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Agricultural Extension Services and the Implementation of Rice Competitiveness Enhancement Fund Program in One Maguindanao

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Abstract

This study examined the relationship between agricultural extension services and the implementation of the Rice Competitiveness Enhancement Fund (RCEF) Program in One Maguindanao, Philippines. Specifically, it assessed farmers' level of satisfaction with agricultural extension services, the extent of RCEF program implementation, differences across municipalities, the predictive influence of agricultural extension services on RCEF implementation and changes in beneficiaries' monthly income. A quantitative descriptive-correlational research design was employed involving 396 RCEF beneficiaries selected through random sampling. Data were collected using a validated, adapted and enhanced questionnaire and analyzed using descriptive statistics, the Kruskal–Wallis H test, multiple linear regression, and the Wilcoxon signed-rank test at a 0.05 level of significance.

The findings revealed that respondents were very satisfied with agricultural extension services (M = 3.96, SD = 0.39), while the implementation of the RCEF program was rated high (M = 3.95, SD = 0.30). Significant differences among municipalities were found in technical consultation and information and communication technology (ICT) for agricultural extension services, and in credit assistance, seeds, training and extension, and overall RCEF implementation. Multiple regression analysis showed that agricultural extension services significantly predicted RCEF implementation, $F(4, 391) = 28.10$, $p < .001$, explaining 22.3% of the variance ($R^2 = .223$). Technical consultation and training and capacity-building emerged as significant predictors, whereas field demonstration and ICT were not. Furthermore, beneficiaries' monthly income significantly increased after RCEF implementation ($W = 78{,}580$, $p < .001$).

The study concludes that strengthening technical support, farmer training, and equitable access to RCEF interventions can enhance program implementation and improve the productivity and livelihoods of rice farmers in One Maguindanao.

Keywords: *Agricultural Extension Services, Rice Competitiveness Enhancement Fund (RCEF) Program, Rice Farmers, PhilRice, PhilMech*

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Background

Agricultural extension services are essential in enhancing farmers' knowledge, technology adoption, and agricultural productivity, while the Rice Competitiveness Enhancement Fund (RCEF) Program was established to strengthen the competitiveness of the Philippine rice industry. Despite these initiatives, limited evidence exists on how farmers' satisfaction with agricultural extension services influences the implementation of the RCEF program at the local level.

REVIEW OF RELATED LITERATURE

This chapter presents the assumptions, views, conceptions, and observations advanced by various writers and authorities on the variables that formed the conceptual framework of this study.

Agricultural Extension Services

Agricultural extension services have been described as a key mechanism for transferring knowledge and innovations from research institutions to farmers. According to Rolling (1988), Extension functions as a specialized form of interaction designed to encourage voluntary shifts in behavior. It represents a strategic approach organization use to foster changes expected to benefit the community or society.

Agricultural extension services play a central role in disseminating technical innovations to farming communities, linking research outputs with practical agricultural practices. From a historical perspective, agricultural extension served as a support mechanism that connected scientific discoveries and policy directives to practical farming applications. Its primary function was to provide essential knowledge and guidance to cultivators, enabling them to adopt methods that enhance both yields and long-term ecological balance (Davis & Sulaiman, 2016).

Agricultural extension services are institutional mechanisms designed to transfer agricultural knowledge, innovations, and technologies from research institutions to farmers. According to the Food and Agriculture Organization (FAO, 2014), extension services or rural advisory services help farmers gain access to knowledge, information, and technologies, enhance their technical, organizational, and management capabilities, and strengthen connections with research institutions, markets, and other relevant stakeholders. Extension systems aim to enhance productivity, promote sustainability, and improve rural livelihoods.

Historically, extension followed a technology transfer model; however, modern approaches emphasize participatory learning, capacity building, and farmer empowerment (Hamisu et al., 2017). Contemporary extension services now integrate advisory support, market linkages, and digital platforms to address evolving agricultural challenges.

Numerous empirical studies demonstrate a positive relationship between extension services and agricultural productivity. Danso – Abbeam et al. (2018) found that access to extension services significantly improved farm productivity and household income in Northern Ghana. Similarly, Baylie and Percsi (2025) reported that farmers who participated in extension programs achieved higher crop yields than non–participants in Ethiopia.

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Agricultural extension services are critical to enhancing household food security. Research shows they help increase food availability by raising production levels and improve economic access to food by boosting farmers' incomes (Awotide et al.). Furthermore, extension enhances resilience to climate variability by equipping farmers with adaptive strategies and risk management skills (Somanje et al., 2021).

Farmers' perceptions of extension services influence the adoption of agricultural technologies. Moshobane and Antwi (2022) found that the perceived effectiveness of public extension services depends on the quality, relevance, and frequency of advisory visits. Where services were regular and tailored to farmers' needs, adoption rates were higher.

Agriculture extension services—recognized under the Agriculture and Fisheries Modernization Act of 1997 (RA 8435) as a key driver of development—cover training, information, and support services that improve the technical, business, and social capabilities of farmers and fisherfolk. These aim to raise productivity, competitiveness, and sustainability in the sector, while supporting areas such as post-harvest processing, marketing, entrepreneurship, management, and institutional development. (DA-ATI, 2025).

Extension services are a powerful driver of development worldwide, playing a key role in ensuring food security and improving economic well-being (Birner et al., 2009). Agricultural extension plays a significant role in advancing global development and contributes to achieving several Sustainable Development Goals, particularly those related to food security, poverty reduction, and sustainable growth (UN, 2015). As a result, the fundamental role of agricultural extension cannot be overrated. Furthermore, Cunguara and Moder (2011) and Chowdhury et al. (2014) asserted that agricultural extension services play a significant role in, and are often credited with, improving food security, reducing poverty, and improving livelihoods. This assertion was sustained in the work of Ngugi et al. (2014) which maintained that participatory extension services are the most effective mechanism and package which assist smallholder farmers by exposing them to various educational techniques that equip farmers by making it possible for them to improve their farming enterprises; cultivation methods; rapidly increase productivity and increase income levels; improve livelihoods; and promote social and economic standards (Anderson & Feder, 2004; Baig & Aldosari, 2013). The consensus view is that agricultural extension plays a pivotal role in encouraging the adoption of improved technologies and innovations; addressing rural poverty; increasing agricultural (mainly food) production; and providing critical access to knowledge. This should lead to enhanced productivity, quality of life, and livelihoods (Anderson & Feder, 2007; Davis et al., 2010; Aker, 2011).

In many developing countries, large numbers of low-income rural farmers struggle to obtain essential agricultural inputs at reasonable prices. These include quality seeds, chemical fertilizers, farm equipment, and storage facilities - all of which are necessary to boost production levels and improve household earnings (Dorward & Chirwa, 2013).

The Food and Agriculture Organization notes that individual farm visits are the primary means by which extension staff interacts directly with producers. These on-site meetings are critical for establishing trust and motivating farmers to become actively involved in the process. Personal interaction during farm visits enhances learning by providing farmers with individualized attention and advice tailored to their specific needs.

Research in the Philippines also indicates that access to extension services, including regular farm visits, significantly influences farmers' adoption of new technologies. In rural areas, where access to information is limited, extension workers serve as the primary source of

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agricultural knowledge. However, challenges such as inadequate funding, lack of transportation, and high farmer–to–extension worker ratios limit the frequency and effectiveness of farm visits (FFTC, 2016).

Training and Capacity Building

ATI provides training opportunities on commodity-based technologies, along the food value chain, through the DA Banner Programs on rice, corn, organic agriculture, and high-value crops. Likewise, the Institute prioritizes capacity development programs focused on social technologies. These include training in organizational leadership, management techniques, interpersonal skills, project planning, agricultural digitalization, and enterprise development (DA-ATI, 2025).

