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MORALITY BEFORE KNOWLEDGE

The exemplary role of farmer institutional administrators as a strengthener for the holistic and integrative reform of the agricultural development paradigm

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ABSTRACT

Background: The agricultural development paradigm, which has shifted evolutionary from traditional agriculture to the current sustainable agriculture stage, has not been able to create prosperity for both farmers and the environment. Since the establishment of this sustainable agriculture paradigm, the back-to-nature movement has not changed the fate of farmers and the environment. This condition indicates that the three pillars/dimensions of sustainable agricultural development have not been successful in economic, sociological, and ecological dimensions, because one of the causes is the role of farmer institutions is not optimal, including not being a role model for its members. The purpose of this study is to strengthen the impact of the implementation of a holistic and integrative agricultural development paradigm through the exemplary role of farmer institutions for its members. **Method:** method used is descriptive through the Literature Review (SRL) technique approach using several published and unpublished research articles. Some theories used are the history of the evolution of agricultural paradigms in Indonesia starting from the traditional stage, agricultural intensification, agricultural diversification and industrialization, sustainable and inclusive agriculture to the optional holistic and integrative paradigm and the theory of farmer group role models. **Findings:** The results of this study reveal that the role model factor of farmer group administrators can have implications for the level of farmer participation in following all recommendations. In line with the exemplary role model of farmer group administrators, this evolutionary paradigm shift in agricultural development toward a holistic and integrative one will positively impact the acceleration of improving the welfare of farming communities and their environment. **Conclusion:** The conclusion of this study is that the paradigm shift in agricultural development in Indonesia from before the 20th century to the 21st century (sustainable and inclusive agricultural development), including holistic and integrative options, has not been able to alleviate poverty in agriculture. **Novelty/Originality of this article:** A holistic and integrative sustainable agricultural development paradigm will have a very positive and accelerating impact on poverty alleviation in the agricultural sector if it strengthens the role of exemplary farmer institutions.

KEYWORDS: agricultural development paradigm; holistic and integrative; exemplary.

1. Introduction

National empirical facts are astonishing for us as an agrarian nation. It reveals that 60% of poverty is spread in rural areas, and as much as 70% of the total poverty in these rural areas is due to the agricultural sector. This condition seems to be overlooked by stakeholders, including the government, resulting in this endemic poverty that receives no

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treatment from the authorities. The symptoms of poverty in agriculture over the past two decades appear to have been neglected, resulting in the widespread conversion of productive agricultural land to non-agricultural land controlled by oligarchs. This torrent of conversion of productive agricultural land cannot be stemmed by any party (especially the proletariat), despite the issuance of related regulations that appear to be merely lip service.

In the last decade, data from the Statistics Indonesia/*Badan Pusat Statistik* (BPS) reveals that the agricultural sector has made a significant contribution to Indonesia's Gross Domestic Product (GDP). In the second quarter of 2024, the agricultural sector, broadly defined, contributed 12.97% to total national GDP, ranking third after the manufacturing industry and wholesale and retail trade. The agricultural sector, particularly in its broadest sense (including forestry, fisheries, and livestock), makes a significant contribution to the Indonesian economy. Although the agricultural sector experienced some fluctuations, such as a contraction in the first quarter of 2024, it still showed positive growth overall and is one of the pillars of the national economy. The agricultural sector, broadly defined, ranks third as the largest contributor to the national economy after the manufacturing industry and wholesale and retail trade. The agricultural sector plays a strategic role in supporting food security, increasing competitiveness, absorbing labor, and alleviating poverty. The government continues to encourage increased production and downstreaming of national agriculture, such as focusing on increasing rice and corn production. The agricultural sector also contributes to non-oil and gas exports, with leading commodities such as palm oil contributing significantly to the country's foreign exchange earnings (BPS, 2025).

However, this contribution contradicts data indicating that 70% of the 60% of poverty in Indonesia is spread across rural areas, particularly in the agricultural sector. This paper will assume that the data cited in the first paragraph accurately reflects this phenomenon, as many factors support this finding. One indicator is the gap between domestic soybean demand of approximately 200 million tons by 2024 and local soybean production of only 800,000 tons. This necessitates the government importing 1.2 million tons to meet this demand.

The case of East Java Province can be used as an indicator of poverty in agriculture, although the research results of Hazmi et al. (2018) only cover the phenomenon in three districts. Discussing soybeans is not just about the production process, but also about a broader scope, namely the agribusiness system based on soybean raw materials. The results of this study revealed the fact that the growth rate of soybean-based agribusiness in Jember, Banyuwangi, and Pasuruan Regencies from 2011 to 2018 experienced an average decline of below 10%, at least in terms of the number of business units. This is due to the decreasing availability of soybean raw materials and the high price of soybean raw materials (an average increase of 25.99% per kg). Another phenomenon can also be revealed from the results of other studies on the Special Efforts for Rice, Corn, and Soybeans in several provinces, where the success rate has not shown encouraging results (Hidayatullah & Djojko, 2021), although some provinces have also shown some success (Nugroho et al., 2021 and Ponto et al., 2017).

Poverty in agriculture is inseparable from the role of farmer institutions in each village. To increase livestock and livestock productivity in rural areas, a group approach is being implemented, namely farmer-livestock groups. Farmer-livestock groups are expected to facilitate livestock development by relevant agencies/institutions and serve as a vehicle for farmers to improve their members' knowledge and skills. Furthermore, government policies encourage farmer groups to be empowered to become business groups/cooperatives. This is expected to enable farmer groups to anticipate these opportunities and increase productivity. The results of Abdullah's (2008) research in Bulukumba Regency revealed that the development of livestock farming groups was quite slow, because the number of livestock farming groups in the beginner category was more dominant compared to those in the intermediate and advanced categories.

Poverty indicators in the agricultural sector are also supported by the research results of Widowati & Alfina (2022), which revealed that the level of independent farmer participation in meeting soybean needs is still low (4.21%). This means that the role of

farmer groups in influencing their members to plant soybeans is less than optimal. Activities to mobilize farmer participation within farmer groups are needed to strengthen farmer participation in planting soybeans. In essence, farmer group administrators can provide motivation and support to their members to continue participating in planting soybeans during the dry season. Some attitudes and actions of farmer group administrators that have been played towards their members include making themselves into educators, consultants/supervisors, mediators/facilitators, and monitors & evaluators. The impact of these roles has not yet resulted in attitudes and actions that have a significant impact on the level of farmer participation in following the recommendations of PPLs and farmer group administrators. Based on this, additional types of attitudes and actions by farmer group administrators are needed to strengthen previous roles in order to increase farmer awareness of following the recommendations of farmer group administrators.

Strengthening the role of farmer groups mentioned above needs to be continuously encouraged to ensure farmer participation is in line with the research findings of Oktarina et al. (2020), which revealed that the success of a sustainable agricultural development program is inseparable from the role of farmer institutions in rural areas. If existing farmer institutions tend to be less proactive and participatory, then the existence of these farmer institutions will not function optimally. Therefore, efforts are needed to change farmer behavior through training, advocacy, group meetings, technology adoption, and comparative studies. The role of institutions and their development is crucial for farmers to become more independent in running sustainable agricultural businesses. The forms of farmer institutions frequently found in the field include farmer groups, Farmer Group Associations, Water User Farmer Associations, Water User Farmer Associations, cooperatives, and Village Unit Cooperatives/*Koperasi Unit Daerah* (KUD).

