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Implementing Machinery Distribution Program on Sustainable Agriculture and Rural Development: Basis for Action Plan

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Abstract. This study utilized a descriptive correlation research design to assess the level of implementation of the Machinery Distribution Program by the Department of Agriculture Regional Field Office I (DA RFO I) in La Union. It also investigated the challenges encountered during the program's implementation. The respondents included LGU municipal agriculturists, banner program coordinators, and the Chairman/President of the Farmer Cooperative Association, with a total of 60 participants. Data were collected using a researcher-made survey questionnaire and analyzed using frequency counts, percentages, weighted means, and Pearson correlation. The analysis indicated that most beneficiary associations are well-established, operating for over a decade with more than 100 members, typically in lowland areas, and properly registered with government agencies. The program was found to be fully implemented. However, there was no significant relationship between the profile variables and the program's implementation level. Several challenges were identified, including limited farm sizes, inappropriate or missing equipment, uneven allocation favoring certain associations, inaccessible roads for machinery delivery, and a mismatch between provided machines and the layout of farmlands. The study concluded that while the program was fully implemented, addressing these challenges could improve farming conditions for the farmers and associations. An Action Plan was recommended to address the identified problems in the Machinery Distribution Program's implementation.

Keywords: Machinery distribution; Sustainable agriculture; Rural development.

1.0 Introduction

Agriculture is a cornerstone of global well-being, serving as the primary source of sustenance and playing a vital role in economic development. Beyond its fundamental function of providing the world's food supply, agriculture significantly contributes to economic growth and employment. It engages millions in farming and related industries, catalyzing income generation and poverty alleviation, particularly in developing countries. Sustainable agricultural practices contribute to environmental preservation, biodiversity, and climate change mitigation. Furthermore, agriculture holds immense social and cultural significance, reflecting heritage, fostering social cohesion, and supporting resilient communities (FAO, 2021).

A current trend in agriculture is the adoption of farm machinery, which has transformed the sector by substituting manual labor. This mechanization is crucial for sustaining agricultural production in many developing countries. Agricultural mechanization, particularly machinery use, offers farmers opportunities to maintain or increase production despite ongoing migration trends (Zhang et al., 2020). Several studies have shown the positive effects

of using farm machinery, such as tractors and harvesters, on agricultural production. For example, Wang et al. (2022) found that farm machinery supports agricultural intensification and conservation, and Benin (2021) noted significant yield increases in Ghana.

Countries like China have heavily invested in agricultural mechanization. Wang (2019) revealed that China has been providing farmers with machinery to boost agricultural production. In India, agricultural workers operate a variety of equipment to perform farm operations efficiently. However, small and marginal farmers often cannot afford these technologies and resort to renting machinery, which can be expensive (Kamboj, 2012). Similarly, Turkish farmers face difficulties replacing machinery due to high costs, prompting the government to implement machinery-sharing programs to reduce expenses and increase production (Basarik, 2015).

In the Philippines, the Department of Agriculture (DA) envisions a modernized and diversified rural economy that is technologically advanced and resource-sustainable. The DA has been distributing modern post-harvest machinery to achieve this vision. However, the country's fragmented agricultural economy and inefficiencies in the distribution system pose significant challenges. The effectiveness of the DA Regional Office I (DA RFO I) machinery distribution program is crucial for sustainable agriculture and rural development, although low mechanization levels persist due to small landholdings, high machinery costs, and unfavorable policies (Palanca-Tan & Gio, 2021; Philippine Center for Postharvest Development and Mechanization, 2021).

The DA RFO I machinery program has distributed 182 farm machinery valued at PhP 107 million in 2022. There is a need for research to evaluate its impact on agricultural productivity, incomes, employment, and the environment. This evaluation will inform policy recommendations to enhance the program's effectiveness, aligning it with broader sustainable agriculture and rural development goals in Region I (DA RFO I Annual Report, 2022). Assessing the program involves examining distribution, maintenance, and beneficiaries to ensure the machinery provided meets the needs of farmer associations and supports overall agricultural productivity (DA Regional Field Office I, 2022).

