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Looking through the Philippines' Agricultural Extension and Advisory Services using Perspectives in Social Change

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Abstract

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In the Philippines, agriculture as an economic institution remains to be a major contributor to its gross domestic product (GDP). One of the ways to improve agricultural productivity is through agricultural extension. The dynamics of extension (as part of the education institution) and agriculture (as economic contributor) has already been established, with empirical evidences from several studies around the world. Given the richness of literature, the study explored gaps between agricultural extension and social change. Using a descriptive-exploratory research design, historical research, and semi-systematic literature review, the study discussed how agricultural extension has navigate through a constantly changing society. From the early forms of farm information etched in clay tablets, to its development across successive industrial revolutions, agricultural extension has continually adapted. Being integrated with science and technology, it remains to be a major mechanism to improve human capacity towards agricultural development. Over time, it has undergone reforms, highlighting partnerships and linkages, institutionalization and policy development, and professionalization. These changes have strengthened support not only extension workers, but also to the whole agricultural extension as an inclusive and responsive social institution. Nevertheless, whether it follows a linear or cyclical evolution pattern, investing in the best fit agricultural extension intervention, coupled with policy and infrastructural support, our farmers could have a fighting chance to navigate through local and global challenges brought by ongoing social change.

Introduction

Keywords: Agricultural extension, extension education, social change, social evolution, Philippines

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Agricultural extension, a form of non-formal education, is "designed to improve farmers' knowledge, skills, and practices" (p. 1300) with the purpose of enhancing their productivity (Raji, Ijomah & Eyeyien, 2024). It is an educational set up outside of the classroom, highly experiential, with a series of activities that are designed to achieve specific objectives (Melania et al., 2024). According to Raji et al. (2024), extension services and training programs have increased agricultural productivity, enhanced food security, and contributed to economic growth especially in countries where agriculture is a major source of income. It bridges the knowledge and skills gap between research and farming communities by educating and enabling them to have access to technologies that they need to effectively manage their agricultural operations and adapt to changing con-

ditions (Raji et al., 2024).

While the term "agricultural extension" is still being used, terms such as "extension and advisory services" and "rural advisory services" emerged in recognition of the presence of other livelihood aside from agriculture, and the clientele's or beneficiaries' role in extension interventions (Davis, Babu, and Ragasa 2020). Nevertheless, Davis et al. (2020) defined agricultural extension and advisory services (EAS) as "the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being" (page 3, Davis et al. 2020).

According to Davis and Alex (2020), global extension studies indicated varied types of extension service providers following a diverse set of governance structures (i.e. profit vs non-profit; service provision vs product marketing; funding and delivery mechanisms; etc.). Regardless, EAS was proven to have positive effects on beneficiaries' knowledge and skills, technology adoption rates, income levels, crop and livestock yield, and overall productivity in Asia especially during the Green Revolution (Davis et al. 2020). The same effects were observed in terms of investment benefits as compared with spending too much on input subsidies and infrastructures (Davis et al. 2020).

Despite these documented benefits, the extensionist-farmer ratio remains to be low in most countries, with extensionists having to play several yet ambiguous roles (Davis et al. 2020). Further, the research-extensionist-farmer feedback mechanism remains weak; several countries lack specific policy for EAS; and in most cases, EAS are insufficiently funded and donor-dependent. Thus, the presence of several unserved or underserved areas (Davis et al. 2020).

In the Philippines, agriculture as an economic institution remains to be a major contributor to its gross domestic product (GDP). Briones (2021) shared that agricultural growth and productivity from the 1960s to 2010s follows a combination of high-low trends, with contributions from various agricultural commodities and fishery products. While the country's performance in the regional market in terms of exportation is relatively good, Briones (2021) emphasized that the Philippines is still "lagging far behind" (page 2) compared with other regional member states. Regardless, millions of farmers and fisherfolks still depend on agriculture and aquaculture as their primary source of living and sustenance (FAO, 2019). Thus, continuous efforts to improve agricultural productivity and yield have been undertaken up to this time.

PCAARRD et al. (2015), Ani & Correa (2016), and Baconguis (2023) stated that extension is an educational intervention that intends to bring positive change not only in the knowledge and skills of farmers, but also in the provision of support services for them (i.e. infrastructural support, credit facilities, etc.), enabling them to improve agricultural productivity and eventually, the quality of their lives. Agricultural extension interventions often involve transfer of knowledge and innovations through capacity-building trainings, seminars, and hands-on learning and demonstration activities, among others (PCAARRD et al., 2015; Ani & Correa, 2016; Baconguis, 2023). Pizana et al. (2021) added that apart from the agriculture sector, extension also addresses communal needs and problems, promotes personal and social development, and advances individual learning.

The dynamics of extension (as part of the education institution) and agriculture (as economic contributor) has already been established, with empirical evidences from several studies around the world. The same is true in the Philippines where agricultural extension as an endeavor has been well documented. Consistently, as what Leoni (2025) explained, improving education contributes to economic development. However, will it be the same

case the other way around? Being part and parcel of a larger system, how do the changes in the different social institutions influence agricultural extension as both an educational and economic component of the society? If so, up to what extent? Given the rich literature base of agricultural extension, this study aims to explore these gaps. Further, while agricultural extension has been well-documented, only few were written in the Philippine context, and lesser on the aspect of social change.

Generally, the study aimed to discuss the evolution of agricultural extension in the Philippines and describe the social changes that go along with it. To have a better understanding of the changes in the delivery of EAS, evolutionary, conflict, and human capability development perspectives were used as lenses.

Specifically, the study sought to:

1. Discuss the history of agricultural extension and advisory services in the Philippines;
2. Explore agricultural extension and advisory services amid social changes; and
3. Make recommendations for policy formulation and implementation towards effective delivery of agricultural EAS in a constantly changing society.

Understanding the interaction of social institutions, and the changes it brings along the way, would enable agricultural extension as an intervention and a discipline to navigate, adapt, and sustainably serve its intended purposes.

Methodology

To achieve the study objectives, a descriptive-exploratory research design was employed. It can be noted that agricultural extension, as a millennium-aged discipline, is well-documented, with a number of published accounts from various research and experiences worldwide. Therefore, to be able to contextualize the changes that occurred through time, Bogenhold's (2020) idea of the importance of having a historical review, and Leoni's (2025) historical research as methodological tool were followed. According to them, this kind of research method enables the researcher to "arrive at a deeper understanding in the processes inherent to sciences and change" (Bogenhold, 2020, p. 78). Contextualization through historical research is necessary to fully understand the present situation, explain the changes that occur, and examine the trends towards predicting possible outcomes; hence, combining contemporary and historical documents can give that full picture (Bogenhold, 2020; Leoni, 2025).