Since its founding, Indonesia has experienced several evolutionary paradigm shifts in agricultural development. Furthermore, several scientific perspectives have been expressed on the discourse of agricultural paradigms, although these are not specifically included in the evolutionary paradigm shift. Agus (2010) argues that agriculture has been a way of life and a source of livelihood for most of our society. However, the community still holds the old paradigm of thinking that sees agriculture as merely a matter of cultivating crops that merely produces commodities for personal consumption. Therefore, a breakthrough in thinking and concrete new steps are needed, recognizing that agriculture has multiple functions that have not yet received and need to receive adequate appreciation from the community and government. Agriculture must be able to serve as the primary supplier of clothing, food, and shelter for the lives of all living creatures on this earth; also as a sustainable natural environmental conservation, a provider of environmental beauty (agro-tourism), a producer of biopharmaceuticals, and a producer of bioenergy. Agriculture must also be developed by eliminating sectoral egos, so it must be developed harmoniously and synergistically with land use for various life sectors within a unified landscape ecology management. Therefore, the development of the Integrated Bio-Cycle Farming System (IBFS) or an integrated organic material cycle-based farming system can be expected to become an alternative farming system for the embodiment of Revitalization of Agriculture, Fisheries and Forestry which was launched by President SBY in June 2005.Since its founding, Indonesia has experienced several evolutionary paradigm shifts in agricultural development. Furthermore, several scientific perspectives have been expressed on the discourse of agricultural paradigms, although these are not specifically included in the evolutionary paradigm shift. Agus (2010) argues that agriculture has been a way of life and a source of livelihood for most of our society. However, the community still holds the old paradigm of thinking that sees agriculture as merely a matter of cultivating crops that merely produces commodities for personal consumption. Therefore, a breakthrough in thinking and concrete new steps are needed, recognizing that agriculture has multiple functions that have not yet received and need to receive adequate appreciation from the community and government. Agriculture must be able to serve as the primary supplier of clothing, food, and shelter for the lives of all living creatures on this earth; also as a sustainable natural environmental conservation, a provider of environmental beauty (agro-

tourism), a producer of biopharmaceuticals, and a producer of bioenergy. Agriculture must also be developed by eliminating sectoral egos, so it must be developed harmoniously and synergistically with land use for various life sectors within a unified landscape ecology management. Therefore, the development of the Integrated Bio-Cycle Farming System (IBFS) or an integrated organic material cycle-based farming system can be expected to become an alternative farming system for the embodiment of RPPK (Revitalization of Agriculture, Fisheries and Forestry) which was launched by President SBY in June 2005.

The role model of farmer institutions in rural areas will become a new paradigm in sustainable agricultural development or at least strengthen the existing paradigm. The importance of this role model is supported by the research results of Mustopa et al. (2023) and Kusnadi & Ait (2019), which revealed that the leadership role of farmer group leaders has a positive relationship with group effectiveness, as well as internal and external factors of farmer group members have a positive relationship with group effectiveness. Furthermore, another finding is that the level of rice productivity is determined by the role of farmer group leaders by 26.3%, meaning that the higher the role of farmer group leaders, the higher the level of rice productivity. The purpose of this study is to strengthen the impact of implementing an inclusive, holistic, and integrative agricultural development paradigm through the role model of farmer institutions for their members.

2. Methods

This study employed a descriptive approach, using a literature review of various studies examining the agricultural development paradigm and farmer institutionalization. This study explores the impact of the implementation of the agricultural development paradigm to date, and its extent to which it has impacted the agricultural sector's progress, as assessed by experts. Several phenomena from the results of these studies reveal a wide range of successes and failures, with all their associated consequences. Similarly, the role of farmer groups in empowering their members through various roles is explored. Previous research studies have examined the varying impacts on farmer participation, whether they support or lack support for government programs. The purpose of this literature review is to comprehensively review the implementation of the agricultural development paradigm, from its initial phase (before the 20th century) to the current paradigm, and its impact on agricultural progress and poverty reduction.

A literature review is an essential part of any academic research. Through this process, researchers can understand the development of previous studies, identify research gaps, and develop a strong theoretical foundation. By using the right literature review method, the research conducted will be more valid, relevant, and provide a real contribution to the academic world. In using this kind of Literature review method, it is very important to use reliable data sources by following a systematic method. The steps in using this Literature review are as follows (Rizzo et al., 2024). The first step in conducting a literature review is to determine keywords that are relevant to this research topic. These keywords are used to search for appropriate references in various academic databases such as Google Scholar, Scopus, or PubMed. Then, ensure the sources used are from credible scientific publications, such as indexed journals, academic books, or research reports from official institutions. Third step is read and analyze the contents of the references critically by highlighting the main points, methods used, and conclusions drawn, so that not all references found are relevant to the research conducted using content analysis. Content analysis is where researchers examine a text objectively to get a picture of the content as it is, without researcher intervention (Ahmad, 2018 in Nurjannah, 2021). After that, making a summary or synthesis that describes how previous research contributes to the research being carried out. For the ending, step of organizing the literature review with a clear structure.

Literature collection was conducted with keywords including agricultural development paradigm; holistic, inclusive, and integrative; exemplary farmer group administrators. The literature was collected in the period from 2008 to 2025. This research method requires critical interpretation of various studies or research results that have been collected as

many as 40 articles originating from reputable national and international journals, media publications, and research reports. The articles are sourced from reputable international journals, reputable national journals, and credible mass media news sources, each amounting to 1, 25 and 5 articles, as well as 1 reference book. It is hoped that the findings and suggestions from this study can provide a clearer, concrete, and comprehensive picture of the holistic, inclusive, integrative, and adaptive agricultural development paradigm. Therefore, the results of this study are ultimately expected to answer the problems and be used as considerations within the scope of the sustainable agricultural development paradigm.

3. Results and Discussion

3.1 History of the evolution of the agricultural development paradigm

The agricultural development paradigm has undergone significant evolution in line with changing thinking, needs, and challenges of the times. This aligns with Rani's (2020) opinion that the application of economic development theories and paradigms in Indonesia has undergone several changes or refinements. Among these refinements is the emergence of Modernization Theory, which emphasizes human factors and cultural values as the core issues in development. This modernization theory is the dominant group of theories in examining development issues in Indonesia. In general, this evolutionary process of change can be grouped into several main stages. Traditional agriculture stage (before the 20th century: main characteristic, this stage is characterized by agricultural practices that rely heavily on nature, manual labor, and inherited knowledge. The technology used is still very simple, with tools such as hoes, traditional plows, and simple irrigation systems. Agricultural production is generally aimed at meeting the needs of families and local communities. Main focus, meeting subsistence food needs, the sustainability of local agricultural systems based on traditional wisdom. Limitations, low productivity, vulnerable to climate change and pest and disease attacks, limited innovation and adoption of new technologies.

Agricultural intensification stage (early to mid 20th century). The main characteristics: This stage was triggered by a growing population and greater demand for food. The paradigm of agricultural development began to shift toward increased production through the introduction of new technologies. The Green Revolution characterized this period, with the introduction of high-yielding varieties, chemical fertilizers, pesticides, and limited agricultural mechanization. Main focus, mass increase in food production to meet national and even international needs. Limitations, negative impacts on the environment due to excessive use of chemical fertilizers and pesticides, dependence on external inputs, and potential socio-economic disparities between farmers due to differences in access to technology and resources.

Stages of agricultural diversification and industrialization (late 20th century to early 21st century). Key Characteristics, awareness of the negative impacts of agricultural intensification prompted a paradigm shift. The focus of agricultural development began to expand beyond increasing production to include crop and commodity diversification, developing an integrated agribusiness system from upstream to downstream, and increasing the added value of agricultural products through processing. This paradigm aligns with Syaukat's (2009) opinion, which states that the concept of agribusiness is a new paradigm used in agricultural development efforts in Indonesia. Agribusiness is defined more broadly than just on-farm business, producing agricultural products alone, but also encompasses upstream businesses such as raw materials and capital goods to support agricultural activities, downstream businesses (processing agricultural products into finished and semi-finished goods), marketing agricultural inputs, outputs, and processed products, and service and support businesses (such as credit, research, extension, transportation, and others). The scope is explained schematically by the Ministry of

Agriculture of the Republic of Indonesia (2001) in Syaukat (2009) as presented in Figure 1 below.

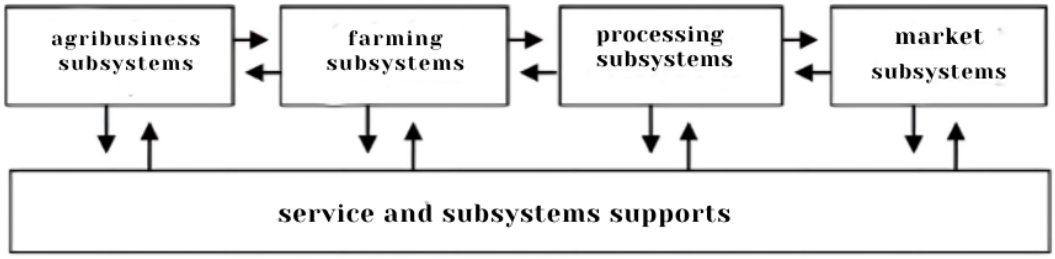

Fig. 1. Scope of Agribusiness System Development
(Department of Agriculture, 2001; Syaukat, 2009).