This study aimed to assess the implementation of the DA RFO I machinery distribution program in promoting sustainable agriculture and rural development in the Ilocos Region as a basis for formulating an action plan to improve the level of implementation of the DA RFO I program. This study provides crucial baseline data for enhancing the Machinery Distribution Program through a well-formulated action plan. The findings offer significant benefits: The Department of Agriculture can leverage insights to refine strategic decisions, optimize resource allocation, and improve program efficacy. Program implementers gain a detailed evaluation of successes and challenges, enabling them to refine strategies and streamline processes. Local Government Units are equipped with the knowledge to tailor support mechanisms and align regional development plans with agricultural needs. Farmers receive insights to optimize machinery use, enhancing productivity and well-being. The Master in Public Administration program benefits from a practical case study, enriching academic and professional development. The study enhances the researcher's analytical skills and provides a deeper understanding of the impact of government programs. Future researchers can build on this study, addressing gaps and driving continuous improvement in agricultural programs and policies.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design to explore the relationship between the machinery distribution program's implementation level and the respondents' various profile characteristics. As per Siedlecki (2020), correlational research determines the tendency for variables to vary consistently. This approach allowed the researcher to identify any significant associations between the program's effectiveness and demographic or organizational factors such as age, work experience, position, sex, civil status, educational attainment, number of members, length of association's existence, number of accreditations, production area, and registration status.

2.2 Sources of Data

The study was conducted in the Department of Agriculture Regional Office 1 (DA RO 1) in La Union, involving personnel responsible for implementing the machinery distribution program. The respondents included LGU

municipal agriculturists, banner program coordinators, and the Chairmen/Presidents of the Farmer Cooperative Association. Their roles provided valuable insights into the challenges and successes associated with machinery distribution and utilization. The study involved 60 respondents, with 40 from local government units and 20 from farmer associations, ensuring comprehensive data collection from key stakeholders.

2.3 Instrumentation and Data Collection

The survey instrument was developed based on a comprehensive literature review, divided into three parts: respondent profiles, implementation level of the machinery distribution program, and problems encountered. Part I gathered demographic and organizational characteristics, Part II assessed program implementation using a 3-point Likert scale, and Part III identified specific challenges faced during implementation. The data collection process involved securing permissions, coordinating with local government units, and using both face-to-face and digital survey methods to maximize participation.

2.4 Validity and Reliability of Research Instrument

The questionnaire underwent rigorous validation and reliability testing. Internal and external validators reviewed the questionnaire, resulting in a high validity score (mean value of 4.89). Reliability was assessed using Cronbach's alpha coefficient, achieving a value of 0.87, indicating high internal consistency. This robust testing ensured the questionnaire's ability to produce consistent and dependable results, enhancing the study's credibility.

2.5 Tools for Data Analysis

Various statistical tools were employed to analyze the collected data. Frequency counts and percentages provided a descriptive overview of respondent demographics. Mean scores assessed the program's implementation level. The correlational analysis explored relationships between profile variables and program implementation using Pearson and Point-Biserial correlations, analyzed through JAMOVI software. This comprehensive approach facilitated a robust interpretation of the data, revealing significant associations and patterns.

2.6 Ethical Considerations

The study adhered to strict ethical guidelines, including securing permissions, obtaining informed consent, ensuring respondent confidentiality, and treating participants fairly. Respondents were informed about the study's nature and their right to withdraw at any time, and their anonymity was preserved through pseudonyms. Data was kept confidential, and tools like Grammarly and Turnitin were used to ensure the study's authenticity and originality, maintaining high ethical standards throughout the research process.

3.0 Findings and Discussion

3.1 Demographic Profile of Farmer Associations

This chapter section presents the demographic profile of the farmer associations, municipal agriculturists, and banner program coordinators. The demographic profile of the farmer associations includes the number of members, length of the association’s existence, production area, registration, and accreditation. On the other hand, the demographic profile of the municipal agriculturists and banner program coordinators includes position, age, sex, civil status, work experience, and educational attainment.

Demographic Profile of the Members of the Farmer Associations

Table 1 provides the demographic profile of the Farmer Association involved in the study. It offers insights into various aspects such as the number of members, length of the association's existence, production area, registration, and accreditation. Regarding the number of members, most associations have more than 100 members, constituting 70.59% of the total associations surveyed. Regarding the length of the association's existence, the highest proportion falls within the category of 13–15 years, accounting for 47.06% of the total associations. When considering the production area, a significant majority of associations operate in lowland areas (70.59%), followed by those in irrigated lowland (29.41%) and rainfed lowland (17.65%) areas. Some associations operate in multiple production areas, such as lowland and upland or irrigated and rainfed lowland. Regarding registration, most associations are registered with the Securities and Exchange Commission (SEC), comprising 82.35% of the total. Meanwhile, regarding accreditation, the Department of Agriculture is the most common accrediting body, with 17.65% of associations accredited by the department. Additionally, several associations are accredited by a combination of the Department of Agriculture, local government units, and other entities.

