Research Article

Stakeholder Collaboration in an Effort to Increase Farmer Empowerment in Indonesia

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Abstract.
This research aims to identify optimal stakeholder collaboration models to improve the resilience of Indonesian farmers in the face of global changes, focusing on communication dynamics, local knowledge integration, and empowerment dimensions such as economic autonomy, adaptive capacity, and participation in decision-making. Using an exploratory qualitative approach, data were collected through semi-structured interviews and focus group discussions (FGDs) involving farmers, governments, NGOs, academics, and industry players. They were then analyzed thematically to uncover patterns of collaboration and barriers to empathy between stakeholders. The findings show that participatory network-based collaboration improves access to markets by adapting locally-based technologies, such as climate-smart farming systems, where farmers are equal partners. In contrast, the integration of local knowledge in policies improves climate resilience. However, bureaucratic hierarchy and reliance on top-down programs remain an obstacle. Theoretically, this study expands the understanding of collaborative governance by linking the dynamics of direct stakeholder relations to multidimensional empowerment indicators (economic, social, ecological), while affirming the importance of frameworks that link active participation of farmers with systemic support. Practical implications include recommendations for establishing multi-stakeholder forums to design local context-based interventions and empathic training for policymakers. This research emphasizes that the sustainability of empowerment depends on managing socio-cultural complexities while ensuring that inclusive collaboration becomes the foundation for agrarian resilience transformation amid global uncertainty.

Keywords: stakeholder collaboration, farmer empowerment, adaptation to global change, qualitative research, sustainable development

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1. Introduction

The terms green economy, green agriculture, green growth, and green order are part of contemporary scientific discourse that reflects a paradigm shift towards sustainable resource utilization [1]. Agriculture is significant for a sustainable food system in these conditions, primarily through biodiversity strategies and efficient land management. This is strengthened through long-term agricultural reform policies, which are the main cornerstone of rural development [2]. Agricultural practices are gaining

increasing attention in the face of complex global changes. The sector is trying to adapt to the dynamics of the rapidly changing environmental landscape, along with the emergence of three competing agricultural paradigms. Each paradigm offers a different approach to developing agricultural practices needed in response to global crises, such as climate change, ecosystem damage, and social inequality [3]. Therefore, development focused on sustainable agriculture requires a deep understanding of socio-ecological interactions [4].

The complexity of the environment requires the Government not to work sectorally, but to collaborate across stakeholders. In addition, expanding entrepreneurship and investment into the sustainable agriculture sector is an important step [5]. However, ego-sectoral and inter-organizational differences often hinder collaboration, leading to policy fragmentation. Therefore, to produce inclusive and resilient agriculture in the long term, collaboration from various parties—the state, the private sector, civil society, and farmers—is essential [6].

Empowerment is a key process that allows people to participate actively in strategic decision-making. This is an important element in reducing the gender gap in society. In agriculture, empowerment is not only about access to resources, but also involvement in agriculture-based organizations. This includes increasing income, ownership, and control of assets and land and strengthening roles in productive decision-making [7]. Empowering farmers, especially in the context of heterogender, is a prerequisite in designing policies and programs responsive to farming communities' needs [8]. The Government is a facilitator in building competitive and fundable farmer organizations. This is based on the assumption that most farming communities already have basic skills that can be maximized with institutional support. In this case, the Government is not only required to focus on technical aspects, but also to open up space for public participation at large. The communication approach must also go beyond the project model (as a delivery system), towards communication as an integral process of culture and social change [9]. This perspective urges a shift in the approach of empowerment programs from top-down to a collaborative approach that is participatory and contextual.

In many social and economic contexts, multidisciplinary and cross-actor approaches are urgently needed to address systemic and structural barriers. Collaboration among stakeholders is a means to reduce tensions between public and private interests and encourage interaction between the Government and civil society to solve problems and raise awareness [10]. In these situations, a successful work program requires cooperation between business, Government, and relevant local resources. In empowering farming

communities, involving various actors such as the Government, the private sector, and community institutions is very important to increase farmers' competitiveness. Cross-stakeholder collaboration not only serves as a driver of empowerment but also as a vehicle for innovation development. A collaborative learning process between farmers, experts, and stakeholders results in Democratic Innovation that considers social norms and power dynamics in agricultural technology systems [11]. This process encourages interaction, discussion, and the creation of new ideas based on social beliefs and local knowledge.