The paradigm shift at this stage is reinforced by Nasiro's (2024) view that crop diversification efforts can stabilize the productivity of cropping systems and reduce negative environmental impacts and biodiversity loss. Additional diversification measures such as varying seeding times or changing cropping patterns have the potential to produce higher and more stable yields, increase profits, and produce greater agro-ecosystem resilience in the long term in terms of ecological dimensions. The following will explain the results of Nasieo's (2024) research related to the relationship between the average yield of cropping systems (a) and the average yield of locations (b), and the relationship between the regression coefficient and the average yield of cropping systems (c, d) (Figure 2).

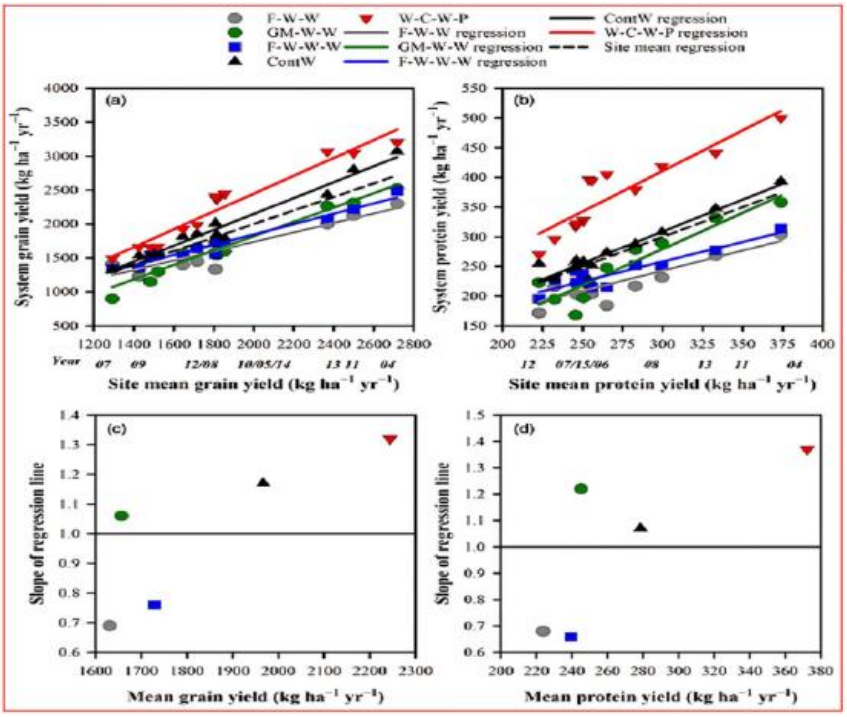

Fig. 2. Long-term stability of five cropping systems in Swift Current, Saskatchewan, Canada over the 12-year period 2004–2015
(Nasiro, 2024)

Then the Effect of crop rotation and fertilization (Figure 3) and the Effect of crop rotation on the development of spring cereal yields (Figure 3). Figure 2 explains that the relationship between the average yield of cropping systems (a) and the average yield of locations (b), and the relationship between the regression coefficient and the average yield of cropping systems (c, d). F-W-W, wheat-wheat; GM-W-W, lentil-wheat-wheat green manure; F-W-W-W, wheat-wheat-wheat fallow; ContW, continuous wheat; W-C-W-P,

wheat-canola-wheat-peas. Crop diversification and rotation patterns can stabilize production per hectare and even tend to increase sharply (significantly) and have a positive impact on the stability of the environmental ecosystem.

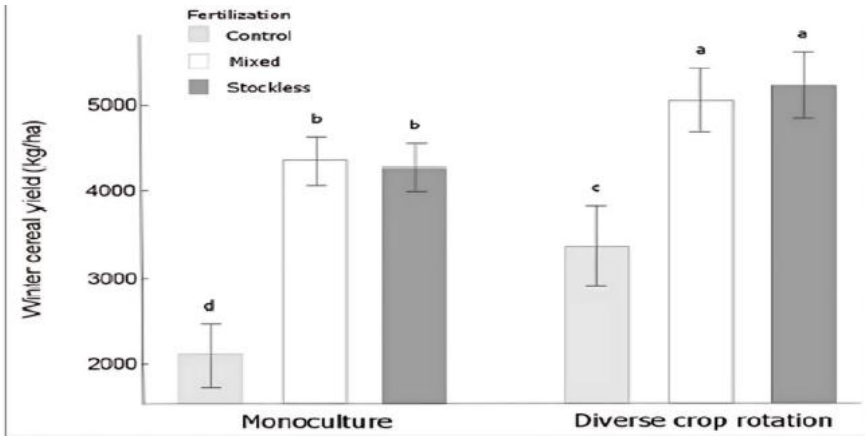

Fig. 3. Effects of crop rotation and fertilization in 6 LTEs across Europe (Nasiro, 2024).

Similarly, in Figures 3 and 4, it is in line with the views of St. Martin, et al. (2016) In Nasiro (2024) that diversification in cropping systems and crop rotations contributed to cereal yields during 8 Long Term Trials (LTE) covering trial periods between 20 and 55 years and crop-livestock and stockless systems both produced high yields in the long term.

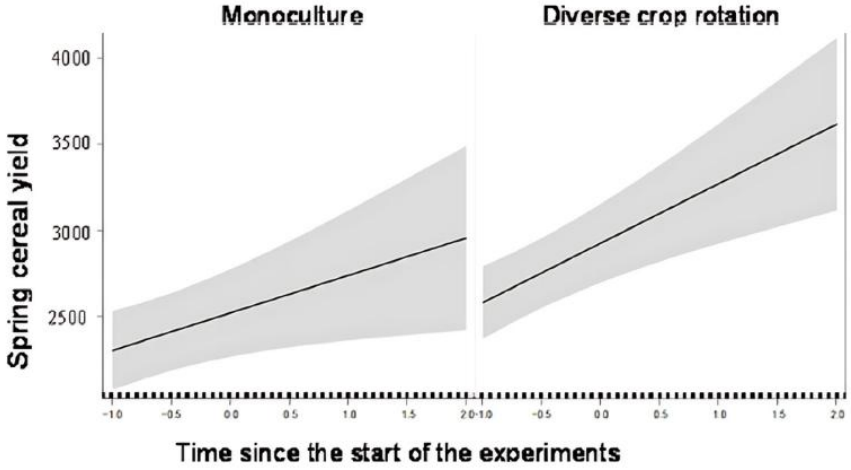

Fig. 4. Effect of crop rotation on spring cereal yield development in 6 LTEs across Europe (Nasiro, 2024).

An effort to encourage downstream processing of the processed food industry within the context of developing an agribusiness system, Afandi & Feryanto (2023) support this paradigm for agricultural development. Food downstreaming boosts agricultural performance, significantly impacting the economy. The agricultural sector is the third largest contributor to GDP. In the second quarter of 2022, agriculture contributed 12.98% to GDP distribution, with growth of 1.37%. Food downstreaming is an effective way to increase the added value of agricultural products. Downstreaming will create new jobs, absorb a large workforce, increase foreign exchange earnings, positively impact the trade balance, and improve public welfare. Main focus, increasing farmer incomes through product diversification, developing agricultural processing industries, and enhancing the competitiveness of agricultural products in domestic and international markets. The research results of Ismail et al. (2022) show that product diversification efforts can increase the income of coconut farmers in Payunga Village, Batudaa District, Gorontalo Regency, and

this is proven by positive results, namely from the R/C Ratio = 4.26. This ratio value indicates that efforts to diversify coconut derivative products are feasible to be developed as presented in Table 1.

Table 1. Average total income, total expenditure, net income, and r/c ratio for each harvest season of product diversification efforts in Payunga, Batudaa District, Gorontalo Regency in 2022

No	Descrip	Average Value (Rp)	R/C Ratio
1	Total Income	23,477,902.00	
2	Total Cost	5,513,242.00	4.26
3	Total Net Income	17,964,660.00	

Furthermore, research by Sihombing (2022) revealed that farmers have already felt the benefits of the implemented technological innovations, including increased production, improved income, and strengthened skills in implementing these technological innovations. This ultimately has implications for improving national food security. Limitations, challenges in building efficient value chains, increasingly fierce global competition, issues of food safety and product quality, and the need for significant investment in infrastructure and processing technology.