For data collection and analysis, a semi-systematic literature review and content analysis were done. Following the methods of Synder (2019) and Harmelink et al. (2024), literature survey and selection was done systematically using Google Scholar, Science Direct, and Web of Science databases based on a set of inclusion/exclusion criteria (Table 1). While most of the literature is between 2015-2025, some of them are classic references that provided sufficient historical foundation for agricultural extension. This is consistent with historical review as a research method mentioned above. The keywords used were: delivery of agricultural extension services in the Philippines; extension approaches in the Philippines, agricultural extension and agricultural productivity, history of agricultural extension in the Philippines. From thousands of literatures worldwide, only those published from 2015 to 2025 were considered, followed by the type of literature as the second filter. For the final

screening, relevance of the literature to the study objectives was checked following the process of Synder (2019) and Harmelink et al. (2024): 1) scanning document titles; 2) scrutinizing abstracts; and 3) reading the full paper. In this study, only the researches that pertain to agricultural extension as a field of discipline and profession were selected; studies evaluating agricultural extension interventions were excluded. Further, this study focuses on the agricultural extension as a subject and part of the social system.

Table 1: Inclusion/exclusion criteria

Criteria	Included	Excluded
Type of Publication	Research/review articles, policy notes, book chapters, monograph, compendium, official reports and documentation of government agencies, online encyclopedia	Papers presented in conferences, theses and dissertations, unpublished reports
Year of Publication	2015 to 2025	2014 and earlier
Sector	Agricultural extension	Other sector/disciplines (i.e., health, education, nutrition, tourism, etc.)
Research method used	Qualitative, mixed-methods	quantitative, none

For the content analysis, the guide developed by Erlingsson and Brysiewicz (2017) was applied. Based on the research question: how do the changes in the different social institutions influence agricultural extension as a component of the society?, and following a deductive process, categories which revolved around agricultural extension at the different phases of industrial revolution (first to fourth industrial revolution) were formed. In addition, changes that occur with respect to different social institutions, were put as subcategories. For instance, keywords like "policies", "structures" (national, regional, local), "functions", and "processes" made up the governance subcategory; "education", "trainings", "capacity-building" made up the non-formal education subcategory; and "information and communication technologies" (ICT), "web-based applications", "mobile learning", "data analytics" made up the technological advances subcategory. The study was conducted from February to May 2025.

Results and Discussion

Agricultural Extension in the Philippines

Agricultural extension as a discipline can be traced back from the ancient times, with published records indicating its practice since 1800 BC in Mesopotamia, Egypt, Greece, Rome, China expanding from one period of time to another (Jones & Garforth, 1997; PCAARRD et al., 2015). Extension back then was relatively simple: agricultural advices on crop and pest management etched in clay tablets; and distribution of agricultural settlements and practical handbooks in woodblock printing. With technological advancement and industrial revolutions, delivering agricultural extension services evolves through time (Jones & Garforth, 1997; PCAARRD et al., 2015). Among the first "modern"

mechanisms in the 18th century were the establishment of model farms, organization of agricultural societies, and publication of research results; and itinerant lecturers, university extension, and land grant universities in the 19th century. These acts then led to agricultural extension as what and how we know it today (Jones & Gartforth, 1997; PCAARRD et al., 2015). While PCAARRD et al. (2015), Ani & Correa (2016), Briones (2021), Bacongus (2023), and Dacuyan et al. (2023) discussed the history of agricultural extension in the Philippines in the context of the laws and policies passed that support its institutionalization, this section however, tried to describe it in line with the industrial revolutions that took place through time.

Industrial revolutions have a huge contribution to agricultural development, especially when it comes to its economic contribution. According to Toynbee (as cited in Encyclopaedia Britannica, 2025), industrial revolutions are process of changes in the society that generally advances economic institutions through industries like agriculture. Form and Wilterdink (2025) also mentioned that industrial revolutions were forms of social change because social structures are being altered, and factors triggering the changes come from various sources, widely affecting the masses. Factors that may prompt social changes may include but not limited to: technological advances, population growth, change in the ecosystems, policies, and organizational behaviour and values system, among others (Form & Wilterdink, 2015). These factors may occur simultaneously, from any direction, and from differing intensities (Form & Wilterdink, 2025).

During industrial revolutions, changes happen not only on how people do things, but how they do it efficiently and effectively with technological advantage (Toynbee as cited in Encyclopaedia Britannica, 2025); agriculture was not exempted from these. According to Lantin (2016), technological advances in agriculture come in the form of mechanization. Through time, agricultural mechanization in the Philippines changed along with the industrial revolution (Lantin, 2016). Being colonized for centuries, the colonizer's agricultural mechanization and practices were adapted in the country, and were used as patterns for the succeeding agricultural development policies (Lantin, 2016). Given the nature of agricultural extension, the need for technology transfer and capacity-building initiatives comes along with the emergence of new agricultural machineries in line with the industrial revolution.

a. First Industrial Revolution (18th to 19th centuries)

The first industrial revolution was labelled as "agricultural revolution", wherein agricultural production was hyped to sustain growing non-agricultural population (Lantin, 2016; Encyclopaedia Britannica, 2025). Agriculture emerged as the population shifted from hunting-gathering way of living, and settling after years of migration (Testolin, 2025). Quealy et al (2022) described this as "traditional agriculture era" where farming is stationary, and there was heavy reliance on manual labor and simple tools; productivity was recorded to be low. Most of the agricultural crops and livestock cultivated/tended were native species of plants and animals; innovation was low, and exchange in knowledge happened through local exchange of products among neighboring borders (Testolin, 2025). Colonization expanded the exchange and distribution of agricultural crops from local to international through trading and discovery of islands (Testolin, 2025). With the call for increasing agricultural productivity, machines powered by steam and electricity were on demand. However, while there was a pressure to increase agricultural production, a number of agricultural workers shifted to industrial labor in growing cities and urban areas.

According to Form & Wilterdink (2025), the preferences for migrating into urban cities resulted to changes in labor system (factory system of labor); valuation of wealth (believing that being industrialized is more economically wealthy than having land resources); and important developments in transportation and communication as more

people and products move from one place to another. Following the social evolution theory, moving from *gemeinschaft* to *gesellschaft*, as F. Tonnies termed them, indicated progress (from traditional to modern) (Form & Wilterdink, 2025). One example of this model was the Philippines under Spanish colonization where a pattern of center-periphery governance was observed (Cullinane et al., 2025).

The center (cities or poblacions) indicated power and progress, with prominent personalities residing in or near it. As one was drawn away from the center, the lesser its familial influence became. Thus, movement from the periphery to the center was an indication of progress (Cullinane et al., 2025). With this kind of governance, the *encomienda* system flourished, where local nobles (*principalia*) became *encomenderos* who control land use and agricultural operations in the area (Anderson, 1976; Lockhart, 1969). To boost agricultural productivity, the *encomenderos* attend trainings, invested in new crops brought from the Galleon trade, and replicated agricultural practices demonstrated by model farms (*granjas modelos*) established by the Spanish government (Ani & Correa, 2016; Dacuyan et al., 2023; Anderson, 1976; Lockhart, 1969).