Furthermore, ATI employs various extension approaches and strategies when conducting training activities. These include: (1) **Ladderized Approach** – ensures capability-enhancement and upscaling of competencies, based on trends, and their needs and demands. Identifying basic, advanced, and specialized training programs will help extension professionals match the right intervention to their clients' needs. (2) **Face-to-face (F2F)** – refers to carrying out a training similar to the traditional classroom setting. Whenever necessary, the conduct of F2F trainings implements the minimum health protocols per the recommendation of the Department of Health, and (3) **Distance Learning** – takes place between the resource person and the learners who are geographically remote from each other during the training. Distance learning may utilize traditional media such as radio and television, and/or new media through the ATI's official social media pages and/or the e-learning portal, accompanied by hard copies of modules, handouts, or other training materials provided to participants to support understanding of the lessons further. The distance learning may be conducted synchronously or asynchronously. Synchronous learning refers to learning with the resource person in real time. For this to occur, the resource person (s) and the participants must be on the same online platform at the same time. The benefits of synchronous learning include participant interaction, resulting in the exchange of knowledge and experiences, and real-time feedback from the resource person. In contrast, asynchronous learning is when participants and resource person (s) are not engaged in the learning process at the same time. Thus, no real-time interaction among the group. While this limits group interaction, asynchronous learning is advantageous for participants, as it allows them to learn at their own pace and on their own time.

Some examples of distance-learning training and activities carried out by the ATI include e-Learning, School-on-the-Air, webinars, and online training.

Blended Learning – combines the F2F sessions with any or a mix of online or modular distance learning. This strategy is used to ensure the effectiveness of training interventions that may require site visits and/or hands-on technology demonstrations to complement distance learning activities. However, if F2F activities are not feasible, participants may be asked to prepare their materials in advance to enable an online hands-on tutorial.

The Institute, with its network of training centers, is accredited by the Professional Regulation Commission (PRC) as a local provider of the Continuing Professional Development (CPD) Program, through which licensed agriculture professionals can earn CPD points by participating in ATI training programs.

In addition, the Department of Agriculture (DA), through the Agricultural Training Institute (ATI), spearheads, coordinates, and supervises programs, activities, and projects

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nationwide. The ATI Regional Training Centers across the country implement various activities for farmers, fisherfolk, and extension partners. These include free seminars, technology demonstrations, and learning sessions, among others, designed to broaden access to knowledge and resources that can strengthen agricultural and fisheries communities in partnership with local government units nationwide.

Integrating input from farmers demonstrates a collaborative methodology, a strategy that Chambers (1994) emphasized as vital for ensuring that development programs remain practical, widely accepted, and effective over the long term.

Field Demonstrations and Practical Learning

On-site trials serve to test and showcase practical methods within specific communities. These activities are conducted directly on producers' land, replicating the actual circumstances and environment found on their farms (Bell & Rickman, 2013).

DA-ATI (2025) stated that field demonstration in agriculture is an on-site event, often held on a cooperating farmer's land, that showcases and tests new agricultural technologies, practices, or products in real-world conditions. These demonstrations raise awareness, educate farmers, and build confidence by allowing them to see the benefits and compare new methods against their existing ones firsthand. Key elements for success include accessible locations, clear objectives, and opportunities for farmers to ask questions and engage with the technology.

Wallau, Rios, and Blount (2024) noted that demonstration plots remain among the most established and effective extension strategies, as they combine experiential learning through observation and hands – on practice. Similarly, Adamson and Fiscovica (2021, et al.) highlighted that on – farm demonstrations are highly beneficial, as they offer practical knowledge that farmers can readily implement in their own operations. Furthermore, Maaki and Antwi (2022) found that demonstrations and farmer training are among the extension approaches most favorably viewed by farmers.

Technical Support

Technical support in agricultural extension services provides farmers with expert advice, training, and knowledge to improve farming practices, increase productivity, and promote sustainability. This includes direct guidance on crops, soil, and water resources, as well as the adoption of new technologies, often delivered through on-farm visits, training programs, and digital platforms. Advisory services are designed to guide producers in solving technical problems, matching output to market needs, and adjusting to ecological changes. This is achieved through cooperative efforts involving farming communities, field staff, and research experts (Birner et al., 2009).

Technical support in extension services refers to targeted advisory support that helps farmers adopt improved practices, technologies, and innovations. Research shows that improved extension advisory services and technical consultations significantly influence production, technology adoption, and farm efficiency. Empirical evidence from Ethiopia indicates that professional guidance and the distribution of appropriate technologies significantly boosted wheat output and operational effectiveness. The study underscores the vital role of delivering specialized and accurate assistance to agricultural producers (Yitayew et al., 2023).

Recent analyses reveal that successful agricultural support involves much more than just passing on knowledge. It also demands flexible guidance and active community involvement.

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Consequently, field workers must evolve from simple messengers into partners who enable producers and scientists to work together to develop practical solutions (Agricultural Extension in South Asia, 2024).

Highly skilled, well – trained extension personnel play a vital role in linking farmers to new technologies, knowledge, markets, and support services, and are essential to the success of any effective extension and advisory system (Swanson and Rajalahti, 2010).

According to Ragasa (2014), the presence, accessibility, and quality of extension services play a crucial role in shaping farmers' satisfaction.

Assessments in South Africa revealed that farmers evaluate extension services partly on the quality, relevance, and applicability of technical advisory services, reinforcing the need for responsive, needs–driven consultation (Maake & Antwi, 2022).

The lower scores in participatory planning and coordination support the evidence that numerous extension systems continue to operate in a top – down manner, thereby restricting involvement in decision – making processes (Chambers, 1994; Rivera & Sulaiman, 2009).

Information and Communication Technology

Information and communication technology (ICT) in agricultural extension provides farmers with instant access to vital information, improves decision-making, and enhances productivity through tools like mobile apps, SMS, and online platforms. These technologies deliver timely advisories on weather, market prices, and best practices, while also providing access to training and remote expert advice, leading to increased yields and income, and more efficient agricultural practices (CGIAR, 2025).

With the advent of digital technologies, technical consultations in agricultural extension have increasingly embraced ICT tools to enhance reach and effectiveness. Reviews of digital extension approaches highlight that incorporating mobile, web, and social technologies can expand advisory services and overcome communication challenges, particularly among smallholder farmers. Analyses of modern information delivery methods show that integrating mobile applications, online platforms, and social networks can widen the reach of support services and bridge communication gaps. Nevertheless, limitations in technical skills and insufficient network facilities continue to pose significant obstacles (Sen et al., 2024).In Africa, research conducted in Ghana and Zambia indicated that regular engagement between farmers and extension officers – including participatory training and ICT - enabled communication – can positively impact technology adoption and productivity outcomes (Somanje et al., 2021).

Studies conducted in the country show that using a combination of communication tools helps us effectively disseminate technical knowledge among rice growers. However, the successful application of innovative techniques relies heavily on their availability and compatibility with the specific needs and inclinations of the farming community (Kante et al., 2024).

According to Aker (2011), digital tools effectively bridge information gaps and enable producers to obtain up – to- date, practical data essential to their operations. Similarly, Davis and Asenso (2010), argued that digital communication systems significantly enhance both speed and the dependability of knowledge delivery to farming communities.

Mittal and Mehar (2016) found that both infrastructural limitations and socio – economic factors are major barriers to the adoption of information and communication technologies among

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farmers. It also reflects a digital divide that may limit the inclusivity of ICT – based interventions, particularly in rural and underserved areas.

Implementation of RCEF in One Maguindanao

The Rice Competitiveness Enhancement Fund (RCEF), a provision under RA 11203, Otherwise Known as the Rice Tariffication Law, is being actively and fully implemented in the One Maguidanao, with the Ministry of Agriculture, Fisheries, and Agrarian Reform (MAFAR) serving as the key implementing partner in collaboration with national government agencies.

One Maguindanao is largely comprised of vast agricultural land suitable for corn and livestock, not to increasing number of Registry System for Basic Sectors in Agriculture (RSBSA) registered farmer and fisherfolks in the region need extension service and a field schools to conduct training, farm visitation, methods demonstration, skills enhancement, modifications, technological advancements and other farm related skills and knowledge to be able to keep abreast with the trends in farming and increase their productivity while ensuring the environments safety.

In an interview, Secretary Tiu Laurel of the Department of Agriculture mentioned that the "extension of the Rice Competitiveness Enhancement Fund-Program is very important. We need additional years to provide adequate support through mechanization and increased seed production", he added (DA Press Office, 2024).