Stages of sustainable and inclusive agriculture (21st century). Main characteristics: the modern agricultural development paradigm emphasizes environmental sustainability, social justice, and economic efficiency (Ard, 2024). The concept of sustainable agriculture is the main foundation, which includes environmentally friendly agricultural practices, wise management of natural resources, reduction of greenhouse gas emissions, and preservation of biodiversity. In addition, the aspect of inclusivity is important, by paying attention to small farmers, marginalized communities, and gender equality in access to resources and opportunities. The use of information and communication technology (ICT) and digital innovation also plays an increasing role in increasing the efficiency and sustainability of agriculture. Main focus, striking a balance between increasing productivity, preserving the environment, and improving farmer welfare in a fair and equitable manner. The development of climate-smart agriculture (CSA), organic farming, and agroecological approaches is becoming increasingly important. The CSA concept has been adopted to help farmers adapt to increasing environmental challenges while maintaining productivity. Some examples of widely implemented CSA practices include the Agroforestry Concept (Bureau of Publications, Scientific Journals, and Digital Information – Medan Area University, 2024). The implementation of the agroforestry concept aligns with the research findings of Purba (2023), which revealed that an integrated land approach combining forestry and agricultural elements offers a sustainable solution to address the increasing demand for agricultural land, environmental degradation, poverty, and global warming. This land integration concept involves various combinations of trees and other crops, emphasizing both economic and ecological aspects. The impacts of implementing the agroforestry concept include improving farmer welfare, conserving natural resources, and empowering local communities, particularly through community-based forest management. Furthermore, the agroforestry concept also ensures food security and environmental preservation, increases productivity, diversifies income sources, mitigates the impacts of climate change, and contributes to sustainable biodiversity conservation.Challenges, the widespread implementation of sustainable agricultural practices requires a shift in mindset and the adoption of new technologies. Limited access to information, technology, and markets for smallholder farmers is a barrier. Consistent and integrated government policies and support are essential to encourage the transition to sustainable and inclusive agriculture.

The evolution of the agricultural development paradigm has not always occurred linearly and uniformly throughout the world. Different social, economic, political, and environmental contexts in each country and region influence the direction and speed of paradigm change. In Indonesia, for example, agricultural development during the New Order era focused heavily on food self-sufficiency, especially rice, through an intensification

program. Although it succeeded in achieving self-sufficiency, this program also had several negative impacts on the environment and social inequality. Currently, the paradigm of agricultural development in Indonesia is starting to shift towards sustainable and inclusive agriculture, with an emphasis on food sovereignty, increasing added value, and empowering small farmers.

The evolution of the agricultural development paradigm is an ongoing dynamic process. From a focus on meeting subsistence needs, increasing mass production, diversification, and industrialization, to reaching the stage of sustainable and inclusive agriculture, each stage has its characteristics, focus, and challenges. Understanding the stages of this evolution is important for formulating appropriate agricultural development policies and strategies that are adaptive to change and able to respond to global challenges such as climate change, food security, and farmer welfare.

3.2. Relevance of paradigms to the context of agriculture in Indonesia

Agriculture in Indonesia has complex and diverse characteristics, influenced by geographical, socio-economic, cultural, and policy factors that vary across regions. Understanding the relevance of each stage of the evolution of the agricultural development paradigm will help us formulate more effective and sustainable strategies for this sector. Relevance of the traditional agriculture paradigm: Indonesia has experienced agricultural modernization, traditional agricultural practices remain highly relevant in many regions, particularly in remote areas, indigenous communities, and small-scale farmers with limited resources. Local wisdom in natural resource management, the selection of adaptive local seeds, and cultivation techniques suited to local agro-ecosystem conditions remain a mainstay. This is supported by research by Pratiwi & Suwardji (2023), which states that cultivation techniques based on local wisdom can not only benefit productivity but also have a positive ecological impact. Continuous implementation of intelligent practices based on local wisdom will reduce the use of modern agricultural tools, herbicides, and pesticides, thereby preserving natural resources and preventing climate change from becoming a serious threat to the future.

Fig. 5. Bemban and Hanjuan plants used as ingredients in pest and disease control for Baduy farmers
(Pratiwi & Suwardji, 2023)

The research also reveals that one of the guidelines passed down through generations by Baduy farmers is the goal of maintaining a sustainable environment. One example of a superior agricultural product among Baduy farmers is rice. To maintain stable rice productivity, Baduy farmers implement pest and disease control based on local wisdom known as ngumbaran pare (a method of pest control) using various plant material mixtures, as shown in Figure 5, which are then applied to specific plant phases. Furthermore, Baduy farmers are also very precise in determining planting times and the types or varieties of rice to be used. The results of this study are also supported by the view of Niman (2019) in

Pratiwi & Suwardji (2023), who stated that the high level of community knowledge about environmental management and preservation is always related to the strong values of local wisdom held by the community. Local wisdom is very beneficial for the people of Serang Village because it is life knowledge and community guidelines in preserving the environment.

Relevance: local food security: traditional agricultural systems are often more resilient to climate change and external shocks because they rely on local resources and biodiversity. This is important for strengthening food security at the community level. Biodiversity conservation: traditional practices often maintain a variety of local plants and animals, which is important for agricultural biodiversity conservation. Cultural and social values: traditional agriculture is often tied to the cultural and social values of local communities, which need to be maintained as part of national identity.

Adaptation Relevance of the Agricultural Intensification Paradigm (Green Revolution). Indonesian context: Indonesia successfully achieved food self-sufficiency (especially in rice) through the adoption of Green Revolution technologies. Government policies supporting the use of superior seeds, subsidized fertilizers, and irrigation played a major role in increasing production. Relevance: productivity increase: green revolution technologies remain relevant for increasing the productivity of major food crops and meeting national food needs, which continue to increase with population growth. National food security: increasing production through intensification remains a key pillar in maintaining food security at the national level.

The agricultural development paradigm at this stage has proven to be inconsistent with the expectations set during the New Order era, despite being justified as a self-sufficient country with rice and a global food barn. This situation aligns with research by Restiyanto & Yusroni (2006) and Gultom & Sugeng (2021), which states that the green revolution arrived in Indonesia during the New Order era and appeared unable to provide a solution for most farmers, especially poor farmers. Dependence on chemical fertilizers and modern agricultural facilities created poverty and social inequality, with post-green revolution regulations severely burdening farmers' farming practices. A further negative implication was the emergence of damaged agricultural land that required replanting.

Relevance of the diversification and agribusiness paradigm. Indonesian context: Indonesia has significant potential for developing agricultural diversification and agribusiness given its rich natural resources and biodiversity. The government has also begun encouraging the development of non-food commodities and the downstreaming of agricultural products. Relevance: increasing Farmer Income: Diversification into high-value commodities and the development of processed products can significantly increase farmer incomes. Job creation: developing agribusiness from upstream to downstream can create jobs in the agricultural and related non-agricultural sectors. Increasing added value: processing and marketing of agricultural products can increase the added value and competitiveness of Indonesian products in domestic and international markets. Economic Resilience: Diversification reduces dependence on one or two commodities, thereby increasing the resilience of the agricultural sector to market fluctuations and other risks. Widowati (2023) argues that Indonesia's local food wealth has not been optimally utilized to reduce food dependence. Instead, demand continues to increase, necessitating imports. The community's dependence on rice, a staple food with ever-increasing demand, has necessitated imports. Furthermore, the rapid growth of wheat-based food products and high consumer preference for these products have resulted in a surge in wheat imports. Therefore, policies and programs to diversify food consumption have long been implemented, but have not had a significant impact on increasing local food consumption. Therefore, efforts are needed to develop locally sourced flour through policies to increase the use of local flour raw materials (substitution) by the flour-based food industry. Diversifying local food consumption is crucial for improving food security and self-sufficiency.

Relevance of the sustainable agriculture paradigm: Indonesian context: sustainability issues such as climate change, land degradation, and the water crisis are increasingly

apparent in Indonesia. Awareness of the importance of environmentally friendly and socially just agriculture is growing. The government has also launched various programs related to sustainable agriculture. Relevance: Long-term food security, sustainable agriculture maintains soil fertility and environmental quality, thus ensuring food security for future generations. Climate Change adaptation and mitigation: sustainable agricultural practices can help farmers adapt to the impacts of climate change and reduce greenhouse gas emissions from the agricultural sector. Environmental health: reducing the use of harmful chemical inputs and preserving biodiversity contribute to environmental health. Farmer well-being: sustainable agricultural approaches often empower farmers through increased knowledge, access to fair markets, and strengthened institutions. Market demand: global and domestic markets are increasingly demanding sustainably produced agricultural products.

