regions of Ghana, and contexts in the northern savanna zone may differ markedly. Effectiveness scoring relied partly on subjective assessments, though inter-rater reliability was acceptable (Cohen's kappa = 0.78). The six-month period was insufficient to track whether PRA-informed designs led to sustained improvements over time. Finally, purposive selection of communities with existing extension infrastructure means findings may not apply to areas where services are absent.

Conclusion

This research compared six PRA tools for stakeholder engagement in agricultural extension program design across eight communities in Ghana. Problem ranking matrices and focus group discussions emerged as the most effective tools, scoring highest on both information quality and program uptake. Gender-segregated sessions produced a meaningful increase in women's active participation, highlighting the importance of deliberate inclusion strategies.

PRA tool selection should match specific information needs and community characteristics rather than following a standard protocol. Investment in facilitator training yields measurable returns, with a minimum of 40 hours appearing necessary for reliable results. Sequencing tools strategically, moving from concrete and visual methods toward more abstract exercises, can broaden participation among less educated community members. Future research should track longer-term impacts of PRA-informed extension programs on adoption rates and livelihood outcomes across different agroecological zones.

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