The *encomienda* system later evolved into *hacienda* system which highlighted agricultural production of high value export crops like sugarcane (Lockhart, 1969). They may not literally move from periphery to center, but improving their agricultural productivity equated to their access to the "crown" or the Spanish government (Lockhart, 1969). Nevertheless, according to Lockhart (1969), both systems involve the interaction of the city (central), and the villages (periphery) where the latter caters to agricultural activities, while the former becomes more and more industrialized. Also, extension was practically duplicating what was being demonstrated by model farms that time as it was assumed that it shows the best way to improve productivity (Dacuyan et al., 2023).

Whether worldwide or in the Philippines, the first industrial revolution was clear: agriculture was highly important yet seen as traditional, while industries equated to modernity – evolution was more of geographic and physical. Thus, as more people migrated to urban areas, lesser people remained in rural areas to farm, which led to a decrease in agricultural productivity (Crain, 2024; Testolin, 2025). Further, learning agricultural innovations during this time occurred through replication. Extension work was highly centralized as in the case of the *encomenderos*, and teaching agriculture was normally done through demonstrations.

In the mid-19th century, the infamous Irish Potato famine happened which prompted the deployment of itinerant lecturers to teach agriculture to farmers in their own farms (Jones and Garforth, 1997; Crain, 2024). This model was adopted by other countries in the region such as Germany where teachers travelled from farm to farm to give lectures or demonstrate farming techniques (Jones and Garforth, 1997; McFeaters and Lauritzen, 2023). Funding for itinerant teachers mostly came from the government, churches, or donors; agricultural extension was not yet formalized (McFeaters and Lauritzen, 2023).

b. Second Industrial Revolution (mid 19th to early 20th centuries)

Coincidentally, this period of agricultural and industrial revolutions occurred simultaneously, which put agriculture beyond subsistence and into commercialization (Crain, 2024; McFeaters and Lauritzen, 2023). Rampant information dissemination during the late 18th to mid-19th centuries, development of infrastructures and transportation systems, as well as agricultural research breakthroughs enabled the agricultural sector to contribute to food security especially for non-farming population (Crain, 2024; McFeaters and Lauritzen, 2023). According to Quealy et al. (2022), it was in this period that crop rotations and drainage management were introduced. These increased crop and livestock

production, improved soil fertility; and increased operational efficiency due to the development of tools, and reliable transportation means (Quealy, et al. 2022). With continuous technological development, agricultural machineries became more advanced (development of tractors and threshers), new tools were developed, and industrial processes became automated (Lantin, 2016; Form & Wilterdink, 2025). The development of scientific management of F. Taylor has improved industrial processes by applying science-based practices to improve productivity and efficiency of operations (Mee, 2025). This transpired to the agriculture industry as well based on the report of the International Labor Organization in 1927 which discussed parameters in efficient fruit-picking.

As an American colony, educational reforms happened in the Philippines in accordance with the laws passed under the United States government. For instance, the passage of Morrill Act (1862), Hatch Act (1887), and Smith-Lever Act (1914) laid the framework for the establishment of agriculture and forestry as formal fields of study in the country. The University of the Philippines College of Agriculture was founded in 1909, followed by the UP Land Grant later in 1972, with the purpose of advancing agricultural research and extension which was anticipated to boost agricultural productivity and utilization of natural resources for economic development (PCAARRD et al., 2015; Ani & Correa, 2016; Lantin, 2016; Dacuyan et al., 2023). Apart from agricultural universities, settlement farm schools were also established which aimed to promote agricultural education and provide hands-on training in the country (PCAARRD et al., 2015; Ani & Correa, 2016; Dacuyan et al., 2023). The Philippines has been very serious when it comes to agricultural modernization. From the term of President Quirino who first advocated for the industrialization of agriculture, to President Marcos who constructed a number of roads, bridges, and ports that facilitated agricultural trade and commerce locally and internationally, to the succeeding Philippine Presidents who have passed meaningful laws that mandated it (Lantin, 2016).

Due to the changing needs of the society, the focus of agriculture also became holistic as it shifted to overall farm management from simply increasing production for food sufficiency (McFeaters and Lauritzen, 2023). The availability of agricultural machineries further improved the management and commercialization of agricultural products (Lantin, 2016). The rise of the computers and the internet also paved the way for faster and wider information dissemination across borders (Dacuyan et al., 2023). The advances in agricultural research, extension, and mechanization led to a more digitized and innovative agriculture.

c. 3rd Industrial Revolutions (mid-20th to early 21st centuries)

The 3rd and 4th industrial revolutions were said to be occurring simultaneously according to Form & Wilterdink (2025). From the agricultural revolution, these periods were called digital revolution due to the rampant use of computers and the internet, as well as the integration of artificial intelligence and big data in industrial and even agricultural processes (Panganiban, 2019; Dacuyan et al., 2023). However, Quealy et al. (2022) separated these eras into 1940-2013 (3rd revolution) and 2013 to present (4th revolution), where they pointed out that it was in the 3rd revolution that the concept of biotechnology, genetic engineering, and computerized programs for agricultural activities were introduced, and still subsist up to the present.

The 3rd industrial revolution in the field of agriculture was labelled as the Green Revolution (GR). According to Crain (2024), GR started from the 1940s to late 20th century, which was characterized by the integration of genetic engineering (i.e. development of high-yielding and disease-resistant crop varieties; effective chemical fertilizers and pesticides), advanced agricultural practices (i.e. adoption of irrigation techniques), and use of modern technologies (i.e. highly mechanized farming) to improve food security. True

enough, agricultural production was at its peak during GR. However, issues on environmental sustainability and socio-economic equity emerged along with it (Crain, 2024).

In the Philippines, the role of agricultural extension was also highlighted during the GR as training-and-visit became a common strategy to capacitate farmers with knowledge and skills to boost agricultural productivity and mechanization (PCAARRD et al., 2015; Lantin, 2016; Briones, 2021; Dacuyan et al., 2023). Tractors, threshers and other machineries from other countries became available, and farmers needed to be trained to utilize them (Lantin, 2016). During these times, a number of agricultural researches produced significant discoveries, inventions, and outputs that must reach the farmers so they can integrate them with their farming systems. Thus, extension agents acted as middlemen, transferring technology and information in a linear, one-way manner (PCAARRD et al., 2015; Ani & Correa, 2016; Bacongus, 2023; Dacuyan et al., 2023).