In practice, field practices indicate that the agricultural development paradigm in Indonesia is still not ideally sustainable. This is in line with Efendi's (2016) view, which states that the current agricultural condition is not sustainable, because physical yields are a measure of the success of agricultural production sustainability. Organic farming is an alternative technology that offers various positive benefits, which can be applied to farming businesses that produce high-commercial value products without reducing production. However, according to research by Wihardjaka (2018), the success of increasing food crop productivity accompanied by environmental sustainability is a principle of implementing a sustainable environmentally friendly agricultural system. This is proven by the fact that with this system, rice yields can increase by up to 47%, farmer incomes increase by 29–76%, and GHG emissions decrease by around 18–26%. Furthermore, according to Deshui Yu & Yali Wang (2024), environmentally friendly agriculture will make agricultural production more standardized and intensive, increase the ability of agricultural producers to withstand risks, reduce operational risks, and encourage rapid rural economic development. With the advancement of industrialization and scaling of agriculture, ecological agriculture will become more adaptable to the market.

3.3. Integration of paradigms for holistic agricultural development

No Indonesian economic activity has a story as dark as the agricultural sector namely, from natural disasters to the complicated problems of agricultural development actors (farmers) over various programs developed by the government for the agricultural sector. The history of Indonesian agriculture is a history of deviation. This deviation has inherited the main structural problems in the agricultural sector that persist to this day. The various programs implemented have not only had a positive impact on development, but have also left significant gaps in agricultural development. The development of various agricultural development paradigms, which are later better known as the basis for sustainable agricultural development, is one answer to the inability of the green revolution paradigm, which has left various polemics over agricultural issues in the country (Mahmuddin, 2013).

Before the 1970s, thanks to the Green Revolution that emphasized the use of large amounts of inorganic fertilizers and pesticides, superior seeds, soil cultivation, and water management (irrigation and drainage), it seemed as if agricultural production would be able to meet human food needs without limit (Brady, 1990 in Dahuri, 1998). However, since the early 1980s, the agricultural sector in a broad sense (including food crops, horticulture, plantations, livestock, and fisheries) has faced very serious challenges in maintaining the sustainability of its production at the level needed by humans throughout the universe (Dahuri, 1998). Integrating various agricultural development paradigms to realize holistic agriculture in Indonesia is a necessity in facing the complexity of challenges and opportunities in this sector. The long journey of paradigm evolution, starting from traditional agriculture that relies on local wisdom, production intensification through the Green Revolution, diversification, and agribusiness orientation, to awareness of sustainability, holds valuable lessons that can be formulated into a comprehensive approach.

To achieve holistic agricultural development, we cannot be fixated on a single paradigm. Instead, we need the ability to synthesize the best elements from each stage of evolution (Panda, 2024). Local wisdom and traditional knowledge about natural resource management and local varieties, for example, play an important role in maintaining ecosystem balance and food security at the local level. Integrating this knowledge with appropriate modern technology can increase efficiency and productivity without sacrificing sustainability. The success of the Green Revolution in increasing food production cannot be ignored, but its implementation in the future must be more prudent and sustainable. The use of superior seeds needs to be balanced with conservative soil and water management practices, as well as environmentally friendly pest and disease control. A precision agriculture approach that utilizes information and communication technology can help optimize the use of agricultural inputs, reduce waste, and increase efficiency.

The diversification and agribusiness paradigm opens up opportunities to increase the added value of agricultural products and create jobs outside of primary production. The development of an efficient and fair value chain, from farmers to consumers, requires synergy between farmers, processing industry players, traders, and the government. Support for product innovation, packaging, and marketing can increase the competitiveness of Indonesian agricultural products in domestic and international markets. However, the main foundation of holistic agricultural development is the sustainable agriculture paradigm. Ecological, social, and economic principles must be the foundation of every agricultural development policy and program.

This means not only focusing on increasing production and economic profits, but also paying attention to farmer welfare, environmental conservation, and social justice. Practices such as organic farming, agroforestry, and land and water conservation must be encouraged and expanded. Realizing the integration of this paradigm requires a multidimensional and participatory approach. The government has a central role in formulating coherent policies and providing the necessary support. Research and development must be directed to produce innovative, efficient, and sustainable agricultural technologies and practices. Agricultural extension needs to transform into an agent of change that empowers farmers with relevant knowledge and skills. In addition, active participation from farmers, farmer organizations, academics, the private sector, and civil society is crucial.

In practice, field practices indicate that the agricultural development paradigm in Indonesia is still not ideally sustainable. This is in line with Efendi's (2016) view, which states that the current agricultural condition is not sustainable, because physical yields are a measure of the success of agricultural production sustainability. Organic farming is an alternative technology that offers various positive benefits, which can be applied to farming businesses that produce high-commercial value products without reducing production. However, according to research by Wihardjaka (2018), the success of increasing food crop productivity accompanied by environmental sustainability is a principle of implementing a sustainable environmentally friendly agricultural system. This is proven by the fact that with this system, rice yields can increase by up to 47%, farmer incomes increase by 29–76%, and GHG emissions decrease by around 18–26%. Furthermore, according to Deshui Yu and Yali Wang (2024), environmentally friendly agriculture will make agricultural production more standardized and intensive, increase the ability of agricultural producers to withstand risks, reduce operational risks, and encourage rapid rural economic development. With the advancement of industrialization and scaling of agriculture, ecological agriculture will become more adaptable to the market.

3.4. Paradigm integration for holistic agricultural development

No other Indonesian economic activity has a history as grim as the agricultural sector, from natural disasters to the complexities faced by agricultural development actors (farmers) in various government-developed programs. The history of Indonesian agriculture is a history of deviations. These deviations have left underlying structural problems in the agricultural sector that persist to this day. The various programs

implemented have not only had a positive impact on development, but have also left significant gaps in agricultural development. The development of various agricultural development paradigms, later known as the basis for sustainable agricultural development, is one response to the inadequacy of the green revolution paradigm, which has left numerous polemics over agricultural issues in the country (Mahmuddin, 2013).

Prior to the 1970s, thanks to the Green Revolution, which emphasized the use of large amounts of inorganic fertilizers and pesticides, superior seeds, soil cultivation, and water management (irrigation and drainage), it seemed as if agricultural production would be able to meet human food needs indefinitely (Brady, 1990 in Dahuri, 1998). However, since the early 1980s, agriculture, in its broadest sense (which encompasses food crops, horticulture, plantations, livestock, and fisheries), has faced significant challenges in maintaining the sustainability of its production at levels needed by humanity worldwide (Dahuri, 1998).

Integrating various agricultural development paradigms to realize a holistic agriculture in Indonesia is a necessity in facing the complex challenges and opportunities in this sector. The long journey of paradigm evolution, starting from traditional agriculture that relies on local wisdom, production intensification through the Green Revolution, diversification and agribusiness orientation, to awareness of sustainability, holds valuable lessons that can be blended into a comprehensive approach.

To achieve holistic agricultural development, we cannot be fixated on a single paradigm. Instead, we need the ability to synthesize the best elements from each stage of evolution. Local wisdom and traditional knowledge on natural resource management and local varieties, for example, play a crucial role in maintaining ecosystem balance and food security at the local level. Integrating this knowledge with appropriate modern technology can increase efficiency and productivity without sacrificing sustainability. The success of the Green Revolution in increasing food production cannot be ignored, but its future implementation must be more prudent and sustainable. The use of superior seeds needs to be balanced with conservative soil and water management practices, as well as environmentally friendly pest and disease control. Precision agriculture approaches that utilize information and communication technology can help optimize the use of agricultural inputs, reduce waste, and increase efficiency.

The diversification and agribusiness paradigms open up opportunities to increase the added value of agricultural products and create jobs outside of primary production. The development of an efficient and equitable value chain, from farmer to consumer, requires synergy between farmers, processing industry players, traders, and the government. Support for product innovation, packaging, and marketing can increase the competitiveness of Indonesian agricultural products in both domestic and international markets. However, the primary foundation of holistic agricultural development is the sustainable agriculture paradigm. Ecological, social, and economic principles must underpin every agricultural development policy and program. This means not only focusing on increasing production and economic profits, but also considering farmer welfare, environmental conservation, and social justice. Practices such as organic farming, agroforestry, and land and water conservation must be encouraged and expanded.

Achieving this paradigm integration requires a multidimensional and participatory approach. The government has a central role in formulating coherent policies and providing the necessary support. Research and development must be directed toward producing innovative, efficient, and sustainable agricultural technologies and practices. Agricultural extension services need to transform into agents of change that empower farmers with relevant knowledge and skills. Furthermore, the active participation of farmers, farmer organizations, academics, the private sector, and civil society is crucial.