The methods used in developing agricultural innovations include stages from planning to post-production. This process allows for open dialogue among stakeholders with relevant time adjustments. Participatory training organized through community-based programs helps farmers increase data-driven decision-making capacity and practical experience [9]. The configuration of partnerships in agricultural ecosystems can vary greatly depending on the level of commitment of the actors involved. Therefore, an in-depth analysis is needed to identify obstacles and potential synergies between actors. The results of this study can be the basis for policy formulation, especially in detecting inequality of representation and distribution of power in partnerships [12]. Two different forms of partnership configuration may require contextual conflict resolution strategies so that all stakeholders can participate equally.

Cross-sectoral collaborative policies have proven successful in helping farmers in various developing countries survive and compete in the global market. However, the limitations of innovation from agrarian companies and the weak relationship between the industrial sector, universities, and research institutions are structural challenges in strengthening the agricultural innovation ecosystem [13]. Therefore, a systemic approach combining economic, social, and ecological elements must be developed through a multi-actor-based collaboration model.

Establishing effective farmer cooperatives is an integral part of efforts to increase production and distribution capacity. The success of cooperatives depends heavily on building trust, strengthening social motivation, and being able to manage local cultural norms [14]. Some research suggests that farmer organizations have an important role in improving technology adoption, household decision-making, and cooperative governance, especially in the context of external interventions [15]. Therefore, it is recommended that public policies support increased farmer participation, strengthen collective action, and encourage the implementation of local value-based innovations.

Ongoing multi-stakeholder collaboration must consider value chains, social networks, and local wisdom principles as prerequisites for intervention effectiveness [16].

Policy changes made by the Government and various actors through public programs and investments are the main drivers of the transformation from conventional agriculture to adaptive agriculture. This approach allows for policy formulation that is responsive to the impacts of global climate change and the need for more resilient agricultural systems [17]. Within this framework, strategic management is used to assess the capacity of smallholders in the food security chain and identify barriers to innovation and inclusivity of sustainable development policies[18]. In order to strengthen a resilient and efficient agricultural system, agricultural consulting services that are integrated with information and communication technology (ICT) are needed. This technology is important in ensuring post-harvest quality, expanding access to market information, and building trust-based relationships between producers and consumers [19]. Nonetheless, significant challenges such as a lack of data, inadequate infrastructure in rural areas, and digital literacy gaps remain obstacles to optimal technology integration.

The potential solution lies in the combination of traditional knowledge and advances in digital technology. Collaboration between information centers, farmer education institutions, and local actors can accelerate the dissemination of information, foster social learning, and strengthen local knowledge systems that are adaptive to change [19] Thus, agricultural transformation depends not only on technological innovation, but also on communication and institutional systems that can bridge the diversity of actors and local needs. Obstacles to collaboration in the management of the agricultural sector often stem from a lack of coordination between institutions and differences in stakeholder priorities. In addition, historical and systemic barriers in the legislation process, particularly related to land management and recognition of farmers' local values, reinforce the complexities faced [20]. For this reason, inclusive collaborative policies need to be developed, with a focus on the active participation of farmers in the resource planning and management process.

In the context of increasing environmental degradation, many organizations and companies are beginning to take a strategic role in biodiversity conservation. A business-based approach to conservation is now part of the Company's strategy to reduce environmental impact and demonstrate a commitment to sustainability [21]. In this scheme, stakeholder involvement in environmental compensation programs can potentially drive the creation of more equitable and ecologically effective governance. Nevertheless, institutional and technological innovation must consider structural barriers that

hinder public participation in public services. Challenges such as negative attitudes towards innovation, rigid organizational structures, and power relations dynamics must be addressed through holistic and transformative policy strategies [22]. This approach is necessary for the success of sustainable farming practices and the maintenance of environmental Sustainability and social justice.

Strategies oriented towards sustainable development must also address farmers' social and economic problems by integrating innovative management and institutional capacity building [23]. To sustain the long-term Sustainability of the agricultural industry, challenges must be systematically identified in three main domains: economic, social, and environmental. These three interrelated aspects require integrated solutions to create a sustainable agricultural system [24].

