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Mapping Postharvest Skills and Extension Priorities of Hybrid Corn Farmers in Bontula Village

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Abstract

This study aims to: (1) assess farmers' skill levels in hybrid corn post-harvest handling; (2) analyze the implementation of agricultural extension services; and (3) formulate extension intervention priorities based on farmers' actual needs in Bontula Village, Asparaga Subdistrict, Gorontalo Regency. The study employed a mixed-methods approach with a sequential explanatory design. Data were collected from 30 hybrid corn farmers selected purposively through questionnaires, interviews, observations, and documentation. Quantitative data were analyzed using a skill index and priority matrix, while qualitative data were analyzed descriptively to support the quantitative findings. The results showed that 63.33% of farmers were categorized as skilled, while 36.67% were less skilled in post-harvest handling. The highest skill scores were found in storage and harvesting activities, whereas drying and packaging had the lowest scores. Agricultural extension performance was generally categorized as appropriate, particularly in harvesting, shelling, and storage stages. However, extension activities related to drying and packaging were still considered less appropriate. The priority matrix analysis identified drying and packaging as the main priority stages requiring immediate intervention due to low farmer skill levels and limited extension support. The study also found a positive relationship between extension intensity and farmers' skill levels, although the correlation remained moderate.

Keywords: Agricultural Extension, Farmer Skills, Hybrid Corn, Post-Harvest Handling, Priority Matrix

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INTRODUCTION

Gorontalo Province is one of the agricultural regions in Indonesia with significant potential in the development of food crop commodities, particularly hybrid corn. The agricultural sector plays an important role in supporting regional economic growth and rural livelihoods, as most communities depend on farming activities as their primary source of income (Wijaya & Bintoro, 2024). Corn has become a strategic commodity not only as a source of carbohydrates after rice but also as an important raw material for the animal feed industry (Khairunnisa et al., 2021). In addition, corn is closely related to local food culture in Gorontalo, reflecting its socio-economic importance within rural communities.

The development of hybrid corn (Zea mays L.) in Indonesia shows promising prospects due to its high productivity and economic value (Dewi et al., 2022). Gorontalo Regency is one of the main corn-producing areas in Gorontalo Province, with production increasing from 527,920 tons in 2023 to 625,971 tons in 2024 (BPS Kabupaten Gorontalo, 2025). However, fluctuations in productivity and product quality remain major challenges in corn agribusiness development. These conditions are influenced not only by agroclimatic factors but also by farmers' technical capacity, particularly in postharvest management practices (Herliani et al., 2021).

Postharvest handling is a critical stage in maintaining product quality, reducing losses, and improving market competitiveness. However, many farmers still rely on traditional postharvest methods, with limited use of modern technologies such as corn shellers and drying equipment, and inadequate implementation of quality standards (Haslindah et al., 2020; Rahmadana et al., 2025). As a result, postharvest losses remain high, product quality declines, and farmers' bargaining positions in the market weaken (Suhana et al., 2023). These challenges indicate the need for strengthening farmers' postharvest management capacity to support sustainable agribusiness development.

Farmer skills in postharvest handling include harvesting, shelling, drying, packaging, and storage activities (Latif et al., 2023). These skills are influenced by several factors, including farming experience, educational background, and access to agricultural information and technology (Gusti et al., 2022). In this context, agricultural extension services play a strategic role in improving farmers' knowledge, technical skills, and adaptive capacity through non-formal education processes (Irdiana et al., 2024). Nevertheless, extension programs implemented in rural areas are often general in nature and have not fully addressed the specific needs and constraints faced by farmers in postharvest management practices (Yuspin et al., 2023).

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Recent evidence from Bontula Village also shows that agricultural extension plays an important role in supporting corn farming, but farmers still face several innovation barriers related to technology access, technical capacity, and the suitability of extension methods. Suniyawan et al. (2026) emphasized that extension roles and innovation barriers need to be understood contextually because they directly influence farmers' ability to adopt improved corn farming practices. Therefore, postharvest extension programs should not only focus on knowledge transfer but also address practical constraints faced by farmers at each stage of postharvest handling.

Previous studies have generally focused on production improvement and technology adoption without systematically integrating farmer skill mapping with extension priority analysis in postharvest activities (Rahmawati et al., 2020). This limitation often leads to less effective and less targeted extension interventions. Therefore, the novelty of this study lies in its integrative approach, which combines farmer skill assessment with extension priority mapping to formulate targeted intervention strategies for postharvest management of hybrid corn. This study aims to: (1) assess farmers' skill levels in hybrid corn postharvest handling; (2) analyze the implementation of agricultural extension services; and (3) formulate extension intervention priorities based on farmers' actual needs to support more effective and targeted agribusiness development strategies.