Despite documented gains, several studies point to implementation challenges that affect RCEF effectiveness. Delays in fund disbursement, uneven resource distribution, limited monitoring capacity, and organizational weaknesses within farmer groups have been cited as recurring issues. Cayetano et al. (2023) emphasized that cooperative governance and maintenance capacity significantly influence the sustainability of mechanization benefits.

Balie and Valera's (2020) analysis of trade policy reforms showed that while households enjoyed lower milled rice prices, local rice millers experienced reduced earnings as market competition intensified with rising imports. This policy context underscores the necessity of RCEF as a compensatory intervention to improve productivity, reduce production costs, and enhance the competitiveness of Filipino rice farmers in an open market.

Mechanization

The RCEF Mechanization Program in the Philippines provides rice farmers with agricultural machinery to increase productivity and competitiveness. It aims to achieve this by giving farmers, through their cooperatives and associations, better access to modern machinery for both production and post-harvest activities. The program also prioritizes skills development and the modernization of farming operations nationwide. By cutting expenses and minimizing waste after harvest, it aims to strengthen the country's position in the international market (DA-RCEF Mechanization, 2025).

Cayetano et al.'s (2023) research conducted in Nueva Ecija revealed that improved production outcomes are closely linked to having proper equipment, expert guidance, and a strong organizational structure. However, the study also noted difficulties with upkeep, limited technical know-how, and issues with teamwork among members.

Numerous studies have analyzed the equipment support under the program. Research conducted by Navarro and Dulay (2021) shows that access to modern tools such as plowing and

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planting machines helped growers reduce costs and physical effort. Furthermore, automation enabled tasks to be completed precisely on time, a requirement necessary for maximizing land use through successive planting seasons.

Research assessing RCEF's outcomes has reported initial gains in productivity but mixed results in long-term competitiveness. An analysis of official agricultural data by Dela Cruz and Soriano (2023) revealed that areas that successfully adopted machinery recorded a slight improvement in production output per hectare.

However, research indicates that the gains from agricultural support are not evenly distributed. Farmers with greater resources are better able to access subsidies and adopt modern technologies, while those with limited means remain hindered by insecure land rights and insufficient capital (Doan & Gill, 2025). These differences underline the need for equitable program design and targeted support.

Research also examines the economic effects on farming households. A study by Salvador and Casco(2025) revealed that enhanced productivity resulting from RCEF training programs led to significant increases in gross earnings for many participating farmers. However, they cautioned that increased production does not always equate to greater profitability if post–harvest and market linkages remain weak.

Numerous empirical studies have explored the implementation and associated difficulties of the RCEF mechanization initiative. Notably, Cayetano et al. (2023) analyzed the factors shaping production efficiency and the obstacles faced by Farmers' Cooperatives and Associations (FCAs) participating in this program. Their quantitative results showed that access to and effective use of mechanized equipment, technical training, and credit services significantly influenced productivity outcomes, while coordination challenges and limited access to information constrained full adoption.

Likewise, Arbes et al. (2024) evaluated the influence of mechanization on production levels among rice growers in Davao Del Norte. Their results demonstrated that following the program intervention, there was widespread acceptance of modern equipment, resulting in higher output per hectare, lower operational expenses, and improved operational efficiency.

Seeds

The RCEF Seed Program primarily contributes to achieving Outcome 1 (yield enhancement), particularly in Output 1.1. Higher Adoption of Certified Inbred Seeds. It also has indirect contributions to the other outcomes. The RESP, on the other hand, also contributes to increasing farmers' yield (Outcome 1) and reducing production cost (Outcome 2) by enhancing the adoption of integrated crop management technologies (DA-Philrice, 2025).

Further, promoting and distributing certified seeds of inbred rice varieties, acquisition and distribution of certified seeds technology demonstrations and field days (PalaySikatan) Mobilizing and strengthening local seed production Basic seed production, Support to seed production, Improvement of seed quality control services, Development of RCEF Seed Monitoring System Supporting variety development, National Cooperative Test, DNA profiling of Philippine-released varieties, Strengthening farmers organizations, Seed promotion through strategic communication, Strengthening farmer and seed grower associations Information, education, and communication (IEC) materials on high-yielding and cost-reducing technologies in rice production were also provided to the program's recipients through the communication support services project of the RCEF-Extension Program co-implemented by the DA-PhilRice.

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Research has also evaluated the effects of seed-related interventions supported by RCEF. According to PhilRice (2022), the provision of high-quality certified seeds and improved planting materials resulted in production gains of 10-15 percent compared with conventional seed varieties.

The dissemination of quality seeds under RCEF has been documented as a major driver of yield improvement. According to Philippine News Agency reports, RCEF's seed program has helped farmers in Central Luzon increase their yields by at least 1 ton per hectare, demonstrating the impact of certified seed use on productivity.

Empirical evidence suggests measurable yield improvements among RCEF beneficiaries. Farmers supported by RCEF in the CARAGA region achieved notable production gains across multiple cropping cycles. Official records show that following the adoption of high-quality seeds and modern equipment, many growers reported an additional yield of up to 0.5 metric tons per hectare (Philrice, 2022). Similarly, RCEF's seed component has been associated with higher average rice yields across targeted provinces, attributed to the superior quality and germination rates of certified inbred seeds provided to farmers.

Research has also documented the wide range of methods that farmers employ in seed management. For instance, studies show that practices related to choosing appropriate varieties, retaining seeds for planting, and ensuring proper storage vary significantly across different communities and production systems (Louwaars & De Boef, 2012).

Studies consistently show that seed quality is a key determinant of rice production. High-quality seeds ensure better germination, stronger seedling growth, and improved resistance to pests and diseases. Consequently, access to certified seeds is widely recognized as essential for increasing farm productivity (IRRI, n.d.).

Morris et.al (2007) highlighted that securing access to high - quality planting materials at the appropriate time is essential for boosting farm output and guaranteeing long – term food stability. Similarly, Evenson and Gollin (2003), showed that enhanced seed types play a major role in increasing crop output, especially in developing nations.

According to Spielman and Smale (2017), how well seed systems function depends greatly on whether crop varieties are suited to the specific environmental and ecological conditions of the area where they are grown.

Training and Extension

Agricultural extension services have evolved from traditional top–down models focused on technology transfer to more participatory and client–oriented systems. Early extension models were built around the Training and Visit (T and V) system, which focused on regularly scheduled visits by field staff to directly deliver technical knowledge and improved farming methods to producers (World Bank, 1993). Modern extension strategies focus on collaborative learning, strengthening farmers' capacities, and linking production to supply chains and market systems to tackle complex agricultural issues more effectively (Hamisu et al., 2017).

The Philippines' RCEF (Rice Competitiveness Enhancement Fund) training and extension initiative seeks to strengthen farmers' capabilities and market competitiveness. It offers capacity-building activities for extension workers, trainers, and producers, focusing on improved cultivation of inbred rice, seed quality assurance, and agricultural mechanization, often delivered through the experiential Farmer Field School (FFS) model. Implemented through

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collaborations among the Department of Agriculture and its specialized agencies, such as ATI, the program also provides farm inputs, equipment, and financial support (DA-ATI, 2025).

The extension component of RCEF is designed to enhance technical proficiency and decision-making skills among growers. In an evaluation by Salvador and Casco (2025), the Farmer Field School (FFS) approach proved highly effective, resulting in statistically significant gains in production output, greater acceptance of standard practices, and increased earnings for participants.

Extension support and farmer education are identified as critical elements for program effectiveness. Studies confirm that capacity-building efforts facilitate the transfer of technical knowledge, which in turn promotes the wider adoption of improved farming practices (World Bank, 2021).

Research indicates that agricultural development programs such as RCEF often foster social cohesion and organizational development. Training and group-based activities facilitate the establishment and strengthening of farmers' cooperatives and networks, which serve as platforms for knowledge sharing, research pooling, and collective action to improve livelihoods (World Bank, 2022).