In addition, government agencies were organized to provide centralized agricultural extension services (PCAARRD et al., 2015; Ani & Correa, 2016; Dacuyan et al., 2023). It was in 1991 that the Republic Act 7160 or the Local Government Code of the Philippines; and the Republic Act 8435 or the Agriculture and Fisheries Modernization Act of 1997 were passed as the two most important laws that transformed the agriculture in the Philippines (Ani & Correa, 2016; Bacongus, 2023; Dacuyan et al., 2023). The RA 7160 has devolved and decentralized the delivery of government services, including those agricultural in nature, passing the function and authority of advancing agricultural modernization to the local government units; while the RA 8435 mandated the continuous effort to modernize agriculture, institutionalizing the research and extension support from government agencies, non-government organizations and state universities and colleges towards progressive agriculture and fisheries sectors (Ani & Correa, 2016; Bacongus, 2023; Dacuyan et al., 2023). Under these laws, the local government units formulate their respective agricultural plans and serve as primary extension providers in their respective jurisdictions (Ani & Correa, 2016; Bacongus, 2023; Dacuyan et al., 2023).

From the centralized provision of EAS for centuries, it has been transformed into a more localized fashion. The passage of Republic Act 7607 or the Magna Carta for Small Farmers in 1992 also encouraged farmers to organize themselves into associations to uphold collective action. With the devolution in place, massive support from non-government organizations, and farmers' associations emerged, extension has become community-based (PCAARRD et al., 2015; Bacongus, 2023; Dacuyan et al., 2023). This signaled the shift from top-down to bottom-up approach, which made extension a highly participatory and collaborative endeavor (PCAARRD et al., 2015; Dacuyan, et al., 2023).

Becoming participatory, coupled with technological advances, the focus of extension and advisory services is not limited in increasing agricultural productivity only. Nowadays, as agriculture shifted from resource-based to technology-based to systems-based, EAS has also shifted the same manner – from productivity to supply and value chains (Briones, 2021; Dacuyan et al., 2023; Raji et al., 2024). Further, extension models are aligned to cater not only to agricultural problems, but also to solve community issues, thus it is now referred to as rural advisory services contributing to community empowerment and development (Kassem, et al., 2021; GFRAS, 2024).

Over the years, improvements in technology continue to significantly influence agricultural extension interventions. Progressive digital advancement eventually paved the way towards the Fourth Industrial Revolution of 4IR.

d. Fourth Industrial Revolutions (late 20th century to present)

According to Quealy et al. (2022), the over-reliance on chemical and machines during the 3rd industrial revolution resulted in increased crop productivity but at the expense of environmental sustainability. Therefore, the goal to sustainably improve productivity to support the growing global population triggered the emergence of concepts like smart farming, highlighting the integration of advanced technologies to boost agricultural production (Quealy, et al. 2022). The fourth industrial revolution (also termed as 4IR) was launched in 2018 at the World Government Summit as the future of farming technologies (Cordero and Park, 2024). The 4IR (also known as Agriculture 4.0 or Smart Farming when applied in the concept of agriculture) features transition from industrial production to advanced technologies for precision agriculture, disruptive technologies, big data, Internet of Things (IOT), remote sensing, and artificial intelligence as basis for decision-making (Cordero and Park, 2024; Quealy, 2022; Waynama et al. 2024). Ebor, Festejo-Abeleda and Brown (2022) defined it as a convergence of digital, biological, and physical sectors of agriculture to support farmers towards more efficient farm operations.

Agustin, Alcaraz and Bristol (2022) categorized these smart farming technologies into three: 1) robotics or "ag-bots" which can be used for production services to improve farming efficiency (i.e. identification of pest and diseases and spraying appropriate pesticide to control them, fruit-picking, or seed collection); 2) remote sensing for up-to-date information that can allow farmers to make timely changes in their farming operations (i.e. use of unmanned aerial vehicles or drones, and satellite imaging for real time monitoring and assessment); and 3) machine learning and analytics which involves big data on previous experiences and scientific studies to incorporate in actual farm operations towards optimization (i.e. crop suitability studies, pest occurrence history). Neighboring countries like Thailand, Vietnam, Japan, South Korea, and Sub-Saharan Africa introduced and practices smart farming technologies such as: precision fertilization and spraying; use of smart phone applications, smart greenhouses; use of global positioning system; vertical farming; and blockchain technology, among others (Agustin et al., 2022; Waynama et al, 2024).

In the Philippines, while still at the early stages, the Department of Agriculture launched the "One DA Reform Agenda" in 2021, which prioritizes agricultural mechanization (Cordero and Park, 2024; Quealy et al., 2022). Under this agenda is the Philippines Modernization Program under 4.0 which strengthens support and application of GIS and remote sensing for assessing agricultural lands; use of big data and analytics to analyze trends, and establish a reliable database and registry system; use of drones for fertilizer and pesticide application; and establishment of smart greenhouses and indoor cultivation system for growing crops in a controlled environment (Cordero and Park, 2024; Agustin et al., 2025).

With technological advancement in the 4IR, agricultural extension interventions were delivered beyond spatial and temporal boundaries. Online learning modalities; web and mobile applications; and wide use of the internet for research and extension became available to support farmers in decision-making (Panganiban, 2019; Dacuyan et al., 2023). As for mechanization, remotely-operated agricultural machineries were developed, and satellite geographic information systems have become reliable sources of site-specific and crop-specific recommendations (Panganiban, 2019). Along with these changes in how people access and utilize information is the challenge to extension workers on how they would be able to deliver information and capacitate farmers and fisherfolks to keep up with rapid technological development. According to Agustin et al. (2022), end-users of technologies, including agricultural extension workers, keeps on lagging behind as it evolves rapidly and steadily leaving little to no time to adopt, among other external challenges such as infrastructure support, budget allocation, lack of trainings, social

inequalities, and occupational safety (Agustin et al., 2022; Eborá et al., 2022; Gumban and Baladjay, 2025; Jaljalis et al., 2026).

Agriculture in the fourth industrial revolution is promising in terms of increasing global food production, adaptation to climate change, facilitating investment in technology and innovation, as well as improving farm efficiency and promoting environment-friendly farm practices (Quealy et al., 2022; Eborá et al., 2022). However, as the production gets more complicated and dynamic, a more holistic approach to it shall be applied, taking into consideration all other social institutions in the agricultural innovation system.

From the literature reviewed, it can be observed that colonization of the Philippines had a huge influence on how Filipinos see agriculture as an economic endeavor then and now, specifically the government policies which were put in place to support it. It can also be noticed that through time, the role of extension workers changed from simply serving as a bridge between researchers and end-users or clients, they also participate in the whole knowledge co-creation by effectively facilitating the flow of knowledge across stakeholders, ensuring a delivery of a more suitable and best-fit intervention. Regardless, agriculture and agricultural extension being one of the many societal sectors, is heavily influenced by social change prompting several challenges and opportunities towards agricultural development.