RESEARCH METHODS

This study was conducted in Bontula Village, Asparaga Subdistrict, Gorontalo Regency. The research location was selected using purposive sampling, given that the majority of the community in that area engages in hybrid corn farming and carries out fairly intensive post-harvest activities. The study was conducted from January to March 2025.

This study employed a descriptive quantitative approach supported by qualitative field observations and interviews. The quantitative approach was used to measure farmers' skill levels in post-harvest handling of hybrid corn, while the qualitative approach was used to strengthen and explain the quantitative results.

The research variable is descriptive in nature, specifically, farmers' skill levels in post-harvest handling of hybrid corn. Indicators of farmers' skills include: (1) post-harvest knowledge, (2) harvesting ability, (3) shelling ability, (4) drying ability, (5) packaging ability, (6) storage ability, (7) utilization of post-harvest technology, and (8) awareness of maintaining crop quality.

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The study population consists of all hybrid corn farmers in Bontula Village. Sampling was conducted using a purposive approach targeting 30 farmers actively engaged in post-harvest activities, with the criterion of having farmed corn for at least five years. Data collection techniques included a structured questionnaire survey, direct interviews, field observations, and a literature review. The data utilized comprised primary and secondary data. Primary data was obtained directly from respondents through interviews and observations, while secondary data was obtained from scientific journals, books, reports from relevant agencies, and other supporting literature.

Because the sample was selected purposively and limited to 30 farmers, the findings should be interpreted as contextual evidence for Bontula Village rather than as a statistical generalization for all hybrid corn farmers in Gorontalo Regency.

The research instrument was designed based on indicators of farmers' skills in post-harvest handling of hybrid corn and was tested for content validity by aligning the indicators with the research objectives and relevant literature reviews.

Quantitative data analysis was conducted using a three-point Likert scale: 3 (agree), 2 (disagree), and 1 (strongly disagree). Respondents' scores were then converted into a skill index using the following formula:

$$I = \frac{(X - Xmin)}{(Xmax - Xmin)} \times 100\%$$

Notes:
I = Skill Index
X = Respondent's average score
Xmin = Minimum Score
Xmax = Maximum Score

The scores obtained were then converted into a skill index expressed as a percentage and classified into the categories of skilled (66,67-100), less skilled (33,34-66,66), and unskilled (0-33,33). Meanwhile, the qualitative data were analyzed descriptively to explain and support the quantitative results. These results were used to formulate extension intervention priorities tailored to the farmers' needs.

The Spearman correlation indicates a positive but moderate association between extension performance and farmers' skill levels. However, this result should be interpreted cautiously because the analysis is primarily descriptive and context-specific.

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RESULTS AND DISCUSSION

Respondent characteristics

Most respondents had 5–19 years of farming experience, accounting for the highest percentage (43.33%), while those with 35–50 years of experience accounted for the lowest percentage (16.67%). This indicates that the farmers are in their productive phase and possess sufficient experience. Farming experience is a key factor influencing technical skills and decision-making in agricultural operations (Layuk et al., 2025).

The educational level is dominated by elementary school graduates (83.33%), which limits the adoption of technological innovations. Ahmad et al. (2025) emphasize that education influences an individual's ability to understand information, make decisions, and manage risks in farming. The dominance of elementary school graduates among respondents indicates that extension programs should be designed using practical, visual, and demonstration-based approaches rather than relying heavily on theoretical explanations. Farmers with relatively low formal education may still possess strong farming experience, but they may require more contextual and hands-on learning methods to understand postharvest standards and technology. This is consistent with Ahmad et al. (2025), who emphasized that education affects farmers' ability to process information, make decisions, and manage farming risks.