The RCEF – Rice Extension Services Program (RCEF – RESP) has been evaluated for its role in enhancing extension delivery and improving farmers' technical skills. A comprehensive national assessment led by SEARCA revealed that the RCEF RESP initiative effectively broadened the application of evidence-based farming methods. It resulted in higher utilization of quality seeds, enhanced crop nutrition and protection strategies, and reinforced the capacity of local extension networks to deliver support services (SEARCA,2026). Farmers trained under Learning Sites for Agriculture (LSAs) and Farmer Field Schools (FFS) demonstrated sustained technology adoption, contributing to higher productivity and resilience (PIA).

Credit Assistance

Under the RCEF program, financial support is delivered via the Expanded Rice Credit Assistance (ERCA - RCEF) scheme. This facility provides access to credit for individual growers and recognized organizations to fund input procurement, equipment purchases, and crop production activities. Administered by state-owned banks, the program offers favorable lending terms characterized by minimal interest charges, streamlined documentation, and flexible security requirements. To apply, individual farmers must be enrolled in the Registry System for Basic Sectors in Agriculture (RSBSA) (BSP, 2025).

Access to financing is essential for farmers to adopt modern technologies and quality inputs. Through the Expanded Rice Credit Assistance (ERCA) under RCEF, Landbank provides affordable loans to individual growers and farmer organizations. As of 2024, the bank has disbursed a total of P 2.89 billion, benefiting over 17,700 farmers and 270 cooperatives to support production activities and infrastructure development (LANDBANK, 2025). Data show that as of early 2024, LANDBANK had disbursed a total of P2.5 billion in credit support under ERCA-RCEF. The bank successfully utilized its full annual allocation of P 500 million from 2019 to 2023, providing affordable financing to thousands of rice farmers and their organizations (PIA, 2024). These loans enable farmers to cover production costs, acquire farm machinery, and engage in milling and trading. The program's success in providing accessible credit to a

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significant number of farmers is a crucial aspect of RCEF's strategy to enhance their economic resilience.

The loans typically offer low fixed interest rates, such as 2% per year for individual farmers and 0% for on–lending cooperatives, provided the pass–through rate to end borrowers does not exceed 6% (Agricultural Training Institute, n.d.; Cordero, 2025).

In a study conducted by Descartin (2021), the attitudes and financial practices of rice farmers availing of ERCA loans in Sta. Rita, Pampanga, was analyzed. Results showed that beneficiaries held favorable views of the program, citing straightforward requirements and prompt disbursement as key advantages. However, it was also observed that credit funds were not used exclusively for agricultural activities, with a portion allocated to household needs and other non-production costs. This demonstrates the complex and dynamic nature of credit utilization in rural farming communities.

While not centered solely on financing, research on the RCEF mechanization initiative highlights credit access as a critical driver of program success. Cayetanao et al. (2023) found that access to credit is among the key factors shaping the productivity and operational capacity of farmers' cooperatives and associations in Nueva Ecija. Their work shows that whether credit is accessible, affordable, and released on time significantly determines how well these groups can adopt and utilize modern farm machinery.

Studies emphasize that aligning different program components is key to maximizing benefits. Official reports note that integrating credit support, mechanization initiatives, and extension services ensures that farmers can fully utilize available technologies and resources to improve productivity and income (PhilMech,2024). Although this study does not directly analyze credit assistance, it indicates that credit should not be viewed in isolation but rather as part of an integrated farm support ecosystem that enhances the adoption of technologies and best practices.

Although not Philippines–specific, global agricultural economics research supports the notion that access to formal credit improves farm productivity and technical efficiency. Global agricultural research confirms that access to formal credit enhances farm productivity and efficiency. Jimi et al. (2019) demonstrated in a field experiment in Bangladesh that easing financial constraints significantly increased rice yields, driven by both greater adoption of modern technologies and more efficient resource use. These findings provide strong theoretical support for the credit component of programs like RCEF.

Research consistently shows that access to credit is essential for boosting agricultural productivity. According to Llanto (2017), financial support enables farmers to acquire modern technologies and high-quality inputs, which directly contribute to higher yields and better incomes. Without sufficient credit, many small-scale producers face difficulties in maintaining production levels or adopting innovative farming techniques.

Research also highlights that access to affordable financing is indispensable for advancing agricultural modernization in the country. Briones (2019) pointed out that limited access to credit often restricts farmers from adopting quality seeds, chemical inputs, and modern equipment, which directly hampers their ability to produce more efficiently and compete in the market.

Access to financial services is widely recognized as a key driver of agricultural progress. According to the FAO, agricultural credit enables farmers to acquire necessary inputs, make productive investments, and cope with production uncertainties. When formal financing is

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unavailable, many smallholders are forced to rely on informal sources with exorbitant interest rates, which often trap them in cycles of debt and financial vulnerability (FAO, 2017).

Access to credit has long been recognized as a critical factor in improving agricultural productivity, particularly among smallholder farmers in developing countries. Credit assistance enables farmers to invest in essential inputs such as seeds, fertilizers, labour, and technology, thereby enhancing farm output and income.

Numerous studies confirm that access to credit is closely linked to better agricultural performance. For example, Lelisho and Lelisho (2024) found that financial support significantly boosted both crop yields and household earnings. Their research showed that farmers with access to credit were able to acquire high-quality inputs and adopt improved production techniques, resulting in measurable increases in output.

Similarly, Haryanto et al. (2023) found that access to both formal and informal credit sources had a favorable effect on farm performance and technical efficiency. Their research showed that financial support, regardless of its source, enabled farmers to improve production outcomes and use resources more effectively.

Microcredit has also been widely recognized as an effective tool for enhancing agricultural productivity. Research conducted by Mbewe (2020) indicates that access to such financial support is significantly associated with increased maize production in Zambia, with some studies reporting production gains of over 27%. This further demonstrates that financial assistance plays a substantial role in rising agricultural output.

In Bangladesh, research and program experiences show that combining microfinance services with agricultural mechanization significantly enhances farm productivity. Financial support allows farmers to acquire modern equipment, reduces costs, and leads to higher crop yields and incomes (Ambler et al., 2024). Ambler et al. (2024) noted that access to microcredit enabled farmers to adopt mechanized farming practices, which improved efficiency and production levels.

Moreover, access to credit is closely linked to the adoption of new technologies, which is a key driver of productivity growth. Nakano and Magezi (2020) found that microcredit helped overcome financial barriers, enabling farmers to use improved inputs like fertilizers and adopt better farming methods, thereby supporting technological advancement in agriculture.

Synthesis

The reviewed literature and studies consistently emphasize that agricultural extension services play a vital role in improving farmers' knowledge, adoption of modern technologies, productivity, and income. Likewise, the Rice Competitiveness Enhancement Fund (RCEF) program, through its components on seeds, mechanization, credit assistance, and training and extension, has been recognized as an important government intervention in enhancing rice production and farmers' competitiveness. Previous studies also suggest that effective extension services contribute to the successful implementation of agricultural programs. However, limited studies have examined the predictive influence of farmers' satisfaction with agricultural extension services on the implementation of the RCEF program, particularly in One Maguindanao. This research addresses this gap by examining the level of satisfaction with agricultural extension services, the extent of RCEF program implementation, their predictive relationship, and the program's impact on beneficiaries' income, thereby providing evidence to support policy and program improvements.

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Statement of the Problem

This study assessed the agricultural extension services and the performance in the implementation of the RCEF Program in One Maguindanao. It answered the following questions:

1. What is the level of satisfaction with the agricultural extension services in One Maguindanao, in terms of:
    1.1. technical support;
    1.2. training and capacity - building;
    1.3. field demonstrations and practical learning; and
    1.4 information and communication technology?
2. What is the extent of implementation of the RCEF program in One Maguindanao, in terms of:
    2.1. credit assistance;
    2.2. seeds;
    2.3. mechanization; and
    2.4. training and extension?
3. Is there a significant difference in the level of satisfaction in the agriculture extension services in One Maguindanao among areas of implementation?
4. Is there a significant difference in the extent of implementation of the RCEF program in One Maguindanao among areas of implementation?
5. Is the level of satisfaction with agricultural extension services a significant predictor of the implementation of the RCEF program in One Maguindanao?
6. Is there a significant difference between the monthly income of beneficiaries before and after the RCEF implementation?