Agricultural Extension in a Changing Society

From the first two industrial revolutions, it can be noticed that there was a shift from physical capital (labor) to human capital (knowledge and skills) as contributors of economic development. In agriculture, there was also a shift from replicating what was demonstrated by Spanish model farms to efficiently increasing productivity through science-based agricultural education. This reflects the social evolution theories of Comte and Spencer. According to Comte (as cited by Form & Wilterdink, 2025), social evolution undergoes stages, from abstract to scientific, highlighting the ability of the society to recognize scientific evidence and make changes in accordance to it (Form & Wilterdink, 2025). Consistently, as the society moved from the 1st to the 2nd industrial revolution, there was continuous differentiation of functions among units, establishing interdependence among them as what Spencer mentioned in his theory of social evolution (as cited by Form & Wilterdink, 2025). This was evident in the agricultural extension sector in a way that from mere technology transfer, the distinct role of extension agents as peddlers of agricultural information was recognized as part of the agricultural system. It can be observed in the research-extension-farmer linkage, and in the more complex Agricultural Innovation System and Agricultural Knowledge and Information System later on – all showing the interdependence of different variables in agriculture, including agricultural extension (Swanson et al., 1997; FAO & WorldBank, 2000). Nevertheless, this kind of social evolution took a very long time to occur, almost in the same direction as indicated by variables population density and level of production: as the population increase, the need to enhance agricultural productivity also increases (Form & Wilterdink, 2025), and the more relevant agricultural extension becomes.

However, what seemed to be linear, one-way direction of social evolution has changed in the 3rd and 4th industrial revolutions. According to Form & Wilterdink (2025), in the 19th century, it was believed that the evolution of society could be predicted as it was assumed to be unidirectional – this was disputed and disproved over time. Therefore, researchers of social evolution (Pareto, Spengler, Toynbee, Sorokin, etc.) agreed that evolution could happen numerous times, from different sources, caused by a variety of factors, in repetitions, and may not always indicate progress; it is a dynamic, unpredictable

process that must appropriately called "social change" (Form & Wilterdink, 2025). Aside from the term itself, social change represented massive transformations in the society, and recognized the influence of every social institution therein (Form & Wilterdink, 2025).

Given the nature of social change, its influence in agricultural extension can be viewed in terms of how it adapts to specific changes in social institutions. In the Philippines, the government undeniably influenced agricultural extension as a discipline and course of action as reflected in the works of PCAARRD et al. (2015), Ani & Correa (2016), Briones (2021), Bacongus (2023), and Dacuyan et al. (2023). From their studies, it can be noticed that agricultural extension as a function of the government is tied to respective policies, and it changes through time – some functions were expanded, transferred to other units, or deleted. Following the previous discussion, agricultural extension does not just follow what was done by other nations, but our government provided necessary policy instrumentation to implement it. This way, there will always be laws that govern and a systematic process to follow in implementing extension programs even if leaders of different priorities were changed every now and then. Table 2 summarizes the government organizations established and their respective functions at that time.

Table 2: Summary of government organizations and their respective functions

Year	Government organization/s & policies	Agricultural Extension Mechanism/Function
Spanish Colonization	<i>Encomienda/hacienda</i>	Enhance agricultural productivity for local & international trade through model farms; training for <i>encomenderos/hacienderos</i>
American Colonization		
• 1902	• Bureau of Agriculture	• agricultural education and hands-on training
• 1910	• Division of Demonstration and Extension Service	• added functions: agricultural financing, animal insurance, and farmer cooperatives
Commonwealth Republic	Commonwealth Act 85 of 1936	establishment of provincial extension services and its personnel, provincial agricultural extension supervisors and municipal agricultural inspectors
Republic of the Philippines		
• 1952	• Republic Act 680 = Bureau of Agricultural Extension (BAEx)	• implement agricultural extension programs that covers farm management, home management, and rural youth development

Table 2: *Continued...*

Year	Government organization/s & policies	Agricultural Extension Mecha- nism/Function
• 1963	• RA 3844 = Land Re- form Code	• renamed BAEx to Commission on Agricultural Productivity under Office of the Presi- dent which supported land reform initiatives and ag- ricultural cooperatives
• 1967	• RA 5185 = Decentralization Act (followed by EO 128 in	• providing agricultural ex- tension services was trans- ferred to local governments
• 1970s	• appointment of Re- gional Directors of Agri- culture	• strengthening of commu- nity-based organizations; extension personnel fo- cused on institutional de- velopment, human resource development, technology transfer for farming sys- tems
• 1984	• EO 967 Minis- try of Agriculture was renamed as Ministry of Agricul- ture and Food	• policy formulation, project implementation, program execution, including research and ex- tension
• 1987	• Executive Order 116 = Agricultural Training Institute	• merging of Bureau of Agricultural Extension, Philippine Agricultural Training Council, and Phil- ippine Training Centers for Rural Development
• 1991	• RA 7160 Local Government Code	
• 1997	• RA 8435 Agriculture and Fisheries Mod- ernization Act	

- **Devolution of authority to local government units (including agriculture)**
- **Collaborative efforts of LGUs, NGOs and SUCs to promote agricultural modernization through research, development and extension**

Sources: PCAARRD et al. (2015); Ani & Correa (2016); Briones (2021); Baconguis (2023); Dacuyan et al. (2023); Cullinane et al. (2025)

To understand how the interaction of social institutions influences agricultural extension, this paper used governance, education, and technology as perspectives.

a. Agricultural extension as a part of governance

Generally, according to Norton & Alwang (2020), the delivery of agricultural extension programs has changed significantly for the past four decades. From the traditional technology transfer for agricultural productivity, extension has become a system responsible for addressing complex issues towards community empowerment (Norton & Alwang, 2020; Pizana et al., 2021; Siankwilimba et al., 2023); a great task but with very limited resources and low returns (Norton & Alwang, 2020). Thus, supporting governance mechanisms are necessary to make this happen.

In the Philippines, the current extension system is called the National Extension System for Agriculture and Fisheries (NESAF) which is pluralistic (Baconguis, 2023), meaning, it can be delivered by the LGUs, national government, and private sectors using a wide range of methods (Norton & Alwang, 2020; Baconguis, 2023). NESAF is a product following the continuous evolution of agricultural extension from the Spanish time up to present (Ani & Correa, 2016), as well as devolution as mandated by RA 7160. From a highly centralized agricultural extension, social sectors are also allowed to conduct extension works as guided by its pluralistic nature. Under NESAF, the Agricultural Training Institute (ATI) serves as the national coordinator defending national budget allocation for extension services (Baconguis, 2023).

The implementation of NESAF was said to have encountered numerous challenges. In a report published by the ATI (2023), they claimed that there has been limited access to and insufficient government support even before the pandemic happened. While there has been subsidy programs for farmers (i.e. rice farmers under Rice Tariffication Law), remains a challenge due to limited personnel and an incomplete database which serves as the masterlist of farmer-beneficiaries. Since agriculture has been devolved as a local government function, the local personnel responsible for delivering extension services were sometimes unequipped, and may become politically-motivated rather than objective sources of agricultural information. Also, some LGUs were unwilling to share with the cost of extension services as they are highly dependent on state-funded projects (Norton & Alwang, 2020; Siankwilimba et al., 2023; ATI, 2023; Jaljalis et al., 2026).