This study aims to identify an optimal multi-stakeholder collaboration model in increasing farmers' independence amid the dynamics of climate change and structural challenges in Indonesia. Organizations play an important role in strengthening public-private partnerships in rural areas. However, different approaches among farmers often lead to dissatisfaction that hinders collaboration. Social innovation in the food system is greatly influenced by the power dynamics between local actors and the degree of geographical, institutional, and organizational proximity that forms the interaction structure [25].

The role of cooperatives as Innovation Brokers and companies' involvement in monitoring the conditions of land, crops, and labor, is becoming an important instrument to restore control of farmers over their agricultural practices [26]. On the other hand, social innovations that strengthen social technologies and the collective perception of stakeholders contribute to the successful adoption of agricultural technologies [27]. The potential for developing sustainable partnership models is enormous, especially when considering local environmental factors such as water availability, plant characteristics, and social connectedness. Adaptive policy design, provision of strategic subsidies, collaborative network building, and participatory approaches are needed to build agricultural partnership patterns that align with local character and existing agricultural systems [28]. Stakeholders expressed optimism for collaborative solutions responsive to dynamic scenarios, including strengthening the relationship between regulations, adaptive policies, and social context-based collaboration models [29].

An important gap in the literature shows that while many studies highlight aspects of smallholder empowerment, few specifically examine the role and dynamics of multi-stakeholder collaboration in increasing smallholder independence and resilience in developing countries such as Indonesia [30]. The involvement of key actors, such as economic associations and marginalized groups, should be managed with awareness of power structures and fair dissemination of information The involvement of key actors, such as economic associations and marginalized groups, should be managed with awareness of power structures and fair dissemination of information [12].

Social, economic, and environmental challenges are still significant, ranging from market limitations and dependence on donors to weak social support and institutional networks [31]. For this reason, it is necessary to integrate collaborative strategies that allow community involvement at every stage, from planning to policy evaluation. The ability of smallholders to adapt depends on the success of participatory mechanisms and institutional capacity to incorporate local and technical information [32].

This research explores why cooperative and collaborative farming approaches are key strategies for empowering farmers in Indonesia and other developing countries. By building close partnerships between governments, the private sector, and farmer organizations, this model can bridge policy gaps, strengthen the adaptive capacity of smallholders, and create a more resilient, equitable, and sustainable agricultural sector in the face of global challenges.

Today, contemporary agricultural systems face the risk of food insecurity, labor shortages, economic decline, and socio-political challenges. Therefore, efforts to strengthen agriculture cannot be separated from social sustainability principles and ecological balance [33]. Climate change, natural resource governance, and inequality in land use policies can only be addressed through multi-stakeholder collaboration based on trust and shared vision [34]. Experience from various contexts shows that inclusive multi-stakeholder platforms can help address land tenure system issues, policy gaps, and interest differences. Approaches such as field visits, workshops, and interactive counseling have proven effective in increasing the adoption of conservation practices [35]. Collaboration between educational institutions, the private sector, and the Government is urgently needed to form resilient agricultural systems responsive to the challenges of food security and energy transition [36].

The ideal collaboration model must blend policies encouraging clean practices with oversight mechanisms involving NGOs and civil society. The level of subsidies must

be adjusted to the regional fiscal capacity, and the function of public supervision must still be maintained. In addition, cooperative-collaborative farming, which integrates state, private, and community actors, is a promising alternative to bridging the gap in implementing farmer empowerment programs [37].

A sustainable business strategy integrated with local industries can overcome market underdevelopment and institutional weaknesses in the commercialization of agriculture [38]. These innovations must be built with a participatory design approach that utilizes visual aids, communication training, and peer support as behavior change methods [39]. Exploring stakeholder collaboration can influence farmer capacity building when facing global economic challenges. Collaboration between farmers, Government, business, academia, community involvement in production, use of natural and cultural resources, stakeholder collaboration, and institutional support is essential for sustainability [40].