Hypotheses

The following hypotheses guided this study:

1. There is no significant difference in the level of satisfaction with agricultural extension services in One Maguindanao across the areas of implementation.
2. There is no significant difference in the extent of implementation of the RCEF program in One Maguindanao across the areas of implementation.
3. The level of satisfaction with agricultural extension services does not significantly predict the implementation of the RCEF program in One Maguindanao.
4. There is no significant difference between the beneficiaries' monthly income before and after the implementation of the RCEF Program.

Materials and Methods

Research Design

The study employed a quantitative descriptive-correlational research **design** to describe the level of satisfaction with agricultural extension services and the extent of implementation of the Rice Competitiveness Enhancement Fund (RCEF) program, while also examining differences, predictive relationships, and changes in beneficiaries' income. According to John W. Creswell and J. David Creswell (2018), quantitative research is appropriate for testing objective theories by examining relationships among variables using statistical analyses. Furthermore, descriptive-correlational designs are suitable when researchers seek to describe existing

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conditions and determine whether variables are significantly related or predictive without manipulating them.

Respondents

The study involved 390 RCEF rice farmer – beneficiaries, 3 agricultural extension workers, and 3 RCEF program coordinators who were selected through random sampling.

Instruments

Data Gathering Instruments

The questionnaire was adapted and refined based on the monitoring and evaluation form for agricultural extension services and the RCEF program.

In enhancing the questionnaire, the statement of the problem and framework served as the basis and were arranged in chronological order. The enhancement of the survey questionnaire was carried out by the researcher, who conducted appropriate consultations with the adviser and panel members, as well as with MAFAR municipal officers and RCEF provincial coordinators.

The research instrument was divided into three (3) parts (Appendix _), such as:

Part I consisted of statements regarding level of satisfaction with agricultural extension services in One Maguindanao. Part II comprised statements on the extent of implementation of the RCEF Program in One Maguindanao. Part III presents the income of rice – farmer respondents before and after the implementation of RCEF

The agriculture extension services were rated using the five-point Likert scale as shown in Table 1, with a description of "extremely satisfied", "very satisfied", "satisfied", "slightly satisfied", and "not satisfied", as adopted from the study of Davin (2013), as shown in Table 1, on the next page.

Table 1. The Five – Point Likert's Rating Scale on the Level of Satisfaction of Agriculture Extension Services in One Maguindanao

Scale	Range of Means	Descriptions	Interpretation
5	4.21-5.00	Extremely Satisfied	Highly Delivered
4	3.41-4.20	Very Satisfied	Delivered
3	2.61-3.40	Satisfied	Moderately Delivered
2	1.81-2.60	Slightly Satisfied	Rarely Delivered
1	1.00-1.79	Not Satisfied	Not Delivered

Likewise, the extent of implementation of RCEF was also rated using the five-point Likert scale as shown in Table 2 with a description of "excellent", "very good", "good", "poor", and "very poor", as adopted from the study of Davin (2013), as shown in Table 2, below

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Table 2. The Five – Point Likert's Rating Scale on the Extent of Implementation in the RCEF in One Maguindanao.

Numerical Rating	Ranges of Mean	Description	Interpretation
5	4.21 – 5.00	Excellent	Very High
4	3.41 – 4.20	Very Good	High
3	2.61 – 3.40	Good	Moderate
2	1.81 – 2.60	Poor	Low
1	1.00 – 1.80	Very poor	Very Low

Data Gathering Procedure

The researcher implemented the following step - by- step procedures for an efficient data gathering process:

1. The first step was to secure permission from the Graduate School Office in SKSU to conduct the study.
2. Questionnaires validated by experts from MAFAR and PhilRice-Midsayap were used. The same instruments were validated through pilot testing with 25 rice farmer respondents, who were excluded from the study. The same questionnaire was translated into Filipino, administered in the local language to elicit appropriate responses, and used to avoid misleading questions in a face-to-face interview.
3. Agricultural extension workers and farmer organization leaders were requested as "enumerators" to assist with data collection. An orientation session attended by research assistants/enumerators were conducted before the actual administration of the instruments to the target respondents. The data were gathered through one-on-one interviews with the respondents. However, to facilitate data collection, this was done during their farmers' organization meeting to ensure the participation of the farmer beneficiaries.
4. During the face-to-face interview, the respondents were properly informed of the study's purpose.

Figure 1 presented the process flow in the data collection, while regular consultation with the adviser was done for guidance.

Data Analysis

The researcher implemented the following step - by- step procedures for an efficient data gathering process:

1. The first step was to secure permission from the Graduate School Office in SKSU to conduct the study.
2. Questionnaires validated by experts from MAFAR and PhilRice-Midsayap were used. The same instruments were validated through pilot testing with 25 rice farmer respondents, who were excluded from the study. The same questionnaire was translated into Filipino, administered in the local language to elicit appropriate responses, and used to avoid misleading questions in a face-to-face interview.
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4. During the face-to-face interview, the respondents were properly informed of the study's purpose.

Delivery of Agricultural Extension Services by the Ministry of Agriculture, Fisheries, and Agrarian Reform – Maguindanao

This section presents the data on the delivery of agricultural extension services by MAFAR – One Maguindanao, covering Technical Support, Training and Capacity Building, Field Demonstrations and Practical Learning, and Information and Communication Technology (ICT).

Table 1. Satisfaction of Agricultural Extension Services in One Maguindanao in terms of Technical Support

Indicator	Mean	SD	Verbal Description
1. Extension officers visit my farm regularly to provide technical advice (at least once month / quarter	4.47	0.66	Extremely Satisfied
2. Extension officers share adequate guidance on production and management (land preparation, planting/transplanting, weeding, fertilization, irrigation, postharvest, marketing and entrepreneurship)	4.07	0.52	Very Satisfied
3. Extension officers are knowledgeable and competent in their areas of specialization	4.12	0.47	Very Satisfied
4. Extension officers provide technical recommendations to improve my crop productivity	4.08	0.47	Very Satisfied
5. Extension officer's responsiveness for the for the farmers technical concerns.	4.07	0.50	Satisfied
6. Extension officers in the area coordinate with other agricultural support institutions (e.g., ATI, cooperatives, NGOs, PhilRice, PhilMech)	3.49	0.70	Very Satisfied
7. Extension officers are involved in planning and evaluating extension programs with the farmers.	2.76	0.87	Satisfied
8. MAFAR ensures availability of agriculture extension officers or agricultural technologists at the office to entertain farmers in a visit for technical consultation	4.08	0.62	Very Satisfied
Section Mean	**3.88**	**0.41**	**Very Satisfied**

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Table 2. Satisfaction of Agricultural Extension Services in One Maguindanao in terms of Training and Capacity Building.

Indicator	Mean	SD	Verbal Description
1. Extension officers encourage farmers to participate in training programs organized by agricultural extension Office	4.08	0.44	Very Satisfied
2. Extension officers provided the training through extension services have improved my knowledge of modern techniques	4.08	0.46	Very Satisfied
3. Extension officers provide training sessions that address the specific needs and challenges of my farming activities.	4.39	0.62	Extremely Satisfied
4. Extension officers follow – up on the support needed by farmers after attending trainings or workshops.	4.03	0.44	Very Satisfied
5. Extension officers ensure that the frequency and quality of capacity – building activities are sufficient to enhance the farming skills of farmers	4.01	0.43	Very Satisfied
6. Extension officers ensure that men, women and farm-youth have equal access to training session services	3.62	0.70	Very Satisfied
7. Extension officers ensure that farmers' feedback is used to improve extension services	4.03	0.53	Very Satisfied
Section Mean	**4.03**	**0.37**	**Very Satisfied**

Table 3. Satisfaction of Agricultural Extension Services in One Maguindanao in Terms of Field Demonstrations and Practical Learning