In a study of Jaljalis et al. (2026), completing the registry system in Basilan has been a challenge as it needs more people who will assist the farmers in their registration, or reach far-flung areas to have them listed. There were also cases of tampering the list of beneficiaries for political purposes, unequal budget allotment and varying prioritization among LGUs and barangays (villages), and political backing of illegal activities (Jaljalis, et al., 2026). This manifests power play as the ones who are tasked to implement the law and advocate for an equitable distribution of benefits among constituents become enablers of power abuse. Moreover, most of the LGU staff assigned to do extension work are on appointment basis; their employment depends on who is elected as local chief executives (ATI, 2023; Jaljalis, et al., 2026). Therefore, institutional memory is difficult to maintain, and the transition from one extension worker to another causes further delay in the delivery of agricultural services (ATI, 2023; Jaljalis et al., 2026). In Basilan, extension work are being done mostly out of passion and compassion, hence, instances of extension staff using their own money to provide continuous extension services is unfortunately a usual account (Jaljalis et al., 2026). With the temporary employment status, delayed salaries, and occupational risks, extension staff becomes less motivated and tend to opt for a different job should an opportunity present itself (Jaljalis et al., 2026). Moreover, in some cases, Municipal Agriculture offices are dilapidated, and has incomplete fixtures and equipment; inputs were sometimes entrusted to the care of farmers who have sufficient storage for them. This makes agricultural services less accessible to its intended clients as there is no physical space where they can raise their concerns and be accommodated accordingly (Jaljalis et al., 2026).

Apart from the concerns mentioned above, structural changes in the society that goes along with economic development have influenced fund support for agricultural extension programs (Norton & Alwang, 2020; Kassem et al., 2021). Examples of these are: 1) international donors' withdrawal of their fund support to Training-and-Visit approach as it was found ineffective which resulted to massive decline in funding of extension programs in general; 2) rapid urbanization of communities which resulted to shift in local government priority funding from agricultural to infrastructure; and 3) investment in more tangible projects (roads, bridges, buildings, irrigation canals, etc.) (Norton & Alwang, 2020; Kassem et al., 2021). As a system of function, the pluralistic agricultural extension is challenging. Aside from financial constraints and skill gaps among personnel, public extension programs have been neglected for a long time (Yang & Ou, 2022). While it is crucial in achieving food security, the growing complexity of its scope and functions are making it difficult to assess (Yang & Ou, 2022). Governance failures, including: 1) lack of accountability and weak local extension policies; 2) insufficient access to affordable extension services; 3) lack of coherence with leadership objectives; 4) understaffed offices, and unskilled and aging personnel; 5) unsustainability of extension programs; and 6) inability to adapt to changes, have been weakening the efficiency of the extension system, agricultural productivity, and the whole value chain development (Yang & Ou, 2022; Dacuyan et al., 2023). On the other hand, privatized extension was expensive, with limited engagement, may become highly technical for resource-poor clients, and may discourage dissemination of information due to its cost (Kassem, et al., 2021).

Following Marx's conflict theory, it can be observed that while national policies are in place, its implementation on the local scale remains inconsistent due to political interference. Marx's Conflict Theory assumes that resources are limited, each person has self-vested interests, and conflicts cannot be totally avoided within and among social groups (Resnick, 2026). In the case of agricultural extension, the limited resources could pertain to budget and human resources, where local projects are programmed and funded according to the priority of the local chief executive and government officials. Hence, political dynamics heavily influence social inequalities, specifically when favor is being given

to one party at the expense of another (Ebora, et al., 2022; Jaljalis, et al., 2026). It should be noted further that the LGUs are not required to conduct extension interventions for farmers and/or fisherfolks, it is based on their own prerogative as local chief executive, hence budgetary allocations for agriculture heavily depends on their local prioritization programs (Baconguis, 2023). Thus, the welfare and needs of farmers and fisherfolks might get overlooked during the process, unless otherwise strongly advocated for. On the other hand, the private sector can support and implement extension programs on their own volition (Baconguis, 2023). Nevertheless, the changes in the extension systems such as the devolution (encouraged participation of stakeholders), pluralism (stakeholders can conduct their own extension interventions), and application of systems perspective (not just agricultural productivity) were relatively constructive (Kassem et al., 2021; Yang & Ou, 2022).

At present, there are senate and house bills advocating for Provincial Agricultural and Fisheries Extension System which aims to put the planning and implementation of extension programs at the provincial level, professionalizing and standardizing salaries and wages of agricultural extension workers, and transform the ATI as a government institution to provide national extension services effectively and efficiently (Baconguis, 2023; ATI, 2023; Jaljalis et al., 2026).

b. Agricultural extension as non-formal education

The history of agricultural extension as an educational intervention to increase farmers' income can be traced back during the American colonization where settlement farm schools were established to provide agricultural education and hands-on training (Baconguis, 2023; Dacuyan et al., 2023). Later, the University of the Philippines College of Agriculture was established in 1909, followed by UP Land Grant in 1972 – both with the purpose of advancing agricultural research, development, and extension in the Philippines (UPLB College of Agriculture and Food Science official website; PCAARRD et al., 2015). The passing of RA 8435 (Agriculture and Fisheries Modernization Act) in 1997 led to collaboration agricultural universities with various stakeholders as they were also recognized as primary extension service provider (PCAARRD et al., 2015; Baconguis, 2023; Dacuyan et al., 2023).

The relationship of agricultural education and economic growth has already been proven (Norton & Alwang, 2020; Raji et al., 2024; Melania et al., 2024). According to Leoni (2025), economic growth attributed to improvement in education has been observed since the 18th century, and could be explained by Human Capital Theory which stated that a unit increase in human capital equates to a unit increase in economic growth. Human capital was defined as "set of skills that increases a worker's productivity and stem from education such as schooling and training" (Leoni, 2025 page 227). On the individual level, education improves skills which make a person more productive and earn higher; on a societal level, the government has to invest in education to improve societal educational attainment, avoid poverty, and facilitate long-term economic growth (Leoni, 2025). With the changes in the scope and function of agricultural extension (Tayang et al., 2023), Amartya Sen's Human Capability Theory was better used as a lens as it does not only discuss productivity, but also social change brought by increased educational attainment (Leoni, 2025). According to Sen (as cited by Leoni, 2025), improving human capability equates to empowerment as one becomes more capable to make informed decisions (Leoni, 2025).

Traditionally, extension interventions were implemented using technology transfer approach in a top-down manner, however this approach was proven as ineffective, labor-intensive, time-consuming, and unsustainable in time (Norton & Alwang, 2020; Raji et al., 2024). With changes in the climate, market trends, pests and diseases (emergence of

new pest species), and growing demand for food, application of traditional extension methods were no longer fit and could no longer keep up (Norton & Alwang, 2020; Raji et al., 2024). Axinn (1988) have provided detailed parameters and indicators in determining the exact extension approach, including variables to guide the extension workers in identifying which one would work best depending on their situation. While Axinn (1988) discussed the distinct characteristics of major extension approaches, Joshua et al. (2023) reiterated that these approaches are not mutually exclusive with one another, but instead, works in synergy complementing each approaches' inadequacies. This idea was further supported by Bhat et al. (2024) which stated that extension approaches are composed of various dynamic actors that using a single, one-size-fits-all approach is impractical. The synergistic nature of extension approaches makes it more effective and efficient in achieving its purposes amid societal changes (FAO, 2021; Joshua et al., 2023; Bhat et al., 2024). These changes include: emergence of new extension models, new information, and shift in the role of respective stakeholders, among others (Norton & Alwang, 2020).