Dialogue and collaboration among stakeholders need to be enhanced to identify needs, formulate solutions, and implement effective and inclusive agricultural development programs. The empowerment of farmers, especially small and marginal farmers, must be a priority so they can become agents of change in a more sustainable and prosperous agricultural system. By integrating local wisdom, responsible technological innovation, intelligent market orientation, and sustainability principles, Indonesia can build an

agricultural sector that is not only productive and economically profitable, but also environmentally sustainable and socially just. Holistic agricultural development is a long-term investment in food security, the well-being of rural communities, and the preservation of Indonesia's natural heritage.

Theoretical Foundations of the Agricultural Development Paradigm. The primary theoretical foundation underlying the agricultural development paradigm is a conceptual foundation that influences how we understand, plan, and implement efforts to advance the agricultural sector. The evolution of the paradigm itself is inseparable from the development of various theories and ideas in the social sciences, economics, and ecology. Understanding this theoretical foundation allows us to appreciate the shifting focus and approaches in agricultural development over time. One significant early theoretical foundation is classical and neoclassical economic thought. These theories emphasize the importance of efficient resource allocation, economic growth through specialization and trade, and the role of markets in determining prices and production. In the agricultural context, early paradigms were often influenced by the view that agricultural modernization through the adoption of more efficient technologies and practices would drive overall economic growth. This thinking encouraged efforts to increase productivity and integrate the agricultural sector into broader markets.

Along with the development and criticism of the classical economic approach, which was deemed to pay insufficient attention to social and environmental aspects, structuralism and dependency perspectives emerged. These theories highlight inequalities in global and domestic economic relations, which often place developing countries, including their agricultural sectors, at a disadvantage. In the context of agricultural development, this perspective emphasizes the importance of addressing structural barriers such as dependence on imported agricultural inputs, inequities in the agrarian system, and the marginalization of smallholder farmers. This thinking encourages more protective policies and an internally oriented development.

Then, a theoretical foundation emerged emphasizing modernization theory. This theory views development as a linear process in which traditional societies gradually transform into modern ones through the adoption of modern values, institutions, and technologies. In the agricultural context, modernization theory encourages the transfer of technology and knowledge from developed to developing countries in the hope of accelerating agricultural modernization and increasing productivity.

Subsequently, awareness of the environmental impacts of conventional development models gave rise to a theoretical foundation rooted in political ecology and sustainable development theory. This perspective integrates the ecological dimension into development analysis, highlighting the interactions between power, natural resources, and the environment. In the agricultural context, this thinking emphasizes the importance of environmentally friendly agricultural practices, sustainable natural resource management, and biodiversity conservation. Sustainable development theory provides a more holistic framework, balancing economic, social, and environmental aspects of agricultural development. Furthermore, institutional theory also makes important contributions to understanding the dynamics of agricultural development. This theory emphasizes the crucial role of institutions, both formal and informal, in influencing the behavior of economic actors and development outcomes. In the agricultural context, institutions such as land tenure systems, farmer organizations, government policies, and social norms can influence technology adoption, market access, and the sustainability of agricultural practices.

Finally, the development of participatory development and community empowerment theories provides a theoretical foundation that emphasizes the importance of active involvement of local communities, especially farmers, in planning and decision-making processes related to agricultural development. This perspective recognizes that farmers possess valuable knowledge and experience, and effective development must be responsive to their needs and aspirations. Farmer empowerment is key to achieving inclusive and sustainable agricultural development. Therefore, Elizabeth (2019) and Novitasari et al. (2025) emphasize that efforts to strengthen and empower agricultural institutions are one

of the government's strategies to support sustainable food security. The improvement and existence of agricultural institutions reflect the human resource capabilities and performance of farmers, one of which is through increased production and productivity of agricultural businesses, which significantly impact farmer income. Farmer participation and local wisdom significantly influence the success of empowerment and the improvement of the role, function, and performance of agricultural institutions. Therefore, farmer empowerment contributes to increased income, diversification of processed products, and agribusiness competitiveness.

Thus, thinking about the agricultural development paradigm is based on a variety of evolving and complementary theoretical foundations. From a focus on economic efficiency and technological modernization to an awareness of the importance of social, environmental, institutional, and community participation, the evolution of this paradigm reflects an effort to understand the complexity of the agricultural sector and formulate a more holistic and sustainable development approach. Understanding this theoretical foundation is crucial for analyzing the successes and failures of various agricultural development approaches in the past and designing more effective strategies for the future.

3.5. The emergence of alternative and innovative agricultural paradigms

The historical background of agricultural development demonstrates a dynamic evolutionary journey. Following the era of agricultural intensification with a sole focus on increasing production through the green revolution, negative consequences emerged, including environmental degradation, dependence on chemical inputs, and issues of social injustice. This awareness of the limitations and negative impacts of the conventional paradigm sparked the emergence of alternative and innovative agricultural paradigms. These paradigms did not emerge suddenly, but rather grew out of a critique of intensive agricultural practices and a deeper understanding of the complexity of agricultural systems and their interactions with the environment and society. The emergence of alternative and innovative agricultural paradigms is driven by several crucial factors.

Growing environmental awareness. The negative impacts of conventional agricultural practices on soil quality, water quality, biodiversity, and greenhouse gas emissions are increasingly documented and understood. This has prompted scientists, farmers, and consumers to seek more environmentally friendly and sustainable agricultural methods. Disillusionment with less inclusive agricultural development models. Although the green revolution successfully increased food production globally, its benefits were often unevenly distributed and actually widened the gap of inequality, especially for small and marginal farmers. Alternative paradigms offer approaches that better address social aspects and farmer empowerment. Advances in science and technology. Innovations in various fields such as biotechnology (when applied responsibly), information and communication technology (ICT), sensors, and robotics open up opportunities to develop more efficient, precise, and sustainable agricultural practices. Alternative agriculture does not mean a complete return to traditional methods, but rather integrates local wisdom with appropriate technological innovations. Changing market demands and consumer preferences. More and more consumers are concerned about the food quality, health, and environmental impact of the agricultural products they consume. Demand for organic products, Fair Trade labeled products, and local products is increasing, creating opportunities for the development of alternative agricultural systems.

This contribution is multidimensional and covers various aspects: Improving Environmental Sustainability. Alternative paradigms emphasize agricultural practices that are in harmony with nature. Agroecology, organic farming, soil and water conservation, and biological pest and disease management are examples of approaches that reduce reliance on synthetic chemical inputs. This contributes to: Biodiversity Conservation: Diverse farming systems and the avoidance of monocultures create better habitats for a variety of flora and fauna species. Improved Soil Health: Practices such as cover cropping, crop rotation, and the use of organic fertilizers naturally improve soil fertility and structure.

Water Resource Protection: More efficient water use through drip irrigation or rainwater management, as well as reducing pollution from chemical fertilizers and pesticides, maintains water quality and availability.

Climate change mitigation and adaptation: sustainable agricultural practices can reduce greenhouse gas emissions (for example, through good peatland management and no-till practices) and increase the ability of agricultural systems to adapt to climate change (for example, through crop diversification and agroforestry systems). Improving Food and Nutrition Security. The alternative paradigm focuses not only on production quantity but also on food quality and diversity. Crop diversification and integrated farming systems can produce a variety of more nutritious foods and reduce dependence on one or two primary commodities. Small-scale and local farming can also shorten supply chains, increase food accessibility for local communities, and reduce vulnerability to global market fluctuations.

Improving the welfare of farmers and rural communities. The alternative paradigm often prioritizes a more participatory approach and empowers farmers. The development of farmer cooperatives, alternative marketing systems (such as local farmers' markets), and increasing the added value of agricultural products at the farm level can improve their income and well-being. Furthermore, more environmentally friendly agricultural practices can reduce health risks from exposure to hazardous chemicals for farmers and surrounding communities. Sustainable increased efficiency and productivity. Technological innovations, such as precision agriculture, the use of sensors and drones for crop and land monitoring, and the development of locally adapted, superior varieties, can increase resource efficiency (water, fertilizer, labor) and productivity sustainably. Integrating technology with local wisdom and ecological principles can create productive agricultural systems without compromising the environment. Local and regional economic development. Alternative agricultural paradigms, particularly those oriented towards local and regional markets, can strengthen rural economies. The development of agrotourism, small-scale agricultural product processing, and the marketing of products under local brands can create new jobs and increase local incomes. Strengthening the role of exemplary farmer institutions. Building the identity of farmer institutions as role models (pioneers) for their members. Numerous facts on the ground demonstrate that farmer group administrators are capable of acting as educators, motivators, facilitators, evaluators, and mediators, but not all are capable of acting as pioneers (role models). Recommendations given to members are not accompanied by concrete actions, resulting in many members not following their recommendations. One characteristic of farmer group members is submission and obedience to their leaders, as most Indonesians still adhere to a paternalistic culture.