Table 1. Demographic profile of the farmer associations

	Frequency	Percentage
Number of Members		
1-30	0	0.00%
31-60	2	11.76%
61-80	2	11.76%
81-100	1	5.88%
More than 100	12	70.59%
Length of the Association's existence		
1-3 years	0	0.00%
4-6 years	4	23.53%
7-9 years	4	23.53%
10-12 years	1	5.88%
13-15 years	8	47.06%
Production Area		
Lowland	12	70.59%
Irrigated Lowland	5	
Rainfed Lowland	3	
Irrigated and rainfed Lowland	4	
Upland Rainfed	1	5.88%
Lowland and Upland	3	17.65%
No answer	1	5.88%
Registration		
Securities and Exchange Commission (SEC)	14	82.35%
Cooperative Development Authority (CDA)	3	17.65%
Accreditation		
Department of Agriculture	3	17.65%
Local Government Unit	1	5.88%
Others	0	0.00%
Department of Agriculture and Local Government Unit	8	23.53%
Department of Agriculture, Local Government Unit and others	4	11.76%
No Answer	1	2.94%

Table 2. Demographic profile of the municipal agriculturists/municipal agriculturists coordinators

Variable	Frequency	Percentage
Position		
Municipal Agriculturists	13	43.33%
Banner Program Coordinator (Rice)	12	40.00%
Banner Program Coordinator (Corn)	2	6.67%
Banner Program Coordinator (High-Value Commercial Crops)	1	3.33%
Banner Program Coordinator (Livestock)	1	3.33%
Banner Program Coordinator (Organic Agriculture)	1	3.33%
Age		
26 to 33	7	23.33%
34 to 41	9	30.00%
42 to 49	3	10.00%
50 to 57	9	30.00%
58 to 65	2	6.67%
Sex		
Male	12	40.00%
Female	18	60.00%
Civil Status		
Single	7	23.33%
Married	21	70.00%
Widow	2	6.67%
Separated	0	0.00%
Years in Service		
1 to 3 years	8	26.67%
4 to 6 years	2	6.67%
6 to 8 years	3	10.00%
9 to 10 years	0	0.00%
Above 10 years	17	56.67%
Educational Attainment		
Associate's Degree in Agriculture or related field	0	0.00%
Bachelor's Degree in Agriculture or related field	18	60.00%
Master's Degree in Agriculture or related field	1	3.33%
Doctorate Degree in Agriculture or related field	11	36.67%

Demographic Profile of Municipal Agriculturists / Banner Program Coordinators

Table 2 presents the demographic profile of the Municipal Agriculturists and Municipal Agriculturist Coordinators participating in the study. It encompasses various variables such as position, age, sex, civil status, years in service, and educational attainment. Most respondents hold the position of Municipal Agriculturists (43.33%), followed closely by Banner Program Coordinators for Rice (40.00%). Other positions include Banner Program Coordinators for corn, high-value commercial crops, livestock, and organic agriculture. Regarding age, respondents span a wide range of age groups, with the highest proportions falling within the 34 to 41 years and 50 to 57 years brackets, each comprising 30.00% of the total. Most respondents are female (60.00%), reflecting a relatively balanced gender distribution within the group. In terms of civil status, the majority of respondents are married (70.00%), followed by those who are single (23.33%) and widowed (6.67%). None of the respondents indicated being separated.

3.2 Level of Implementation of the Machinery Distribution Program

In terms of Machinery Distribution

Table 3. Descriptive statistics of the level of implementation of the machinery distribution program interms of machinery distribution