Indicator	Mean	SD	Verbal Description
1. Extension officers encourage the attendance of the farmers in the field demonstrations.	4.06	0.43	Very Satisfied
2. Extension officers ensure that field demonstrations are effective in showing practical solutions to farming problems	4.40	0.60	Extremely Satisfied
3. Extension officers encourage to adopt new technologies after seeing demonstrated in the field	4.02	0.42	Very Satisfied
4. Extension officers ensure the demonstration plots are accessible and representative of local farming conditions	4.02	0.43	Very Satisfied
5. Extension officers are giving opportunities for the farmers to participate actively in the field demonstrations	4.00	0.44	Very Satisfied
6. Extension officers facilitate the availability of resources (inputs, credit information, infrastructure to be used) for	3.82	0.56	Very Satisfied

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the success of extension services			
7. Extension officers ensure the participation of other agency before, during, and after the conduct of field demonstration	3.47	0.73	Very Satisfied
Section Mean	**3.97**	**0.37**	**Very Satisfied**

Table 4. Satisfaction of Agricultural Extension Services in One Maguindanao in Terms of Information and Communication Technology (ICT)

Indicator	Mean	SD	Verbal Description
1. Extension officers regularly share the agricultural information through ICT tools (e.g. mobile phones, SMS, radio, social media, apps)	4.39	0.72	Extremely Satisfied
2. Extension officers ensure that the use of ICT has improved the timeliness of	3.97	0.49	Very Satisfied
3. agricultural information dissemination for the farmers			
4. Extension officers ensure the accuracy and reliability of agricultural information shared through ICT platforms for the farmers	3.96	0.48	Very Satisfied
5. Extension officers effectively use ICT tools to communicate with farmers	3.92	0.50	Very Satisfied
6. Extension officers in addressing the challenges (cost, connectivity, digital skills) in accessing ICT - based extension services	3.49	0.65	Very Satisfied
7. Extension officers facilitate the ggovernment policies and information support for the extension services for the Farmers	3.97	0.50	Very Satisfied
8. Extension officers ensure the participation of other agency before, during and after the conduct of field demonstrations	4.00	0.51	Very Satisfied
Section Mean	**3.96**	**0.42**	**Very Satisfied**

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Table 5. Level of Satisfaction of Agricultural Extension Services in One Maguindanao

Dimension	Mean	SD	Verbal Description
Technical Support	3.88	0.41	Very Satisfied
Training and Capability Building	4.03	0.37	Very Satisfied
Field Demonstrations and Practical Learning	3.97	0.37	Very Satisfied
Information and Communication Technology	3.96	0.42	Very Satisfied
Overall Mean	**3.96**	**0.39**	**Very Satisfied**

Table 6. Extent of Implementation of the RCEF Program in One Maguindanao in Terms of Credit Assistance

Indicator	Mean	SD	Verbal Description
1. Credit assistance program is easily accessible to eligible farmers	2.17	0.74	Poor
2. Requirements for availing RCEF credit are clear and reasonable	2.76	0.56	Good
3. Processing time for RCEF loans is timely and efficient	2.76	0.51	Good
4. Amount of credit provided is sufficient to support rice production needs	3.05	0.52	Good
5. Interest rates under the RCE credit program are affordable to farmers	2.90	0.54	Good
6. Credit assistance contributes to increased farm Productivity	3.67	0.75	Very Good
7. Farmers receive adequate information and guidance on how to avail RCEF Credit	3.28	0.70	Good
8. Repayment terms are manageable and suited to farmers' income	2.86	0.61	Good
Section Mean	**2.93**	**0.47**	**Good**

Table 7. Extent of Implementation of the RCEF Program in One Maguindanao in Terms of Seeds

Indicator	Mean	SD	Verbal Description
1. Certified seeds are distributed to farmers on time for planting seasons	4.50	0.53	Excellent
2. Quality of seeds provided meets expected standards	4.87	0.38	Excellent
3. Quantity of seeds distributed is sufficient for farmers cultivated area	3.97	0.85	Very Good
4. Seed distribution process is well -organized and	4.37	0.58	Excellent

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ttransparent			
5. Seeds contribute to higher yields compared to traditional seeds	4.49	0.52	Excellent
6. Farmers are properly informed about the benefits and proper use of	4.45	0.55	Excellent
7. certified seeds			
8. Variety of seeds provided is suitable for local soil and climate conditions	4.49	0.52	Excellent
9. Seed distribution reaches the intended beneficiaries effectively	4.33	0.62	Excellent
Section Mean	**4.43**	**0.45**	**Excellent**

Table 8. Extent of Implementation of the RCEF Program in One Maguindanao in Terms of Mechanization

Indicator	Mean	SD	Verbal Description
1. Farm machinery provided is appropriate for local farming conditions	4.52	0.52	Excellent
2. Availability of machinery helps reduce labor cost	4.52	0.52	Excellent
3. FCAs have reasonable access to provided farm equipment	4.36	0.60	Excellent
4. Machinery provide is well – maintained and functional	3.93	0.66	Very Good
5. Use of machinery improves efficiency in farm operations	4.45	0.58	Excellent
6. Farmers receive adequate orientation or training on the use of machinery	3.62	0.81	Very Good
7. Mechanization program contributes to faster land preparation	4.83	0.43	Excellent
8. Distribution of farm machinery is fair and transparent	4.27	0.68	Excellent
Section Mean	**4.31**	**0.38**	**Excellent**

Table 9. Extent of Implementation of the RCEF Program in One Maguindanao in Terms of Training and Extension

Indicator	Mean	SD	Verbal Description
1. Training program are relevant to farmers needs	4.27	0.53	Excellent
2. Extension services are accessible and responsive to farmers' needs	4.25	0.52	Excellent

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3.	Trainings improve farmers' knowledge of modern rice farming technologies	4.20	0.51	Very Good
4.	Frequency of training and extension activities is sufficient	3.27	0.72	Good
5.	Trainers and extension workers are knowledgeable and competent	4.15	0.50	Very Good
6.	Training sessions are conducted at convenient times and locations	4.14	0.51	Very Good
7.	Farmers are able to apply the knowledge gained from trainings	4.15	0.51	Very Good
8.	Training and extension services contribute to improved farm productivity	4.50	0.59	Excellent
Section Mean		**4.12**	**0.41**	**Very Good**

Table 10. Extent of Implementation of the RCEF Program in One Maguindanao

Dimension	Mean	SD	Verbal Description
Credit Assistance	2.93	0.47	Good
Seeds	4.43	0.41	Excellent
Mechanization	4.31	0.38	Excellent
Training and Extension	4.12	0.41	Very Good
Overall Mean	**3.95**	**0.30**	**Very Good**

Table 11. Satisfaction of Agricultural Extension Services by Area of Implementation using Kruskal - Wallis Test

Dimensions	Area of Implementation	N	Mean	SD	χ^2	p	ε^2
Technical Support	Ampatuan	290	3.84a	0.43	11	0.004	0.0277
	Sultan Kudarat	44	3.96ab	0.36			
	Datu Paglas	62	4.02 a	0.30			
Training & Capacity-Building	Ampatuan	290	4.01a	0.38	4.00	0.135	0.0101
	Sultan Kudarat	44	4.02a	0.30			
	Datu Paglas	62	4.13a	0.34			
Field Demonstration & Practical Learning	Sultan Kudarat	44	3.94a	0.34	3.44	0.179	0.0087
	Ampatuan	290	3.94a	0.28			

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	Datu Paglas	62	4.05a	0.39			
Information & Communication Technology	Sultan Kudarat	44	3.76ab	0.34	7.65	0.022	0.0194
	Datu Paglas	62	3.91b	0.42			
	Ampatuan	290	4.00a	0.39			
Overall Implementation of AES	Sultan Kudarat	44	3.92a	0.30	3.90	0.142	0.0099
	Ampatuan	290	3.95a	0.34			
	Datu Paglas	62	4.03a	0.23			

Notes: *df*=2; Means with the same subscript are comparable.