Whatever the leader says and does, the community will follow suit. This patronage phenomenon aligns with the paternalistic culture of the Pandalungan Tapal Kuda community in East Java Province. Hadi et al. (2025) revealed that the institutional success of BUMDes in the Horseshoe coastal area of East Java Province will be largely determined by the involvement (participation) of certain community elements that were previously ignored because they were not structurally related to the pentahelix model. The participation of these informal leaders (such as becoming one of the BUMDes organs) will encourage patron citizens to participate in supporting the success of BUMDEs. The involvement of informal leaders (key persons) is very important and can develop the concept of the pentahelix model into a Hexahelix in economic development in the Horseshoe coastal area. The exemplary/initiative of farmer group administrators through their role in farming will have a significant impact on the performance of the institution with one indicator being the level of land productivity. This opinion is in line with the results of research by Febriana et al. (2023), Wahyuni et al. (2021), and Handayani et al. (2019) which revealed that the role of the "Mekar Budi" farmer group significantly influences the level of productivity. This is supported by the results of the Kendal rank concordance correlation test (W = 0.975), which confirms a strong relationship with a significance value of 0.000 or a probability below 0.05. The importance of pioneering/exemplary behavior by a farmer group leader (manager) is crucial for the success of farmer institutions in carrying out farming activities. This is consistent with the results of research by Kusnadi and Ait (2019),

which revealed that the leadership role of farmer group leaders has a positive relationship with group effectiveness.

Fig. 6. Causality Model of Farmer Institutional Urgency Indonesia Vers.
(Oktarina et al., 020)

In line with the phenomenon of farmer groups and the role of their administrators in Indonesia, the facts are full of interesting dynamics in efforts to ground an inclusive and holistic agricultural development paradigm. Complex and pervasive problems remain within farmer institutions, making it difficult for farmers to resolve their internal problems and becoming highly dependent on assistance from others. In relation to this problem, Oktarina et al. (2020) provides several solutions with several methods that can be used to solve the problems of farmer institutions, namely: Training as supported by the research results of Ramdhani et al. (2015) in Oktarina et al. (2020) which aims to strengthen institutions in order to develop the capacity of the management and members of a group, Advocacy which is a planned communication process that aims to support decision making, so that problems can be solved, Group Meetings as a regular discussion schedule for farmers with their assistants to discuss and find solutions to problems faced by farmers or groups, Technology Adoption as an effort to implement diffusion technology innovation, so that farmers can adopt the technology which indicates that there is a change in behavior

(psychomotor) in themselves, and Comparative Studies as an activity to explore a place supported by the theory of Euriga, Amanah, and Fatchiya, 2018) in Oktarina et al. (2020).

Oktarina et al. (2020) further emphasized that the success of farmer institutions means that these institutions are able to make farmers involved in the program independent, so they do not depend on the government for their livelihood. One example of a successful farmer institution is the Community Economic Institution in Southeast Sulawesi. They consistently receive government assistance in the form of production facilities. Therefore, this LEM needs to be a role model for other farmer institutions to emulate. The following is the analysis of the urgency of farmer institutions using the NVivo analysis tool, illustrated by a causality diagram as shown in Picture 6.

The emergence of alternative and innovative agricultural paradigms is an appropriate and crucial response to the challenges of future agricultural development. By integrating the principles of sustainability, social justice, and responsible technological innovation, this paradigm offers solutions to address the negative impacts of conventional agriculture, improve food and nutritional security, improve the welfare of farmers and rural communities, and preserve the environment. The contributions of this paradigm are not limited to production aspects but also encompass interrelated ecological, social, and economic dimensions. Therefore, supporting the development and adoption of alternative and innovative agricultural paradigms is a strategic investment in realizing sustainable and inclusive agricultural development in the future.

In line with the above efforts, efforts are needed to strengthen the role of farmer group administrators as pioneers or role models in thinking, acting, and consistently supporting government programs to advance the agricultural sector in a broader sense. The emergence of an innovative, holistic, and integrative agricultural paradigm without the support of existing farmer institutional commitments (Farmer Groups, Farmer Group Associations, HIPPA, GHIPPA, IPPA, and other related institutions), will make it impossible to achieve agricultural development goals, no matter how special the paradigm is. The existence of farmer institutions significantly influences the level of farmer participation in various agricultural development programs, particularly in relation to the role of farmer groups in motivating, transferring knowledge, raising awareness, empowering, educating, mediating, facilitating, and serving as role models for their members.

This condition aligns with several previous studies, who argue that agricultural development should utilize a community empowerment paradigm to achieve participation in planning, implementation, and control of development at the village level. In the process of fostering participation, communication is a key element, with the motive to realize the message conveyed. Furthermore, Noviyanti (2019) in Wahyuni et al. (2021) believes that the purpose of establishing farmer groups is to enhance and develop the capabilities of farmers and their families as subjects of the group approach, enabling them to play a greater role in development. Farmer group development needs to be implemented more intensively, in a focused, and planned manner to enhance their role and function.

These findings are also supported by the view of Mutmainah and Sumardjo (2014) that group leaders play a crucial role in managing their farmer groups. The role of group leaders encompasses the leader's ability to provide direction and guidance to group members, facilitate the achievement of goals, motivating members to be active, and accommodating their aspirations. The leadership role in both groups is considered a research finding. Furthermore, when linked to the level of farmer empowerment, the results of their research on the Bina Sejahtera Farmer Group in Situ Udik Village, Cibungbulang District, and the Hurip Farmer Group in Cikarawang Village, Dramaga District, Bogor Regency, revealed a significant positive relationship between leadership and the empowerment process. If this empowerment process is not accompanied by exemplary leadership from farmer group administrators/leaders, then the level of awareness and participation is very low to support the programs being implemented. Therefore, the following is a compilation of paradigm shifts in agricultural development in Indonesia, as presented in Table 2.

Table 2. The phenomenon of paradigm shifts in agricultural development in Indonesia from the 20th century to the present

No	Period Century	Type Paradigm	Characteristics of Paradigm
1	Before the 20th Century	The Relevance of the Traditional Agricultural Paradigm	Agricultural practices are highly dependent on nature, Manual labor, Hereditary knowledge. Technology is still very simple, such as the use of traditional tools such as hoes and plows, Simple irrigation systems, Agricultural production is generally subsistence.
2	Early to Mid 20th Century	Agricultural Intensification	Beginning to shift towards increased production through the introduction of new technologies, The Green Revolution became a characteristic of this period with the introduction of superior varieties, chemical fertilizers, pesticides, and limited agricultural mechanization.
3	Late 20th Century to Early 21st Century	Agricultural Diversification and Industrialization	There is a growing awareness of the negative impacts of agricultural intensification, resulting from the uncontrolled/unlimited use of chemical fertilizers. Efforts to control pests and diseases and/or natural enemies are underway. The focus of agricultural development is expanding beyond increasing production to diversifying crops and commodities. Development of an integrated agribusiness system from upstream to downstream. Increasing the added value of agricultural products through processing.
4	During the 21st Century	Modern Sustainable Agriculture (Holistic and Inclusive)	Emphasis on ecological, economic, and social sustainability, Sustainability as the main foundation: environmentally friendly agricultural practices, wise natural resource management, greenhouse gas emission reduction, and biodiversity conservation, Practices prioritizing inclusivity by paying attention to smallholder farmers, marginalized communities, and gender equality in access to resources and opportunities, Utilization of information and communication technology and digital innovation for agricultural efficiency and sustainability, and The need for exemplary and pioneering leadership from farmer group administrators and strengthening the performance of farmer institutions

4. Conclusions

The current paradigm of agricultural development is undergoing a fundamental paradigm shift, no longer limited to increasing production alone but also encompassing the imperatives of environmental sustainability, equitable social welfare, and inclusive economic progress. This paradigm has yet to improve the well-being of farmers and their families, triggering a shift toward alternative and innovative agricultural paradigms as a crucial response to the challenges of modern agriculture, including negative ecological impacts, social inequality, and threats to food security. Therefore, the results of this study lead to a deeper understanding of the importance of new paradigms in agriculture that emphasize the integration of local knowledge, appropriate technology, and ecological principles in agricultural practices, as well as the need to strengthen them by the exemplary role of farmer group administrators and strengthening the performance of existing farmer institutions. Based on this understanding, it is recommended that collective awareness be raised among farmer group administrators, farmers, and all stakeholders to support and develop a future agricultural system that is not only productive but also resilient, economically viable, inclusive, sustainable, environmentally friendly, and capable of improving farmer welfare and meeting food needs for current and future generations.