Obstacles such as a lack of training and pressure hinder collaboration. Continuous training and upskilling are the right solutions [41]. In addition, increased stakeholder engagement through training in marketing, post-harvest, and sustainable agriculture will strengthen farmers' resilience to external shocks [42]. However, until now, there has been no truly effective mechanism for measuring the impact of collaboration on farmers' welfare. Data shows that farmers with access to social networks, family support, and government assistance tend to be more successful and resilient to crises [43]. For this reason, the Social Learning that combines local knowledge, technology, and socio-political dynamics should be the foundation in any sustainable agriculture program [44].

2. Methods

This study uses an exploratory-descriptive qualitative approach that deeply explores the dynamics of multi-stakeholder collaboration in efforts to empower farmers in South Sulawesi Province. This approach allows researchers to fully understand the social context, interactions, and subjective experiences of stakeholders involved in peasant community empowerment. This study's primary data collection techniques were semi-structured interviews and focus group discussions (FGD) [45]. Interviews were conducted with key informants: farmers, local government representatives, civil society organizations, academics, business actors, and the media. Interview questions are developed based on the results of a literature review and validated by qualitative research experts to ensure the relevance and depth of the questions. The interviews are

designed in an open and flexible format to allow for a more in-depth exploration of participants' perceptions and experiences regarding communication between stakeholders, empathic barriers, and strategies to improve collaboration.[46]. The FGD was held in several strategic locations in Pangkajene Regency and the Islands, involving participants from various institutional backgrounds. The FGD process uses the same instrument as the individual interview, i.e., a semi-structured interview guide, to maintain consistency and alignment of thematic exploration. The entire interview session and FGD were documented through audio recordings and field notes to ensure the integrity and accuracy of the data collected. This study's total number of participants reached 30, representing six main stakeholder clusters: governments, farmers, the private sector, NGOs, academics, and the media [47]. To maintain the validity of the data, this study applied the triangulation technique of sources and researchers. Source triangulation is done by comparing information from different categories of participants, while researcher triangulation involves different research teams in verifying and interpreting data to minimize individual bias. The validity of analytics is also emphasized by adopting a second-person approach, which places the farmer's perspective at the center of empathic understanding. The researcher consciously considered the subjectivity of the respondents as an important part of the social reality being studied. The collected data was analyzed using thematic analysis techniques. The analysis stage includes verbatim transcription of all interviews and FGDs, identification of initial codes based on the appearance of often-repeated keywords and meanings, and grouping these codes into subthemes and main themes. Preparing the theme is carried out manually and iteratively, involving the entire research team in discussions to ensure consistency of interpretation and integrity of meaning. Using written interview guidelines as the main instrument also ensures the consistency of data mining in the field. With a rigorous systematization of the analysis process and a comprehensive validation strategy, this study produced findings that reflect the participants' experiences, have methodological robustness, and can be scientifically accounted for[48].

3. Results and Discussion

This study aims to find out the optimal model of stakeholder collaboration to increase farmers' independence and help them face the challenges of change in Indonesia. The importance of empowerment is a diverse and complex process in which collaboration between various stakeholders is essential to achieving the goal of empowering farmers.

This includes improving the skills and knowledge of individuals but also requires the support and active involvement of public sector entities, non-profit institutions, and the corporate sector. An important role of openness in fostering innovation as a strategic response to these pressing issues is that a culture of transparency enhances collaborative problem-solving among stakeholders and strengthens producers' competitive position in the global marketplace [49]. Effective collaborative empowerment can be generated by optimizing the use of resources and improving the Sustainability of programs, which will address social, economic, and environmental issues faced by marginalized segments of society, the importance of a stakeholder-centered approach in developing strategies to combat climate change challenges by integrating food-adapted indigenous peoples' knowledge and expertise, energy, and water systems can improve adaptability among stakeholders [50]. Within this framework, each individual can participate in greater empowerment to contribute significantly to the progress and well-being of their community. In addition, this study emphasizes the need for collaborative governance that involves all stakeholders in policy formulation and program implementation to address the needs and ambitions of the community adequately.

3.1. Stages of Farmer Community Empowerment

Smallholder community empowerment includes several stages: situational mapping and analysis, engagement and awareness, collaborative planning, capacity building, resource mobilization, organizational development and partnership formation, business and market advancement, monitoring and evaluation, sustainable empowerment, advocacy, and networking. It is important to recognize that each community has unique attributes; Therefore, the empowerment strategy should be tailored to their needs, values, and aspirations. The empowerment process must be based on cooperation, participation, and empowerment of farming community members.