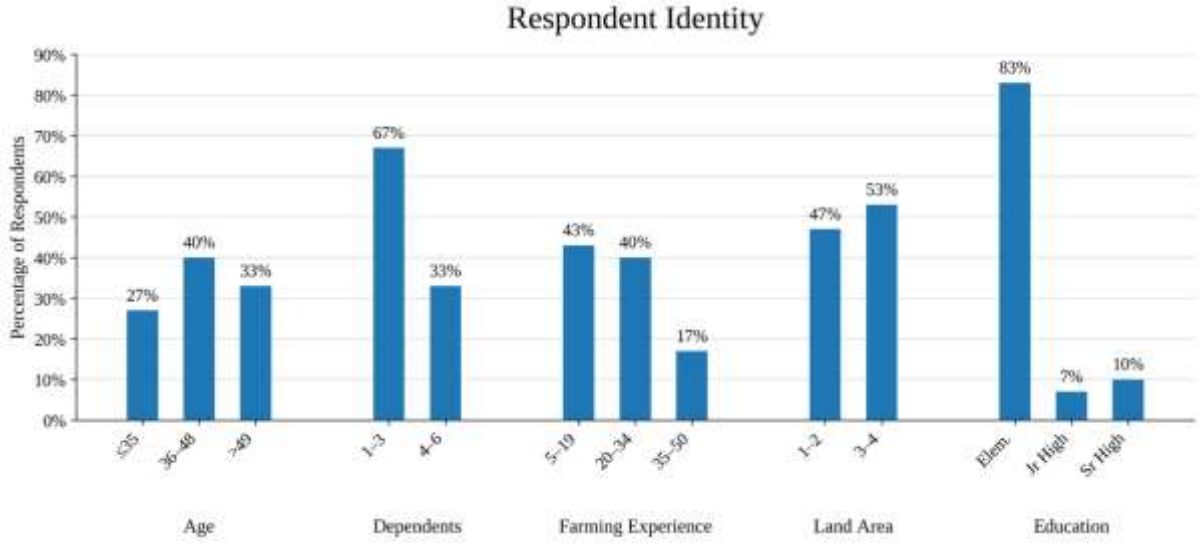


Figure 1. Respondent Profile

The number of family members is dominated by the 1–3-person category (66.67%), while the 4–6-person category accounts for 33.33%. This indicates that most farming households have a relatively moderate economic burden. (Mawardani et al.,

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2025) found that of family dependents does not significantly affect productivity, but it does influence the allocation of family labor, which can increase production.

The respondents were in the productive age range (25–60 years), with the largest group being those aged 37–48 (40%). This age group is considered working age and has sufficient physical ability and experience to engage in farming. Farmers' age is linked to their level of innovation adoption, with older farmers tending to have more conservative farming practices (Puspita et al., 2024).

The productive age of most respondents also suggests that there is still a good opportunity to improve the adoption of postharvest innovations. Farmers in the productive age group generally have sufficient physical capacity and can still participate actively in training, field demonstrations, and farmer group activities. However, as stated by Puspita et al. (2024), age may influence the level of innovation adoption, where older farmers tend to be more cautious or conservative in changing existing farming practices. Therefore, extension activities should combine new technical information with familiar local practices to increase farmers' acceptance.

Meanwhile, the land area ranges from 1 to 4 hectares, with the majority falling within the 3- to 4-hectare range (53.33%), indicating small- to medium-scale operations. The relatively limited land area requires farmers to improve efficiency, particularly during the post-harvest stage, to minimize yield losses.

The farming experience of 5–19 years indicates that most farmers already have adequate practical experience in hybrid corn farming. However, long farming experience does not automatically mean that farmers fully understand technical postharvest standards, especially in drying, packaging, and quality control. Gusti et al. (2022) explained that farming experience and educational background influence farmers' knowledge and their ability to apply agricultural information. Therefore, experienced farmers still need technical strengthening, particularly in postharvest stages that require specific standards and equipment.

Most respondents cultivated land ranging from 3 to 4 hectares, indicating small- to medium-scale farming operations. This condition requires farmers to improve postharvest efficiency because larger harvest volumes can increase the risk of quality loss if drying, shelling, packaging, and storage are not properly managed. Thus, postharvest extension should not only focus on technical knowledge but also on efficiency, loss reduction, and product quality improvement to strengthen the competitiveness of hybrid corn farming.

Farmers' Skills in Post-Harvest Management

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In this study, farmers' skills are defined as their ability and awareness regarding the post-harvest handling of corn, encompassing the entire sequence of activities from harvest until the corn is ready for market. Corn is one of the main crops cultivated by farmers in Gorontalo Regency, particularly in Bontula Village. Problems during the post-harvest stage can lead to yield losses, both in terms of quantity, such as a decrease in the number or weight of the crop, and in terms of product quality. Some common post-harvest activities carried out by farmers include husking, sun-drying, and shelling corn. Primary post-harvest processing plays a crucial role in adding value to agricultural commodities through agro-industrial processes, including harvesting, shelling, drying, packaging, and storage. These stages aim to minimize yield losses, reduce damage, and enhance the shelf life and utility value of the commodities.