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References

Abdullah, A. (2008). Identification of capability class of livestock farmer groups in Herlang District, Bulukumba Regency. *Animal Science Journal, 8*(1), 77–82. http://jurnal.unpad.ac.id/jurnalilmuternak/article/view/2218/2070

Afandi, F. A. (2023). Komoditas pertanian unggulan untuk hilirisasi. *Pertanian, Kelautan, dan Biosains Tropika, 5*(901), 1–7. https://doi.org/10.29244/agro-maritim.0503.632-638

Agus, C. (2010). *Towards a new paradigm of Indonesian agriculture*. PIAT UGM.

Ard. (2024, December 31). *Modern agricultural revolution: Towards sustainable food security*. Fakultas Pertanian UMA.

Dahuri, D. (1998). Pembagunan pertanian berkelanjutan: Dalam perspektif ekonomi, sosial, dan ekologis. *Media*, 4(1), 6–11. https://repository.ipb.ac.id/bitstream/handle/123456789/29161/

Deshui, Y., & Yali, W. (2024). Ecological agriculture farming models and associated technologies: Current status and prospects. *Advances in Resources Research*, 4(3), 402–429. https://www.jstage.jst.go.jp/article/arr/4/3/4_402/_pdf

Efendi, E. M. (2016). Implementasi sistem pertanian berkelanjutan dalam mendukung produksi pertanian. *Jurnal Warta, 47.* https://jurnal.dharmawangsa.ac.id/index.php/juwarta/article/view/231

Elizabet, R. (2019). Peningkatan partisipasi petani, pemberdayaan kelembagaan dan kearifan lokal mendukung ketahanan pangan berkelanjutan. *Jurnal Agribisnis dan Sosial Ekonomi Pertanian UNPAD, 4*(2), 48–61. https://jurnal.unpad.ac.id/agricore/article/view/26509

Febriana, F., Usman, R., & Rosmawaty. (2023). Peran kelompok tani dalam upaya meningkatkan produktivitas padi sawah tadah hujan di Desa Keisio Kecamatan Lalolae Kabupaten Kolaka Timur. *JIPPM (Jurnal Ilmiah Penyuluhan dan Pengembangan Masyarakat)*, 3(2), 50–58. http://dx.doi.org/10.56189/jippm.v3i2.42533

Gultom, H., & Sugeng, H. (2021). Revolusi hijau merubah sosial-ekonomi masyarakat petani. *Temali: Jurnal Pembangunan Sosial*, 4(2), 145–154. https://doi.org/10.15575/jt.v4i2.12579

Handayani, W. A., Tenten, T., & Betty, R. (2019). Peran kelompok tani dalam meningkatkan produktivitas usahatani padi. *Jurnal AGRISTAN*, 1(2), 80–88. https://jurnal.unsil.ac.id/index.php/agristan/article/download/1375/1008

Hazmi, M., Sutiarso, E., & Syamsul, H. (2018). Efforts to fulfill stock of soybean commodity (Glycine max) through restoration of rural agribusiness development program. *International Food Research Journal*, *25*(Suppl. 2), S127–S134. https://www.cabidigitallibrary.org/doi/pdf/10.5555/20193284475

Hidayatullah, W., & Djokjo, K. (2021). Impact of the special effort program (UPSUS) for rice, corn, and soybeans on the level of food security in Malang Regency. *Journal of Agricultural Economics and Agribusiness (JEPA)*, *5*(4), 1059–1068. https://doi.org/10.21776/ub.jepa.2021.005.04.9

Ismail, R., Idris, Y. N., & Andi, J. (2022). Peningkatan pendapatan petani melalui diversifikasi produk turunan kelapa (kopra). *Jurnal Ilmiah Manajemen dan Bisnis*, *5*(2), 464–473. https://ejurnal.ung.ac.id/index.php/JIMB/article/download/16463/5184

Mahmuddin. (2013). Paradigm of agricultural development: Farmer-based sustainable agriculture in a sociological perspective. *Journal of Sociology, Syiah Kuala University*, *3*(3), 59–75. https://jurnal.usk.ac.id/JSU/article/view/10599/8364

Ministry of Agriculture. (2014). *Master strategy for agricultural development 2015–2045: Solutions for Indonesia's future development of sustainable agriculture – BioIndustry*. Ministry of Agriculture.

Mustopa, K., Kordiyana, K. R., & Yuniar, A. (2023). The roles of farmer group leaders chairman for improving rice productivity in Margosari Village North Pagelaran Sub-

District Pringsewu District. *Indonesian Journal of Socio Economics, 2*(1), 1–6. https://jurnal.fp.unila.ac.id/index.php/IJSE/article/download/8454/5155

Mutmainah, R., & Sumardjo. (2014). The role of farmer group leadership and the effectiveness of farmer empowerment. *Sodality: Journal of Rural Sociology, 2*(3), 182–199. https://doi.org/10.22500/sodality.v2i3.9425

Nasiro, K. (2024). Cropping systems diversification as an approach to enhancing crop productivity: A review. *Plant, 12*(3), 48–65. https://sciencepublishinggroup.com/article/10.11648/j.plant.20241203.12

Novitasari, Y., Mohammad, Kh., Harsuko, R., & Panji, S. (2025). Pemberdayaan petani sebagai kunci keberhasilan model ketahanan wilayah berbasis budidaya pisang cavendish. *Jurnal Ketahanan Nasional, 31*(1), 43–59. https://doi.org/10.22146/jkn.102600

Nugroho, P., Agnes, Q., Pudjiastuti, & Sumarno. (2021). Increasing rice production in Malang Regency through the UPSUS Pajale program during the Covid-19 pandemic. *Journal of Agriculture, 32*(3), 199–206. https://jurnal.unpad.ac.id/agrikultura/article/view/35176

Oktarina, S., Rahmawati, Z., Anna, G. Z., Eko, W., & Muhammad, A. (2020). The role of communication and farmer institutional urgency to the agriculture development program. *International Journal of Multicultural and Multireligious Understanding, 7*(11), 266–276. https://ijmmu.com/index.php/ijmmu/article/view/2188

Panda. (2024). *Holistic approach in agriculture: Initiating an organic-based integrated farming system*. Panda.

Ponto, J., Noortje, M. B., & Ribka, M. K. (2017). UPSUS PAJALE in supporting the food self-sufficiency program in Boolang Mongondow Regency. *Agri-SocioEconomy Unsrat, 13*(2), 253–260. https://doi.org/10.35791/agrsosek.13.2A.2017.17017

Pratiwi, N., & Suwardji. (2023). Praktek pertanian cerdas dengan kearifan lokal berbasis agroekologi untuk mengatasi perubahan iklim di Indonesia. *Jurnal Pengabdian Magister Pendidikan IPA, 6*(1), 398–403. https://doi.org/10.29303/jpmpi.v6i1.3722

Rani, R. P. H. (2020). Analisis paradigma pembangunan di Indonesia. *Indonesian Journal of Intellectual Publication, 1*(1), 40–52. https://journal.intelekmadani.org/index.php/ijipublication/article/view/37

Rizzo, G., Giuseppina, M., Giorgio, S., & Riccardo, V. (2024). Key factors influencing farmers' adoption of sustainable innovations: A systematic literature review and research agenda. *Organic Agriculture, 14*, 57–84. https://dx.doi.org/10.1007/s13165-023-00440-7

Wahyuni, Z., Abd, A. P., & Azisah. (2021). The role of farmer groups in increasing rice production (Case study in Taroada Village, Turikale District, Maros Regency). *Agribis Journal, 9*(2), 205–214. https://ejournals.umma.ac.id/index.php/agribis/article/download/1087/777

Widowati, E. H., & Alfina, H. (2022). The impact of government programs on increasing soybean production in Central Java. *Central Java Provincial Research and Development Journal, 20*(2), 205–213. https://ejournal.jatengprov.go.id/index.php/jurnaljateng/article/view/1009/738

Wihardjaka, A. (2018). Penerapan model pertanian ramah lingkungan sebagai jaminan perbaikan kuantitas dan kualitas hasil tanaman pangan. *Jurnal PANGAN, 27*(2), 155–164. http://dx.doi.org/10.33964/jp.v27i2.376

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