Table 12. RCEF Program Implementation by Area (Municipality) using Kruskal-Wallis Test

Dimensions	Area of Implementation	N	M	SD	χ^2	p	ε^2
Cash Assistance	Ampatuan	290	2.87_b	0.49	18.88	< .001	0.0478
	Datu Paglas	62	3.08_a	0.40			
	Sultan Kudarat	44	3.13_a	0.30			
Seeds	Datu Paglas	62	4.34_a	0.45	7.92	0.019	0.02
	Ampatuan	290	4.43_{ab}	0.45			
	Sultan Kudarat	44	4.57_b	0.41			
Mechanization	Datu Paglas	62	4.24_a	0.36	4.63	0.099	0.0117
	Ampatuan	290	4.32_a	0.36			
	Sultan Kudarat	44	4.38_a	0.40			
Training and Extension	Ampatuan	290	4.08_b	0.43	10.98	0.004	0.0278
	Datu Paglas	62	4.13_{ab}	0.34			
	Sultan Kudarat	44	4.30_a	0.39			
Overall RCEP Program	Ampatuan	290	3.87_b	0.29	9.3	0.01	0.0236
	Datu Paglas	62	3.89_{ab}	0.31			
	Sultan Kudarat	44	4.02_a	0.28			

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Table 13. Results of Regression Analysis for RCEF Program Implementation with AES Satisfaction as Predictors

Predictor	Estimate	t	p-value	Interpretation
Technical Support	0.20	4.46	< .001	Significant Predictor
Training & Capacity-building	0.22	3.94	< .001	Significant Predictor
Filed Demo & Practical Learning	-0.08	-1.36	0.175	Not Significant
ICT	0.06	1.52	0.130	Not Significant

Notes: R^2=.223, Adj R^2=.216, $F(4, 391)$=28.1, p<.001

Table 14. Paired Samples T-test for the Monthly Income of RCEF Beneficiaries

	Mean μ	SD	Wilcoxon W	p	Rank biserial correlation
Monthly Income after RCEF Implementation	7820	3566	78580	<.001	0.999
Monthly Income before RCEF Implementation	5573	1673			

Notes: n=392; $H_a\mu$ Measure 1 - Measure 2 ≠ 0

Discussion

Technical Support

Interpretation of the Findings

Technical Support obtained a mean score of 3.88 (SD = 0.41), interpreted as Very Satisfied. This indicates that respondents generally perceived extension officers as responsive and capable of providing timely technical advice and practical solutions to farming concerns. Although this dimension received the lowest mean among the four AES dimensions, it still reflects a high level of satisfaction.

Comparison with Existing Studies

The findings are consistent with Anderson and Feder (2007), who emphasized that technical advisory services are fundamental in improving farmers' adoption of agricultural technologies and enhancing productivity. Similarly, Swanson and Rajalahti (2010) noted that effective

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technical consultation enables farmers to make informed decisions and improve farm management practices.

Implications for Practice and Policy

Agricultural agencies should continue strengthening the technical competence of extension personnel through regular capacity-building programs and ensure that technical advisory services remain accessible, timely, and responsive to farmers' needs.

Study Limitations

The findings are based on farmers' perceptions and do not directly measure the quality, frequency, or actual effectiveness of technical consultations provided by extension personnel.

Training and Capacity Building

Interpretation of the Findings

Training and Capacity Building obtained the highest mean score of 4.03 (SD = 0.37), indicating that respondents were Very Satisfied with the training programs provided. This suggests that farmers considered the training activities relevant, useful, and beneficial in improving their agricultural knowledge and skills.

Comparison with Existing Studies

The result supports Davis (2008), who reported that farmer training enhances knowledge acquisition, technology adoption, and agricultural productivity. Likewise, Anderson and Feder (2007) recognized continuous farmer education as a cornerstone of effective agricultural extension systems.

Implications for Practice and Policy

Extension agencies should continue investing in regular, needs-based training programs while expanding opportunities for farmers to participate in advanced agricultural capacity-building activities.

Study Limitations

The study evaluated participants' satisfaction but did not assess long-term knowledge retention, behavioral change, or the direct impact of training on farm productivity.

Field Demonstrations and Practical Learning

Interpretation of the Findings

Field Demonstrations and Practical Learning obtained an overall mean of 3.97 (SD = 0.37), indicating that respondents were Very Satisfied with demonstration activities conducted by extension workers. Farmers generally agreed that field demonstrations provided practical learning opportunities and encouraged the adoption of improved farming technologies.

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Comparison with Existing Studies

The findings are consistent with Davis (2008), who emphasized that field demonstrations are effective extension approaches because they allow farmers to observe agricultural technologies under actual field conditions. Similarly, Rogers (2003) explained that demonstrations facilitate innovation adoption by allowing farmers to observe the advantages of new technologies before implementation.

Implications for Practice and Policy

Extension providers should increase the frequency of demonstration activities, strengthen partnerships with other agencies, and encourage greater farmer participation to maximize experiential learning.

Study Limitations

The study measured farmers' perceptions but did not evaluate whether participation in field demonstrations resulted in sustained adoption of recommended farming technologies.

Information and Communication Technology (ICT)

Interpretation of the Findings

Information and Communication Technology (ICT) recorded an overall mean of 3.96 (SD = 0.42), indicating that respondents were Very Satisfied with ICT-based extension services. Farmers generally acknowledged the usefulness of ICT in disseminating agricultural information, although challenges related to connectivity and digital access remained evident.

Comparison with Existing Studies

The findings partially support Aker (2011), who found that ICT improves farmers' access to agricultural information and enhances decision-making. However, the relatively lower ratings for addressing ICT challenges suggest that infrastructure limitations and digital literacy continue to affect the effectiveness of ICT-based extension services in rural communities.

Implications for Practice and Policy

Government agencies should improve internet connectivity in rural areas, strengthen farmers' digital literacy, and expand the use of mobile-based agricultural advisory platforms to improve information dissemination.

Study Limitations

The study did not assess farmers' actual ICT usage, digital skills, or access to internet services, which may influence satisfaction with ICT-based extension services.

Level of Satisfaction with Agricultural Extension Services

Interpretation of the Findings

The overall mean of 3.96 indicates that respondents were **very satisfied** with the agricultural extension services provided in One Maguindanao. Among the dimensions, **Training and Capacity Building** obtained the highest mean (4.03), while **Technical Support** had the lowest (3.88), although all dimensions were rated "Very Satisfied."

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Comparison with Existing Studies

These findings are consistent with Anderson and Feder (2007), who emphasized that effective extension services enhance farmers' knowledge and technology adoption. Similarly, Davis (2008) reported that well-delivered extension programs improve farmers' skills and increase confidence in adopting improved agricultural practices.

Implications for Practice and Policy

The findings suggest that extension services in One Maguindanao are generally effective. Policymakers should continue investing in extension personnel development while strengthening technical consultation services to maintain high farmer satisfaction.

Study Limitations

The findings are based on farmers' perceptions and may not fully reflect the actual quality or effectiveness of extension service delivery.

Extent of Implementation of RCEF in Terms of Credit Assistance

Interpretation of the Findings

Credit assistance received an overall mean of **2.93**, indicating a **moderate** level of implementation. Accessibility to credit was the lowest-rated indicator, while respondents agreed that credit contributed to increased farm productivity.

Comparison with Existing Studies

The findings support Llanto (2007), who reported that limited access to agricultural credit remains one of the major constraints affecting smallholder farmers. Feder et al. (1990) likewise emphasized that access to agricultural credit is essential for improving farm productivity and technology adoption.

Implications for Practice and Policy

Government agencies should simplify loan application procedures, improve information dissemination, and expand farmers' access to affordable agricultural financing.

Study Limitations

The study measured farmers' perceptions of credit implementation but did not examine institutional factors affecting loan approval and distribution.

Table 7. Extent of Implementation of RCEF in Terms of Seeds

Interpretation of the Findings

The seed component obtained an overall mean of **4.43**, indicating a **very high** level of implementation. Respondents particularly appreciated the quality and timely distribution of certified seeds.

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Comparison with Existing Studies

These findings agree with Evenson and Gollin (2003), who concluded that improved seed varieties substantially increase agricultural productivity. Likewise, Pingali (2007) highlighted certified seeds as one of the most effective agricultural innovations for improving rice production.

Implications for Practice and Policy

The Department of Agriculture should continue ensuring timely distribution of high-quality certified seeds while maintaining transparency in beneficiary selection.

Study Limitations

The study assessed farmers' satisfaction with seed distribution but did not measure actual yield improvements resulting from certified seed use.