No	Farmers' Skill	Number of Farmers	Percentage (%)
1	Unskilled	0	0,00
2	Less Skilled	11	36,67
3	Skilled	19	63,33
Total		30	100.00

Table 1. Farmers' Skills

The research results show that the majority of farmers fall into the skilled category (63.33%), while 36.67% remain in the less-skilled category, and there are no unskilled farmers. These findings indicate that, in general, farmers already possess basic skills in postharvest handling skills, although some respondents still have skill gaps. These results align with those of Latif et al. (2023), who state that increasing knowledge through extension activities can drive skill improvement and the adoption of innovations.

Although most farmers were categorized as skilled, this finding should not be interpreted as an indication that postharvest management problems have been fully resolved. The presence of 36.67% less-skilled farmers shows that a considerable proportion of respondents still face limitations in applying proper postharvest practices. Moreover, the skill gap is not evenly distributed across all stages, but is concentrated mainly in drying and packaging. This means that farmers may already be familiar with basic postharvest activities such as harvesting and storage, but still require technical assistance in stages that demand more specific standards.

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The lower skill levels in drying and packaging indicate that these stages require more intensive attention from extension workers. Drying is closely related to moisture content control, product durability, and market quality, while packaging contributes to product protection, cleanliness, and marketability. Rahmadana et al. (2025) stated that limited knowledge of postharvest handling can reduce the quality of hybrid corn, while Haslindah et al. (2020) highlighted that traditional practices and limited equipment remain major constraints in postharvest improvement. Therefore, the skilled category at the aggregate level should be interpreted carefully because several critical stages still require targeted intervention.

Extension activities, particularly through field demonstrations, have proven effective in transferring technical knowledge to farmers. However, farmers still face several major constraints, including limited access to shelling equipment, high shelling costs, limited drying space, and dependence on weather conditions during the drying process. Regarding storage, farmers' practices are relatively better, though still simple; they use sacks and store the product in their yards.

From an agribusiness perspective, weaknesses in drying and packaging may affect farmers' bargaining position and product competitiveness. Poor drying can reduce grain quality, while inadequate packaging can increase the risk of physical damage and reduce market appeal. This is in line with Suhana et al. (2023), who emphasized the importance of good agricultural practices in improving productivity and quality in hybrid corn farming. Therefore, strengthening farmers' skills in these two stages is essential to reduce postharvest losses and increase the added value of hybrid corn.

Analysis of Skills by Post-Harvest Stage

The analysis results show that farmers' average skill level is 2.4 (on a scale of 1–3) or 70 (on a scale of 0–100), indicating a moderate-to-high level. The storage stage had the highest score (2.8 or 90), followed by harvesting (2.6 or 80) and shelling (2.4 or 70). Meanwhile, the drying and packaging stages had the lowest scores, at 2.1 (55) each.

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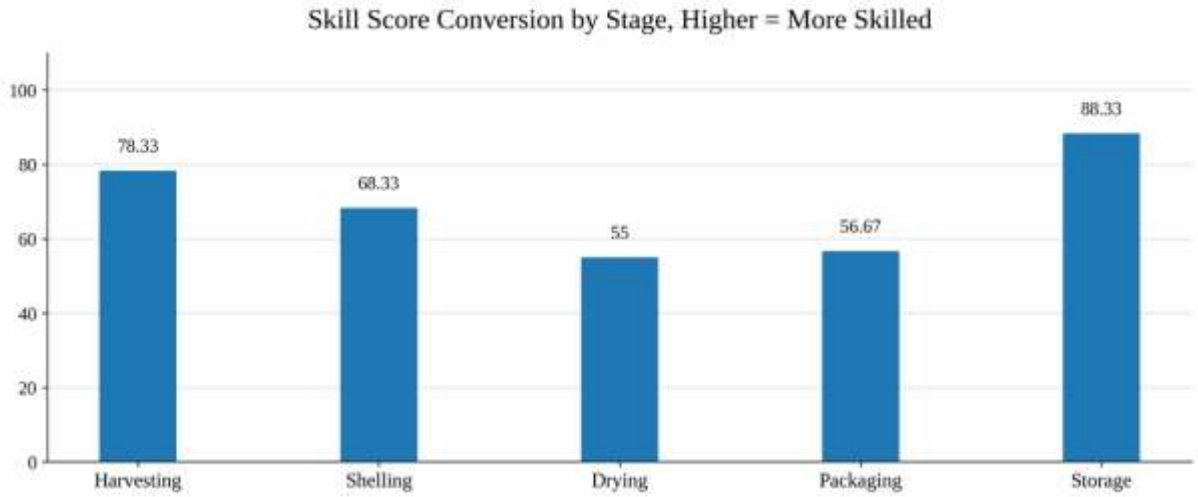