Indicators	Farmer Association	MA and BPA	Mean	Interpretation
1. The program meets its objective, which is to distribute the following machinery:	2.94		2.94	FI
a. Rice Combine Harvester	3.00		3.00	FI
b. Recirculating Dryers	3.00		3.00	FI
c. Four-wheel drive Tractors	2.92		2.92	FI
d. Hand Tractors (Kuliglig)	2.75		2.75	FI
2. The program maximizes the utilization of its budget to distribute machinery.		2.73	2.73	FI
3. The program identifies the needs of the farmers regarding machinery.	2.69	2.83	2.76	FI
4. The program can distribute machinery to its intended beneficiaries.		2.90	2.90	FI
5. The program is being monitored and evaluated to assess its effectiveness and identify areas for improvement.	2.88	2.63	2.76	FI
6. The program implements mechanisms to ensure its continuity and sustainability	2.94	2.77	2.86	FI
7. The program is being monitored and evaluated to assess its effectiveness and identify areas for improvement. G2		2.63	2.63	FI
8. The program adheres to standards set by the implementing rules and regulations.	2.94	2.87	2.91	FI
Overall Mean	**2.90**	**2.77**	**2.85**	**FI**

Note: 1 to 1.67 = Not Implemented (NI); 1.68 to 2.34 = Partially Implemented (PI); 2.35 to 3.00 = Fully Implemented (FI); MA (Municipal Agriculturist), BPA (Banner Program Coordinator

Table 3 shows that the machinery distribution program has been fully implemented with an overall mean score of 2.85, indicating the achievement of its objectives. The program's effectiveness in providing essential agricultural machinery, such as rice combine harvesters and tractors, supports sustainable agriculture and rural development. This full implementation status highlights the program's adherence to established standards and regulations, enhancing its credibility and ensuring proper governance.

The study's findings align with those of Amongo et al. (2018), who found high mechanization levels in agricultural operations due to the availability of various types of machinery. The highest mean score of 2.91 was adherence to standards set by implementing rules, reflecting strong compliance and governance within the program. Adherence to standards is crucial for accountability, transparency, and promoting stakeholder trust, as well as improving program outcomes and sustainability.

However, Briones (2021) points out that strict regulatory adherence can sometimes hinder innovation and adaptive management, suggesting a need for balance between compliance and flexibility. Despite this, the program's commitment to monitoring and evaluation, with a mean score of 2.76, underscores its dedication to continuous improvement. Regular monitoring and evaluation help track progress, identify challenges, and make informed decisions, essential for the program's long-term success.

The study further notes that farmer associations (Group 1) showed slightly higher effectiveness (mean score of 2.90) compared to municipal agriculturists and banner program coordinators (Group 2), with a mean score of 2.77. This discrepancy could be due to farmer associations' hands-on experience and direct engagement with agricultural activities, leading to better resource allocation and maintenance practices. Group 2's lower scores may result from bureaucratic constraints and less direct involvement in farming.

Zhang et al. (2023) found that farmer-led initiatives typically outperform government-led programs in resource allocation and program management due to their deeper understanding of local contexts and participatory decision-making processes. Conversely, the FFTC (2018) study highlights systemic issues within government agencies, such as bureaucratic red tape and limited resources, which can impede the effectiveness of programs like those in Group 2. These challenges can delay decision-making and reduce responsiveness to farmer needs, impacting overall program effectiveness.

In terms of Machinery Maintenance

Table 4. Descriptive statistics of the level of implementation of the machinery distribution program in terms of machinery maintenance

Indicators	Farmer Association	MA and BPA	Mean	Interpretation
1. The machines are well maintained to ensure functionality	2.94	2.57	2.76	FI
2. A budget is allotted by the association for the maintenance of the machines.	3.00	2.63	2.82	FI
3. The farmers use the machinery with utmost care.	2.88	2.67	2.78	FI
4. The farmers notify the department when the machines malfunction.	2.59	2.47	2.53	FI
5. The department conducts a machine audit each year.	2.71	2.70	2.71	FI
6. The machines are well kept after use to avoid damage.	2.88	2.73	2.81	FI
Overall Mean	**2.83**	**2.63**	**2.73**	**FI**

Table 4 shows the machinery distribution program's maintenance practices are fully implemented, with an overall mean score of 2.73. This indicates the program's effectiveness in maintaining machinery to ensure their functionality and longevity, contributing positively to agricultural productivity and sustainable rural development. The highest mean score (2.82) was for budget allocation for maintenance, demonstrating the program's strategic approach to financial management and resource allocation, crucial for minimizing downtime and maximizing machinery productivity.