Table 8. Extent of Implementation of RCEF in Terms of Mechanization

Interpretation of the Findings

Mechanization obtained an overall mean of **4.31**, indicating a **very high** level of implementation. Respondents highly appreciated the suitability of machinery and its contribution to faster land preparation and improved farm efficiency.

Comparison with Existing Studies

The findings are consistent with Pingali (2007), who emphasized that agricultural mechanization improves labor efficiency, reduces production costs, and enhances productivity. Similarly, FAO (2014) recognized mechanization as a key driver of sustainable agricultural development.

Implications for Practice and Policy

Government agencies should continue expanding mechanization support while providing regular maintenance services and operator training to maximize machinery utilization.

Study Limitations

The study did not evaluate the long-term utilization, maintenance status, or economic returns of distributed farm machinery.

Table 9. Extent of Implementation of RCEF in Terms of Training and Extension

Interpretation of the Findings

Training and Extension recorded an overall mean of **4.12**, reflecting a **high** level of implementation. Respondents highly rated the relevance of training programs and their contribution to farm productivity, although the frequency of training activities received comparatively lower ratings.

Comparison with Existing Studies

These findings support Davis (2008), who reported that farmer training enhances technology adoption and agricultural productivity. Anderson and Feder (2007) likewise emphasized that continuous extension education is fundamental to successful agricultural development.

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Implications for Practice and Policy

Extension agencies should sustain quality training programs while increasing the frequency of extension activities and ensuring that training addresses farmers' emerging needs.

Study Limitations

The study measured participants' perceptions but did not assess actual knowledge retention or long-term behavioral changes resulting from the training programs.

Overall Extent of Implementation of the RCEF Program

Interpretation of the Findings

The RCEF program achieved an overall mean of **3.95**, indicating a **high** level of implementation. Seeds and mechanization were the strongest program components, while credit assistance received the lowest implementation rating.

Comparison with Existing Studies

The findings are consistent with RA 11203, which identifies seeds, mechanization, extension services, and credit as major components for improving rice competitiveness. They also support Anderson and Feder (2007), who emphasized that integrated agricultural support programs enhance productivity when implemented effectively.

Implications for Practice and Policy

The findings suggest that while the RCEF program has been successfully implemented overall, policymakers should prioritize improving agricultural credit access to ensure that all program components are delivered equitably and effectively.

Study Limitations

The study was limited to One Maguindanao and relied on respondents' perceptions. Therefore, the findings may not be generalizable to other provinces or regions with different agricultural and institutional contexts.

Kruskal–Wallis Test on Satisfaction with Agricultural Extension Services by Area of Implementation

Interpretation of the Findings

The Kruskal–Wallis test revealed that the overall level of satisfaction with agricultural extension services did not significantly differ among Ampatuan, Datu Paglas, and Sultan Kudarat ($\chi^2 = 3.90$, $p = .142$). However, significant differences were observed in Technical Support ($p = .004$) and Information and Communication Technology ($p = .022$), suggesting that these service components vary across municipalities.

Comparison with Existing Studies

The significant variation in technical consultation supports Anderson and Feder (2007), who argued that extension service quality differs depending on institutional capacity, accessibility, and local resource availability. Likewise, differences in ICT-based services are consistent with Aker (2011), who emphasized that digital extension effectiveness depends on

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infrastructure, internet connectivity, and farmers' digital literacy. Conversely, the absence of significant differences in training and field demonstrations suggests standardized implementation, consistent with Davis (2008), who noted that government extension programs often employ uniform training approaches.

Implications for Practice and Policy

The findings indicate that while agricultural extension services are generally delivered consistently across municipalities, targeted improvements in technical consultation and ICT services are needed in underserved areas. Policymakers should allocate resources toward strengthening extension personnel and expanding digital agricultural infrastructure to ensure equitable access to advisory services.

Study Limitations

The study focused only on three municipalities in One Maguindanao and relied on farmers' self-reported satisfaction, which may not fully capture the actual quality of extension service delivery.

Table 12. Kruskal–Wallis Test on RCEF Program Implementation by Area

Interpretation of the Findings

Significant differences were found in credit assistance, seeds, training and extension, and overall RCEF implementation across municipalities, whereas mechanization showed no significant difference. These findings indicate that implementation of several RCEF components varies depending on locality.

Comparison with Existing Studies

The uneven implementation supports Anderson and Feder (2007), who observed that agricultural programs are influenced by local institutional capacity and governance. Similarly, Llanto (2007) highlighted that access to agricultural financing differs across localities, affecting program effectiveness. The consistent implementation of mechanization aligns with Pingali (2007), who explained that mechanization programs are often implemented uniformly through centralized procurement and distribution systems.

Implications for Practice and Policy

The Department of Agriculture and local government units should strengthen monitoring systems to ensure equitable distribution of credit assistance, seeds, and extension services across municipalities while maintaining the successful implementation of mechanization.

Study Limitations

The study did not examine municipality-level factors such as budget allocation, staffing, or infrastructure that may explain differences in implementation.

Table 13. Multiple Regression Analysis

Interpretation of the Findings

The regression model significantly predicted RCEF program implementation ($R^2 = .223$, $p < .001$). Technical support , training and capacity-building were significant predictors, whereas field demonstrations and ICT were not. This indicates that advisory support and farmer training

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play a greater role in program implementation than the other extension components included in the model.

Comparison with Existing Studies

The findings are consistent with Anderson and Feder (2007), who emphasized that extension services facilitate technology adoption and improve agricultural program outcomes. Similarly, Davis (2008) found that technical assistance and farmer training enhance agricultural productivity. However, the non-significant effect of ICT contrasts with Aker (2011), possibly due to limited digital infrastructure and ICT utilization in rural communities.

Implications for Practice and Policy

Extension agencies should prioritize investments in technical support and capacity-building programs while strengthening ICT infrastructure and improving the quality and frequency of field demonstrations. Integrating these components may further improve RCEF implementation.

Study Limitations

The regression model explained only **22.3%** of the variance in RCEF implementation, indicating that other factors—such as institutional support, farmer characteristics, financial resources, and local governance—may also influence implementation but were not included in this study.

Table 14. Wilcoxon Signed-Rank Test on Monthly Income

Interpretation of the Findings

The Wilcoxon signed-rank test showed a statistically significant increase in beneficiaries' monthly income after RCEF implementation ($p < .001$), indicating that participation in the program was associated with improved household earnings.

Comparison with Existing Studies

The findings support Evenson and Gollin (2003), who demonstrated that improved agricultural technologies increase productivity and farm income. Likewise, Feder et al. (1990) concluded that access to extension services, improved inputs, and agricultural credit contributes to better economic outcomes. The findings also align with Pingali (2007), who emphasized that agricultural modernization enhances farmers' income and reduces rural poverty.

Implications for Practice and Policy

The findings support the continued implementation and expansion of the RCEF program. Policymakers should sustain investments in quality seeds, mechanization, extension services, and accessible financial assistance to improve farmers' livelihoods.

Study Limitations

Because the study employed a before-and-after comparison without a non-beneficiary comparison group, improvements in income cannot be attributed solely to the RCEF program. External factors such as market prices, weather conditions, and other government interventions may also have influenced beneficiaries' income.

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Conclusion

This study demonstrated that farmers in One Maguindanao were generally **very satisfied** with the agricultural extension services provided, while the implementation of the Rice Competitiveness Enhancement Fund (RCEF) Program was assessed to be at a **high** level. Agricultural extension services, particularly **technical consultation** and **training and capacity-building**, were found to significantly predict the implementation of the RCEF program, highlighting the vital role of extension services in achieving successful agricultural interventions. Moreover, the program contributed to a significant increase in the monthly income of RCEF beneficiaries, indicating its positive impact on farmers' livelihoods.

The findings suggest that policymakers and implementing agencies should strengthen technical advisory services, expand farmer training programs, improve access to credit assistance, and enhance ICT-based extension services to further improve the effectiveness and sustainability of the RCEF program. Future researchers are encouraged to include additional variables, employ mixed-methods or longitudinal research designs, and conduct similar studies in other provinces to validate and extend the findings.

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