Figure 2. Skill Scores by Stage

These differences indicate that farmers' skills are not evenly distributed across all postharvest stages. Stages with more complex technical standards, such as drying and packaging, tend to have lower skill levels. Previous studies state that substandard drying can lead to quality degradation due to suboptimal moisture content.

Extension Service Performance in Postharvest Handling

Postharvest handling of corn plays a crucial role in determining its quality and market value. While cultivation focuses on increasing yield, post-harvest management focuses on maintaining crop quality (Mujaidi et al., 2023). Errors at this stage can reduce the quality and quantity of the crop (post-harvest loss), thereby affecting the selling price. Post-harvest stages include harvesting, shelling, drying, packaging, and storage, which aim to minimize damage, reduce post-harvest loss, and improve the commodity's shelf life and utility value. To support the effectiveness of post-harvest handling, the role of agricultural extension workers is crucial in delivering optimal performance and services. Agricultural extension workers play a role in providing information, guidance, and assistance to farmers in addressing the agricultural challenges they face.

No	Postharvest Handling	Total Score	Average	Criteria
1	Harvesting	77	2,60	Appropriate
2	Shelling	71	2,40	Appropriate
3	Drying	60	2,00	Inappropriate

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4	Packaging	60	2,00	Inappropriate
5	Storage	83	2,80	Appropriate

Table 2. Post-harvest Handling Criteria

An assessment of extension workers' performance indicates that most post-harvest stages have been carried out in accordance with recommendations, particularly during harvesting (2.60), shelling (2.40), and storage (2.80). This suggests that extension activities during these stages have been effective.

Conversely, the drying and packaging stages are still in the "less appropriate" category (2.00 each). This indicates a gap between extension materials and implementation in the field. The effectiveness of extension is largely determined by the alignment of materials, methods, and the actual conditions farmers face (Wakhidah et al., 2024).

The Relationship between Skills and Extension Intensity

The research results indicate a positive relationship between extension intensity and farmers' skill levels, with an extension index of 68/100. Stages with high extension intensity, such as storage and harvesting, exhibit higher skill levels. Conversely, stages with low extension intensity, such as drying and packaging, show lower skill levels.

These findings support the theory that extension services act as a catalyst in enhancing farmers' capacity. However, the effectiveness of extension services is determined not only by frequency but also by the quality of the methods used.

Skills and Extension Services by Postharvest Stage

Agricultural extension is a form of informal education aimed at improving farmers' knowledge, attitudes, and skills in running their farming businesses. Agricultural extension is utilized to accelerate agricultural development by building farmers' capacity. In this context, agricultural extension workers serve as catalysts, partners, facilitators, and problem-solvers in supporting farmers' well-being. Therefore, agricultural extension at the village level is crucial for human resource development, particularly among farmers, to boost productivity, income, food security, and economic resilience.

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No	Stage	Skills	Score 0-100	Extension Services	Score 0-100
1	Harvesting	2,57	78,3	2,57	78,3
2	Shelling	2,37	68,3	2,37	68,3
3	Drying	2,10	55,0	2,00	50,0
4	Packaging	2,13	56,7	2,00	50,0
5	Storage	2,77	88,3	2,77	88,3
Overall Index		2,39	69,3	2,34	67,0

Table 3. Skills and Training by Stage

A stage-by-stage analysis shows that storage received the highest scores in both skills (88.3) and extension services (88.3), while drying and packaging received the lowest scores. This indicates a gap in intervention at certain stages.

Priority Matrix (Based On Skill Scores And Extension Worker Performance Scores, On A Scale Of 0–100)

The priority matrix is an analytical tool used to determine the level of need for intervention or the focus of training at each stage of the activity based on two main indicators: farmer skill scores and extension worker performance scores, on a scale of 0-100. This matrix maps the level of urgency for improvement, enabling training to be conducted more effectively. Its primary objective is to identify stages requiring immediate capacity building (top priority), stages that need to be improved gradually, and stages that have demonstrated good performance and can be maintained as is.