The study aligns with Huo et al. (2022), who found that effective maintenance practices, such as timely repairs and routine inspections, significantly extend machinery lifespan and enhance productivity. Conversely, Abirami (2023) highlights challenges like inadequate training and limited access to spare parts that can hinder maintenance effectiveness. Despite these challenges, the program's systematic budget allocation for maintenance underscores its commitment to preserving machinery functionality. The lowest mean score (2.53) was for farmers notifying the department of malfunctions, yet this is still considered fully implemented. This suggests that while there may be inconsistencies in reporting, the program has established functional communication channels for addressing machinery issues. Prichard (2023) found that effective communication mechanisms enhance program responsiveness and farmer satisfaction, although Mwangwela & Duvel (2006) identified barriers such as limited communication infrastructure and cultural norms that can affect reporting efficiency.

Farmer associations (Group 1) scored higher (2.83) in maintenance effectiveness compared to municipal agriculturists and banner program coordinators (Group 2) with a score of 2.63. The higher effectiveness of Group 1 can be attributed to their direct involvement and familiarity with machinery management, as supported by Syahyuti et al. (2021). However, Daum & Birner (2017) noted challenges such as limited technical expertise and coordination issues, which can affect both groups' maintenance efforts despite their roles and resources.

In terms of Beneficiary

Table 5 shows the machinery distribution program's implementation level, with an overall mean score of 2.89, indicating it is fully implemented. This suggests the program effectively meets beneficiary needs, providing appropriate machinery to support agricultural activities. It ensures transparent and accountable processes by including beneficiary associations in the distribution, enhancing their productivity and efficiency. This finding

aligns with Mokgomo et al. (2022), which highlighted the importance of aligning machinery provision with beneficiary needs and promoting transparency in distribution processes.

Table 5. Descriptive statistics of the level of implementation of the machinery distribution program along with beneficiary

Indicators	Mean	Interpretation
The association is well-identified as a beneficiary of the program.	3.00	FI
The machinery that is provided suits the farm needs of the association.	2.90	FI
The association receives the machineries that are requested.	2.77	FI
Overall Mean	2.89	FI

However, Loon et al. (2020) identified challenges in accessing and utilizing distributed machinery, such as inadequate training and maintenance support. These challenges suggest potential gaps in the program's ability to comprehensively address beneficiary requirements. Despite these issues, the program's high mean score for budget allocation and clear beneficiary identification demonstrates its commitment to transparency and accountability, as highlighted by Ballesteros et al. (2017).

The highest mean score of 3.00 was for the clear identification of beneficiary associations, underscoring the program's excellence in transparency and accountability. This clarity fosters trust, allows effective monitoring, and ensures that support reaches the intended beneficiaries. Ballesteros et al. (2017) found that programs excelling in transparent beneficiary identification enhance trust and credibility among stakeholders, promoting equitable access to program benefits.

The lowest mean score of 2.77 was for associations receiving requested machinery, though still fully implemented. This suggests that while there are occasional delays or discrepancies, the program generally meets machinery requests, contributing to agricultural activities. Peng et al. (2022) noted similar challenges in machinery distribution programs, emphasizing the need for ongoing monitoring to improve efficiency and beneficiary satisfaction.

3.3 Relationship Between the Level of Implementation and Profile of the Respondents

Table 6. Correlational analysis for the relationship between the level of implementation and profile of the respondents

Profile Variables	r	Strength and Direction	P-value	Decision	Remark
Age	-0.293	Weak Negative	0.116	Do not Reject Ho	Not Significant
Work Experience	-0.189	Weak Negative	0.317	Do not Reject Ho	Not Significant
Position	0.252	Weak Negative	0.180	Do not Reject Ho	Not Significant
Sex	-0.268	Weak Positive	0.153	Do not Reject Ho	Not Significant
Civil Status	-0.143	Weak Negative	0.453	Do not Reject Ho	Not Significant
Educational Attainment	0.085	Weak Positive	0.654	Do not Reject Ho	Not Significant

Note: Significant at alpha = 0.05

Table 6 presents the correlation between the implementation level of the machinery distribution program and the respondents' profiles. The results show that demographic factors like age, work experience, position, sex, civil status, and educational attainment have weak correlations with the program's implementation, none of which are statistically significant. For instance, while older respondents and those with more work experience show a slight decrease in implementation levels, and females show a slight increase, these variations are not substantial enough to be statistically meaningful.

Age shows a weak negative correlation (-0.293) with implementation levels, indicating a slight decline as age increases, though this is not statistically significant. Similarly, work experience has a weak negative correlation (-0.189), suggesting a minor decrease in implementation level with more experience. The positions held by respondents, whether Banner Program Coordinators or Municipal Agriculturists, also show a weak negative correlation (r = 0.252), implying slight challenges in program execution among different positions, but again, this is not statistically significant.