Given the complexity of agricultural extension as an educational intervention, the expectations from extension workers were set to a high standard despite mismatched benefits. For instance, in Davao Oriental, Gumban and Baladjay (2025) found out that extension workers usually conduct farm home visits and meetings with the farmers who normally resides in remote villages. Service vehicles or transportation allowances shall be provided for them to be able to perform their official duties; however, based on their study, this remains a challenge (Gumban and Baladjay, 2025; ATI, 2023). In addition, Jaljalis et al. (2026) pointed out that some of the extension workers in Basilan do not have formal agricultural education or came from various fields of specialization that were not related to agriculture at all, and only rely on trainings or seminars to have basic agricultural knowledge; hands-on experiences remains insufficient. The lack of technical capacity further reduces trust in advisory services and hinders adoption of modern agricultural techniques (Jaljalis et al., 2026).

Their experiences are not isolated cases. In the 2023 report, ATI specified that extension workers' competencies in some subjects that are crucial in delivering extension services at the local level remains low. Agricultural education curriculum has to be updated to keep up with societal changes (ATI, 2023), especially now that more farmers and fisherfolks are becoming digitally-equipped with basic smart communication technologies. Technological modernization was so fast that aging extension workers cannot keep up; teaching something one does not understand is a serious problem in extension (Dacuyan et al., 2023). While digital resources might be accessible through it, Gumban and Baladjay (2025) and Jaljalis, et al. (2026) agreed that they cannot substitute structured field training and hands-on experiences that can be provided by technically-competent agricultural extension workers.

Further, Norton & Alwang (2020), Yang & Ou (2022), and ATI (2023) also mentioned that education-research-extension linkage remains weak due to limited funding and weak coordination between the academe and extension service providers. Privatization and fragmentation (project-based extension) was seen as alternative solution to the funding issue, however, these interventions may become inaccessible to some farmers; unsustainable; inconsistent with national government advocacies, laws and policies; unfit and irrelevant to the specific needs of farmers; and resistant to change (Norton & Alwang, 2020; Yang & Ou, 2022; Tayang, et al., 2023; Dacuyan et al., 2023).

The education-economic interaction indeed influenced agricultural extension, however, as part of a larger system, challenges cannot be avoided but can be kept at bay when given attention and appropriate action. Unfortunately, economic growth attributed to agricultural productivity was invested in other social sectors, keeping public funds for

agriculture limited and dependence on private sector intervention increased (Norton & Alwang, 2020; Yang & Ou, 2022).

c. Agricultural extension and technological advances

Science and technology remain to be one of the major influencing factors when it comes to agricultural extension simply because it provides the content/subject matter to be extended, and how it is best disseminated (Panganiban, 2019). Going back to the primary role of extension (that is enabling farmers to make educated decisions towards improving their productivity) the emergence of information and communication technologies (ICTs) facilitated the exchange of knowledge, making it more available to them (Norton & Alwang, 2020). According to Agustin et al. (2022), the 3rd and 4th industrial revolution is also a form of agricultural revolution not for its capacity to increase productivity, but for it becoming 'smart'. While productivity is still a priority, the concept of smart farming or the integration of advanced technologies into every aspect of food production, makes it more efficient and sustainable (Agustin et al., 2022; Quealy et al., 2022; Hassoun et al., 2025).

In the time of COVID-19 pandemic, the delivery of agricultural extension services in the Philippines were severely affected (Pizana et al., 2021; Singh et al., 2023; Siankwilimba et al., 2023; Dacuyan et al., 2023). The series of lockdowns, quarantine periods, social and physical distancing, and even the virus itself caused death of some agricultural extension workers, drop in attendance and postponement training programs, and exhaustion and distress to a number of extension service providers; the use of ICTs during those times were a huge help in terms of information dissemination and exchange (Pizana et al., 2021; Singh et al., 2023; Siankwilimba et al., 2023; Dacuyan et al., 2023). In fact, according to Dacuyan et al. (2023), there was a huge increase in the number of clients (farmer and non-farmer) who availed online courses in agriculture, either through the official website of the ATI or through their other official channels. Indeed, the ICTs have widened the reach of agricultural extension during the pandemic, but its quality remains to be a question.

According to Siankwilimba et al. (2023), the disruption of agricultural extension services has put the burden to the public in making the relevant information available to them, especially for smallholder farmers who have limited access to these kinds of digital services. Aside from accessibility, the complexity of information may also cause confusion and misunderstanding in a self-paced learning environment (Siankwilimba et al., 2023). On the other hand, with the growth of digital-native consumers, smart technologies integrated in the supply and value chains can assist in meeting local and global demands for food, fueling the next agricultural revolution (Agustin et al., 2022). Smart farming technologies facilitate data-driven decision-making, empower small-holder farmers, scale-up adoption of technologies, and fast and efficient knowledge transfer (Quealy et al., 2022). However, the question on readiness is still left unanswered. The wealth gap among farmers and corporations influences capacity to invest and adopt certain technologies; decrease in rural employment specifically for farm workers who also served as daily wage earners; inclusive but inequitable access to technologies; and the absence of a legal and regulatory framework for these kinds of technologies are some of the challenges that has to be dealt with (Eborá et al., 2022; Quealy et al., 2022).

Technology is multifaceted, and the integration of it with agricultural extension goes beyond the delivery mechanism; it needs to be put into research and extension, product diversification, and even in policy instruments to be fully optimized (Lanzona Jr., 2023). According to Quealy et al. (2022), Eborá et al. (2022), and Hassoun et al. (2025), smart technologies applied in agriculture can respond to food security issues, adaptation to climate change, and spur economic growth especially in rural poor communities.

However, Eborá et al. (2022) and Hassoun et al. (2025) emphasized that there has to be investment on these technologies and innovations for it to revolutionize agriculture as an efficient system of production, climate change adaptation strategy, and means for attaining social equity.

From the discussions above, it can be observed that as sectors of society change, the delivery of agricultural extension services also follows. From the government policies institutionalizing its functions, to it being a form of non-formal education that enhances human capability to make informed decisions, and to technological advances that smoothens out its content and mechanisms – it has transformed as well from traditional to modern along with the changes in the society. However, one variable was observed to be so significant that it can change local extension interventions, which are the local government units. Since devolution, they can control fund allocation, amount, and prioritization, which mean they could support agricultural extension programs, or hinder its implementation. Using the conflict perspective and power dynamics (Form & Wilterdink, 2025; Resnick, 2026), LGUs alone can make or break social change. Further, the challenges that are being faced in agricultural extension can also be traced back to who holds more authority over the other: allocation of resources, capability to understand and adopt innovations, access to technological support – inequalities could be observed in these aspects. Therefore, while social institutions work together to achieve their function of delivering agricultural extension services, on the other side of the coin, the investment in it is unequal.