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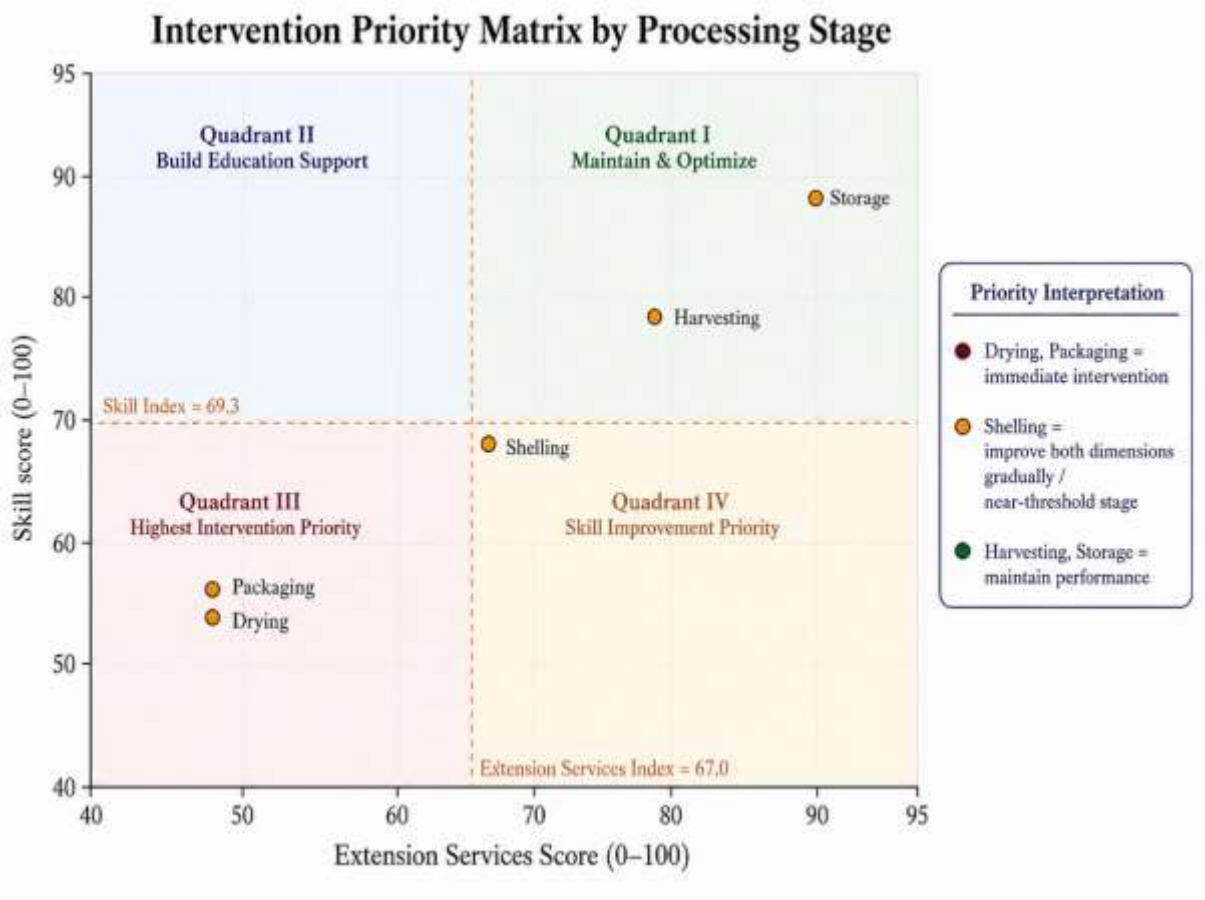


Figure 4. Intervention Priority Matrix

The priority matrix provides a clearer basis for determining extension intervention strategies according to the condition of each postharvest stage. Drying and packaging are classified as the first priority because both stages have low farmer skill scores and low extension performance scores. This indicates that farmers not only lack technical capacity in these activities, but also have not received sufficient and effective extension support. Therefore, intervention in drying and packaging should be implemented immediately through practical training, field demonstrations, and the introduction of simple postharvest technologies.

Shelling can be categorized as a second priority or a gradual improvement stage. Although the score is relatively close to the overall index, this stage still requires improvement, particularly in terms of efficiency, access to shelling equipment, and the quality of technical assistance. The intervention for shelling does not need to be as urgent

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as drying and packaging, but it should be strengthened through farmer group-based training and shared equipment management. This approach is important because limited access to postharvest tools can reduce work efficiency and increase production costs.