Gender exhibits a weak positive correlation (r = 0.268), indicating a slight improvement in implementation scores among females. However, like the other correlations, this is not statistically significant, suggesting that the relationship may not be meaningful across the entire population. Civil status shows a weak negative correlation

(r = -0.143), with married or widowed individuals having slightly lower implementation scores, potentially due to additional responsibilities, though this relationship is not statistically significant.

Lastly, educational attainment has a weak positive correlation (r = 0.085) with implementation scores, suggesting a slight tendency for higher educational attainment to be associated with higher implementation scores. However, this correlation is very weak and not statistically significant, indicating that educational attainment alone is not a significant predictor of program implementation effectiveness. Overall, demographic factors do not significantly influence the program's implementation level.

3.4 Relationship Between the Level of Implementation and Profile of the Farmer Associations

Table 7. Correlational analysis for the relationship between the level of implementation and profile of the farmer associations

Profile Variables	r	Strength and Direction	p-value	Decision	Remark
Number of Members	-0.209	Weak Negative	0.421	Do not Reject Ho	Not Significant
Length of the Association's Existence	0.289	Weak Positive	0.261	Do not Reject Ho	Not Significant
Number of Accreditations	0.670	Moderate Positive	0.003	Reject Ho	Significant
Production Area	-0.076	Almost Negligible Positive	0.780	Do not Reject Ho	Not Significant
Registration	0.385	Weak Positive	0.127	Do not Reject Ho	Not Significant

Note: Significant at alpha=0.05

Table 7 presents the statistical results on the correlation between the program implementation level and various profile characteristics of farmer associations. Notably, while most variables show weak or negligible correlations, the number of accreditations significantly influences the implementation level. Specifically, the number of members has a weak negative correlation (r = -0.209) with implementation levels, but this is not statistically significant (p = 0.421), indicating that member count does not significantly impact program implementation.

The length of an association's existence shows a weak positive correlation (r = 0.289) with implementation levels, but this too is not statistically significant (p = 0.261), suggesting that how long an association has been established does not notably affect program implementation. However, the number of accreditations held by farmer associations displays a moderately positive and statistically significant correlation (p = 0.003) with implementation levels, indicating that associations with more accreditations tend to have higher levels of program implementation.

Other variables, such as the production area and registration status, exhibit minimal or weak correlations with implementation levels. For instance, the production area has a negligible positive correlation (r = -0.076), and registration status has a weak positive correlation (r = 0.385) with SEC-registered associations slightly outperforming those registered with the CDA. However, these correlations are not statistically significant (p > 0.05), suggesting that these factors do not significantly predict program implementation effectiveness.

3.5 Problems Encountered in the Implementation of the Machinery Distribution Program

Table 8 reveals several issues in the implementation of the machinery distribution program. The most significant problem, reported by 65% of respondents, is the very small landholdings of farmers, which pose obstacles to the effective use of distributed machinery. Small plots make it economically and logistically challenging to deploy and maintain large-scale machinery. This finding aligns with Zerssa et al. (2021), who highlighted similar challenges faced by smallholder farmers due to limited landholdings and economic constraints.

Another major issue, reported by 63% of respondents, is the absence of certain necessary machinery provided by the Department of Agriculture. This indicates gaps in the machinery distribution, potentially due to logistical constraints or budget limitations. The discrepancy between the program's perceived full implementation and the reported absence of essential equipment suggests possible misalignment between administrators' and farmers' needs. The repetitive selection of certain associations, reported by 45% of respondents, raises concerns about fairness and equity in the distribution process. This practice could stem from favoritism or systemic challenges within the program's framework, as noted by the International Food Policy Research Institute (IFPRI) in 2009, which highlighted similar issues in other contexts.