Agricultural Extension of the Future

Panganiban (2019) foresaw the role of ICTs in delivering agricultural extension interventions even before the pandemic happened. As early as the 1990s, the concept of distance learning had been emerging, along with the building of e-governance system in the Philippines (PCAARRD et al., 2015; Panganiban, 2019; Briones, 2021; Dacuyan et al., 2023). The use of ICTs was heightened when pandemic hit, as there was no more effective way to communicate but through ICT devices from the usual face-to-face to online information generation, dissemination, and utilization (Agustin et al., 2022; Singh et al., 2023; Tayang et al., 2023; Raji et al., 2024). The role of ICTs as extension tools was seen as very important, however, following the extension approaches by Axinn (1988) and extension reforms discussed by (Rivera & Alex, 2004), the models and approaches in delivering extension services remain the same.

On the other hand, according to the International Labor Organization (2022), aside from the digitalization of extension, the widening of the scope of the agriculture sector in general is imminent. In their technical note, they discussed the importance of the role of the socio-civic organizations in dealing with the shift in focus from productivity to value and supply chains. They reiterated that employers and employees are key drivers in the agriculture sector, and therefore must be protected, equipped with relevant competencies, and protected under the law (International Labor Organization, 2022). It was a good reminder especially since agricultural extension caters to agricultural workers and stakeholders, that they will be treated with respect and dignity as partners and not just merely participants.

Agricultural extension systems in the Philippines is currently pluralistic (PCAARRD et al., 2015; Bacongus, 2023; Dacuyan et al., 2023), heavily relying on various sources of information, resources, and implementation modalities (Dacuyan et al., 2023; Siankwilimba et al., 2023). While the approach itself was potentially effective, there were still challenges specifically in terms of funding and collaboration among stakeholders (Norton & Alwang, 2020; Briones, 2021). Digitalization of extension services also made access to information

easier and wider, enabling proactive ways of continuously providing extension services even in unfavorable conditions (Panganiban, 2019; Dacuyan et al., 2023). However, digitalization also comes with insufficiencies in terms of equitability and equality (Panganiban, 2019; Agustin et al., 2022; Eborá et al., 2022; Dacuyan et al., 2023; Siankwilimba et al., 2023). Given these circumstances, researchers in agricultural extension recommended extension reforms to improve extension systems.

One of the most common reform suggestions is the increased partnership with the private sectors, including international organizations and research centers not only because they usually have fund support, but also, they are investing in knowledge generation which improves the quality of information to be shared with stakeholders (Briones, 2021; Yang & Ou, 2022; Bacongus, 2023). Cruz (2022) also mentioned the strengthening of university-industry linkage to come up with long term solutions, specifically innovative and strategic policies towards achieving food sufficiency. Yang & Ou (2022) encourages that the public extension and advisory services systems must be reviewed and re-aligned with national agricultural development goals, and ensure not just the funding but the implementation of local extension programs. Pizana et al. (2021), Yang & Ou (2022), Dacuyan et al. (2023), and Raji et al. (2024) also advocated for the recognition of extension workers, enabling their professional development, and boosting their morale and nobility as extension professionals and not merely 'messenger' of new information but an important part of the whole system. Functioning monitoring and evaluation mechanisms should also be put in place, as a function of every stakeholder and not just the funding agency, to ensure the quality and fitness of extension interventions in accomplishing its objectives (Yang & Ou, 2022). GFRAS (2024) also highlighted the evaluation of extension interventions to identify target-performance, and capacity gaps. Lastly, with the proliferation of tech-savvy farmers, Panganiban (2019) and Dacuyan et al. (2023) also suggested that infrastructures supporting digitalization of extension services be established to reach not just wider but deeper down in the grassroots. Raji et al. (2024) also mentioned that digital extension services must be scaled-up, with emphasis on the use of data analytics to make precise recommendations.

These reforms, ideally, would make agricultural extension more responsive to social change, with stakeholders more accountable and in touch with reality, and the one that promotes inclusive agricultural development (Panganiban, 2019; Norton & Alwang, 2020; Pizana et al., 2021; Yang & Ou, 2022; Bacongus, 2023; Dacuyan et al., 2023; Raji et al., 2024).

Conclusions and Recommendations

Throughout Philippine history, it was revealed that agricultural extension contributed to agricultural development in terms of educating farmers on how to improve their farming systems and improve their productivity and income. It is a long process of change in sectors relevant to agriculture, and agricultural extension as a discipline and educational intervention underwent modifications in trying to adapt to the changing environment (i.e. policies that mandated and changed its organizational structure and functions). Using an evolutionary perspective, it can be concluded that the evolution of agricultural extension is linear and unidirectional. From being a model to be replicated; a form of non-formal education; a part of the research-extension continuum; into a system that is composed of parts that must collaborate together to achieve its development goals – extension in the Philippines is similar to an organism evolving from simple to complex, following the global course of action.

However, as a part of social institutions, agricultural extension has encountered challenges along the way and was forced to adapt to it: no funds, collaborate; declining human resource, recruit non-professional experts; no internet access, provide learning modules, among other scenarios documented and encountered in the field. These temporary remedies to long term issues are more cyclical than linear, and it would come to a point of exhaustion where efforts cannot solve them anymore. Under conflict perspective, agricultural extension is an interplay of power and authority, where one stakeholder has more influence over the other, and could affect direction and magnitude of change in a short period of time. The person of authority decides their priorities, resource allocation, and projects to be implemented, among others, that imbalances would mean opportunity costs.

Using different lenses in discussing agricultural extension would enable one to see it in a bigger picture. This paper may not cover the full view as agricultural extension is broad discipline – there are several variables other researchers could explore such as gender dynamics, youth engagement, or climate change adaptation studies. Nevertheless, this study recommends policy reviews of extension systems, giving attention to strengthening multi-stakeholder partnerships (i.e. in NESAF); institutionalization of e-extension and digitalization of extension services as tools to information dissemination (passing of joint memorandum circulars between executive departments like DA, DepEd, CHED, TESDA, etc. advancing formal and non-formal agricultural extension education); and provision of incentives to agricultural extension workers (i.e. passing of Magna Carta for Extension Workers). Social change is partly predictable and partly unpredictable; it has no definite pattern, and it is not always progressive (Form & Wilterdink, 2025), but investing in the best fit agricultural extension interventions, coupled with policy and infrastructural support, our farmers could have a fighting chance to navigate through local and global challenges brought by consistent social change.

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Conflict of Interest

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