Meanwhile, harvesting and storage are located in the maintain-and-optimize category. These stages show relatively higher skill and extension performance scores, indicating that farmers already have better practical knowledge and experience. Therefore, extension programs for harvesting and storage should focus on maintaining existing good practices, improving consistency, and using these stages as learning examples for other postharvest activities. Farmers who already apply good practices in harvesting and storage can also be involved as peer-learning resources within farmer groups.

The results of the priority matrix imply that agricultural extension programs should be more specific, participatory, and needs-based. Extension activities should not only be delivered through conventional meetings, but also through demonstration plots, farmer field schools, and shared postharvest equipment schemes. Yuspin et al. (2023) emphasized that postharvest technology extension should be adapted to farmers' actual field problems, while Wakhidah et al. (2024) argued that extension effectiveness depends on the suitability of materials, methods, and farmers' needs. Therefore, a stage-based extension strategy is necessary to ensure that training is more relevant, practical, and directly applicable to farmers' postharvest activities.

Statistically, the relationship between extension services and skills is positive (Spearman's rho = 0.33), but it is not yet statistically significant. This indicates that improving the quality of extension services remains necessary to achieve optimal impact.

The findings indicate that farmers' postharvest skills are unevenly distributed across different stages of hybrid corn handling. Storage and harvesting showed the highest skill scores, while drying and packaging recorded the lowest scores. This pattern suggests that farmers tend to master commonly practiced, less technically demanding postharvest activities that are directly embedded in their daily farming routines. Similar findings were reported by Latif et al. (2023), who emphasized that farmers' knowledge, attitudes, and skills are strongly shaped by repeated practice, farming experience, and exposure to extension activities. This also supports Gusti et al. (2022), who found that farming experience and educational background influence farmers' ability to understand and apply agricultural information.

The relatively high scores in harvesting and storage indicate that farmers already possess practical knowledge in basic postharvest handling. These stages are familiar to

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farmers because they are directly connected to crop collection and temporary storage before marketing. This finding is consistent with Mujaidi et al. (2023), who explained that harvesting and storage are essential components of postharvest management because they influence product quality, shelf life, and market value. In the context of Bontula Village, the high storage score may also reflect farmers' development of simple yet functional storage practices, such as using sacks and storing corn in available household or farm spaces.

In contrast, the low scores in drying and packaging reveal a critical capacity gap in postharvest management. Drying requires technical knowledge related to moisture content, weather conditions, drying duration, and quality control. Rahmadana et al. (2025) found that limited farmer knowledge of postharvest standards can reduce the quality of hybrid corn and increase the risk of postharvest losses. Haslindah et al. (2020) also highlighted that traditional postharvest practices and limited access to appropriate equipment remain major constraints in improving the efficiency and quality of hybrid corn handling. Therefore, the low drying score in this study can be attributed to limited technical facilities, reliance on sunlight, and insufficient hands-on training.

Packaging also emerged as one of the weakest stages, indicating that farmers may still perceive packaging as less important than production and drying activities. However, packaging plays an important role in maintaining product quality, reducing physical damage, and improving marketability. Suhana et al. (2023) emphasized that the application of Good Agricultural Practices in corn agribusiness is important not only for productivity but also for improving product quality and farmers' competitiveness. In this regard, weak packaging practices may reduce farmers' ability to obtain higher market prices, especially when buyers require cleaner, drier, and more standardized products.

The priority matrix further confirms that drying and packaging should become the main focus of extension intervention. Both stages are located in the low-skill, low-extension-performance quadrant, indicating that farmers' technical ability and extension support are simultaneously weak. This finding supports Yuspin et al. (2023), who argued that extension strategies for postharvest technology should be adjusted to the actual problems faced by farmers in the field. In addition, Wakhidah et al. (2024) emphasized that the effectiveness of extension services depends on the alignment between extension materials, delivery methods, and farmers' practical needs. Therefore, extension programs should not only increase the frequency of meetings but also improve the relevance, demonstration quality, and technical specificity of the training materials.

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This finding is consistent with Suniyawan et al. (2026), who found that innovation barriers in corn farming in Bontula Village are closely related to farmers' access to technology, extension support, and practical field constraints. In this study, such barriers are reflected in the low scores of drying and packaging, indicating that farmers require more practical, stage-specific, and problem-oriented extension interventions.