Table 8. Descriptive statistics of the problems encountered in the implementation of the machinery distribution program

Problems	Farmer Associations	MA and BPA	Total	Percentage	Rank
1. The distribution is uneven some associations are repetitively chosen as the recipient of the machinery	15	12	27	45.00%	3
2. Farmers lack awareness of utilizing the machinery	4	1	5	8.33%	8.5
3. The equipment distributed did not match the originally identified or requested	7	2	9	15.00%	10
4. Machinery easily malfunctions since they are not well-maintained.	12	3	15	25.00%	4.5
5. Machinery lacks the monitoring to see if they are well kept or well stored.	13	1	14	23.33%	6
6. The program does not first identify the needs of the farmers.	3	6	9	15.00%	8.5
7. Some machinery/equipment is not provided by the Department of Agriculture.	23	15	38	63.33%	2
8. There is abundant rural labor.	3	0	3	5.00%	11
9. Farmers have very small landholdings.	27	12	39	65.00%	1
10. Government policies are not favorable to mechanizing agriculture.	0	0	0	0.00%	12
11. Inappropriateness of the machines to the random layout, irregularly shaped and small-sized farms.	12	3	15	25.00%	4.5
12. Unavailable access roads prevented machines from easily traversing each rice field.	7	3	10	45.00%	7

Additionally, 25% of respondents reported machinery malfunctions due to inadequate maintenance, indicating the need for better maintenance procedures to ensure reliability and longevity. This finding contrasts with quantitative data suggesting effective maintenance practices, possibly due to differences in perception among respondents. Furthermore, the inappropriateness of machinery for irregularly shaped or small farms, also reported by 25% of respondents, underscores the need for equipment that considers diverse farm layouts, as unsuitable machinery can hinder productivity.

4.0 Conclusion

The analysis revealed several key findings about the associations and the Machinery Distribution Program. Most associations have over 100 members and have been in existence for 13–15 years, operating in lowland areas. They are registered with the Securities and Exchange Commission and accredited by both the Department of Agriculture and Local Government Units. The program is fully implemented across all areas, including machine distribution, maintenance, and beneficiary management.

A significant finding was that the number of accreditations showed a moderate positive correlation with the level of implementation, indicating that associations with more accreditations tend to have higher implementation levels. However, other profile variables, such as the number of members, the association's age, production area, and registration status, showed weak or negligible correlations with the implementation level, which were not statistically significant. Several challenges were identified in the program's implementation, including the small landholdings of farmers, gaps in the provision of machinery, uneven distribution, inaccessible roads, and inappropriate machinery for varied farm layouts. These issues highlight obstacles that impede the effective utilization of the distributed machinery and the overall success of the program.

The conclusions drawn from the findings indicate that most associations share similar profiles and that the Machinery Distribution Program is fully implemented in key areas, demonstrating adherence to guidelines. The number of accreditations is a significant predictor of higher implementation levels, while other profile variables are not. The program faces several challenges that need to be addressed to enhance its effectiveness, such as addressing the issues of small landholdings and ensuring fair distribution of machinery. The conclusions from this study indicate that the Machinery Distribution Program has been effectively implemented, adhering closely to established guidelines. The finding that the number of accreditations significantly correlates with higher implementation levels highlights the importance of institutional support in enhancing program success. Addressing challenges like small landholdings, gaps in machinery provision, and distribution inequities is crucial for further improving the program's effectiveness. This study advances the field by providing empirical evidence on how organizational factors influence program outcomes, offering valuable insights for policymakers to optimize agricultural support initiatives and suggesting areas for future research to explore long-term impacts and innovative solutions in machinery distribution.

To address the identified problems, it is recommended that the Department of Agriculture Regional Office 1 (RO 1) adopt and implement the proposed Action Plan. A follow-up study should be conducted to assess the strategic plan's effectiveness. Additional funding sources should be identified to provide more machinery and equipment, especially for farmers with small landholdings. Regular monitoring and evaluation are essential to ensure proper maintenance and functionality of the machinery. Timely reporting by associations on the status of the machinery should be enforced. Additionally, training and seminars on storage and maintenance should be provided to ensure the good condition of the machinery.

5.0 Contributions of Authors

The sole author was responsible for the comprehensive development and execution of this research study. They conceived and designed the research framework, identifying key objectives and formulating the methodological approach. The author coordinated and conducted the data collection process, ensuring the effective gathering of relevant data. They performed the data analysis, using statistical tools to interpret findings and derive significant conclusions. The author wrote the manuscript, including all sections, and meticulously revised and refined it to meet publication standards. They integrated literature reviews, developed the discussion, and crafted recommendations to address challenges identified in the Machinery Distribution Program. This thorough involvement ensured the research's integrity and rigor, contributing to the advancement of knowledge in agricultural program implementation.

6.0 Funding

None

7.0 Conflict of Interests

No conflict of interest.

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