The position of shelling in the near-threshold quadrant suggests that this stage does not require immediate intervention at the same level as drying and packaging, but it still needs gradual improvement. Farmers may already have sufficient basic skills in shelling, but constraints such as limited access to shelling machines, high operational costs, and dependence on manual labor can reduce efficiency. This is in line with Haslindah et al. (2020), who found that labor methods and equipment availability strongly influence postharvest work efficiency in hybrid corn farming. Therefore, shelling interventions should focus on improving access to shared equipment, strengthening farmer groups, and introducing cost-efficient shelling technologies.

The positive association between extension services and farmers' skills indicates that agricultural extension remains an important mechanism for strengthening farmer capacity. Irdiana et al. (2024) stated that effective extension communication can improve farmers' understanding, participation, and adoption of agricultural practices. Khairunnisa et al. (2021) also found that the role of agricultural extension workers contributes to improving corn farming performance. However, the moderate correlation observed in this study suggests that extension intensity alone is insufficient. The quality of extension methods, the availability of postharvest facilities, farmers' educational background, and the suitability of training materials also influence whether farmers can translate extension messages into improved practices.

The agribusiness perspective findings have important implications for strengthening the competitiveness of hybrid corn in Gorontalo. Postharvest weaknesses in drying and packaging can reduce product quality, increase losses, and weaken farmers' bargaining position in the market. Herliani et al. (2021) emphasized that the development of hybrid corn agribusiness requires integration across agribusiness subsystems, including production, postharvest handling, marketing, and supporting institutions. Therefore, improving farmers' postharvest skills should be viewed not only as a technical intervention but also as an agribusiness strategy to improve product value, market access, and rural income.

Based on these findings, extension programs in Bontula Village should prioritize practical and needs-based training. Drying interventions should include demonstrations

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of appropriate drying techniques, control of moisture content, the use of simple drying equipment, and the quality standards required by buyers. Packaging interventions should focus on shelling, cleaning, packaging materials, labeling, and storage preparation. These interventions should be delivered through field demonstrations, farmer group learning, and participatory extension methods. Rahmawati et al. (2020) argued that agricultural extension can influence farmers' socioeconomic behavior and technology adoption when delivered in a relevant and applicable manner. Thus, targeted extension based on the priority matrix can improve the effectiveness of postharvest capacity-building programs.

Overall, the study demonstrates that integrating skill mapping and extension priority analysis provides a useful basis for designing more targeted agricultural extension programs. Rather than treating postharvest management as a single activity, the matrix approach allows extension workers and policymakers to identify which stages require immediate support, gradual improvement, or maintenance. This strengthens the study's practical contribution, particularly for local agricultural extension agencies, farmer groups, and agribusiness stakeholders involved in hybrid corn development in Gorontalo.

The findings suggest that postharvest extension programs should be designed based on stage-specific farmer needs. Drying and packaging should become the first priority of intervention, as both stages indicate low skill levels and weak extension performance. Practical training on moisture content control, drying techniques, packaging materials, and quality standards is urgently needed to reduce postharvest losses and improve product quality. Shelling should be treated as a second priority through gradual improvement, particularly by strengthening access to shelling equipment and improving the quality of technical assistance. Meanwhile, harvesting and storage should be maintained as best-practice stages and can be used as learning models for other postharvest activities. Therefore, extension programs should be implemented through demonstration plots, farmer field schools, and shared postharvest equipment schemes to ensure that farmers receive practical, relevant, and applicable support.

CONCLUSION

Farmers in Bontula Village generally possess moderate to high skills in post-harvest handling of hybrid corn, particularly in harvesting, shelling, and storage. However, drying and packaging remain the weakest stages due to limited technical knowledge, inadequate equipment, and low implementation of post-harvest standards. Agricultural extension services have contributed positively to improving farmers' skills, although their effectiveness varies across post-harvest stages. The priority matrix analysis identified

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drying and packaging as the main intervention priorities because both stages showed low farmer skill levels and limited extension performance. Meanwhile, harvesting and storage stages demonstrated relatively good performance and can be maintained as best-practice models. The positive relationship between extension intensity and farmers' skills indicates that strengthening the quality and relevance of extension programs is essential for improving post-harvest management capacity. Therefore, extension programs should focus on practical, needs-based training, particularly in drying and packaging techniques, to reduce post-harvest losses, improve product quality, and strengthen the competitiveness of hybrid corn agribusiness in the Gorontalo Regency.

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