In developing countries, the realization of various critical phases begins. Development begins with increased confidence and skill development, a fundamental component for further empowerment. When accessing important resources and opportunities, they develop into proactive participants in economic activities, leading to improved well-being. The social effects of this empowerment include personal gain, increased community cohesion, and reduced conflict. Ultimately, the Sustainability of these empowerment initiatives is intrinsically linked to the transformation of institutions that advocate for women's involvement in agricultural practices. This holistic framework underscores the

interdependence of the stages of empowerment, explaining how each stage contributes to the overall advancement of women's roles in the agricultural sector and their respective communities [51]. Empowering the farming community is an integral part of improving the welfare and productivity of agriculture in the agricultural industry. This initiative concentrates not only on improving the capabilities of individual farmers but also on strengthening the collective community. By facilitating access to critical knowledge, resources, and opportunities, farmer coalitions can assert control over decision-making processes that affect their existence. As a result, empowerment efforts aspire to build a more sustainable agricultural framework, increase farmers' incomes, reduce poverty, and increase food security. In addition, increased involvement in decision-making and strengthening networks among farmers are important components in achieving this goal, which can further improve access to markets and financial resources.

Investigating the facilitation of empowerment through participatory methodologies describes a complex and nuanced process with several key phases. Awareness, understanding, and empowerment journeys are developed through educational initiatives that enlightening farmers. This fundamental phase forms a framework for active engagement, where stakeholders provide their perspectives and collaborate to achieve a shared vision for a sustainable food system. The construction of knowledge together further strengthens this empowerment, fosters confidence, and allows participants to express their aspirations for the future. As the process progresses to the action planning stage, the focus shifts to identifying strategic initiatives and advocating for necessary policy changes, thus emphasizing the importance of political engagement in realizing a sustainable transition. These phases underscore the critical role of participatory approaches in fostering empowerment, knowledge dissemination, and collective action, ultimately contributing to the reconfiguration of systems [52].

The research results from several regions in South Sulawesi Province show that farmer empowerment is effective through cross-sector collaboration and MSME development based on the Pentahelix model. Farmer community cooperatives are inclusive in encouraging local economic strengthening, job creation, and poverty reduction. Empowerment challenges include a lack of knowledge, differences in perceptions among stakeholders, and limited policy support and reliable information, helping to reduce poverty and empower individuals economically [29]. Supporting smallholder independence requires collaboration between stakeholders, lack of knowledge and professional skills of stakeholders, disagreements between stakeholders from various fields, lack of funding and policy support, differences in citizens' cognitive based on

economic level, and differences in willingness to participate based on age are some of the main challenges and obstacles to stakeholder participation [53]. These include confusion, misinformation, lack of reliable sources of information, high transaction fees, markets, and policy conditions.

Farmer empowerment is a multifaceted process that involves awareness, agronomic transformation, and intellectual improvement. Awareness helps farmers understand agronomic conditions and the importance of active participation; transformation encourages the adoption of sustainable farming techniques; and intellectual enhancement equips farmers with managerial skills. The synergy of these three components is expected to encourage increased productivity, food security, and sustainable local economic growth. The success of this process depends on the active commitment of all stakeholders.

3.2. The Role of Stakeholders in Empowering Farming Communities

Empowering farming communities is a multifaceted process that requires the active involvement of all stakeholders. Government agencies, NGOs, academic institutions, cooperatives, the private sector, and civil society have different but complementary roles in designing and overseeing strategic initiatives to improve farmers' welfare. Cross-sectoral engagement is essential in meeting the challenges of global change [30]. The Government shapes policies and regulations, NGOs and farmer organizations advocate for farmers' interests, while academic institutions provide the scientific basis and innovation of practice. The commercialization of Information Services for smallholders, involving companies, scientific institutions, and governments, aims to increase the relevance and effectiveness of data-driven services [55]. The private sector is supported by investment and market access, while civil society strengthens public participation. Formal legal frameworks protect farmers' rights and access to resources, but challenges such as overlapping authority must be addressed to ensure justice and Sustainability. Inclusive participation is crucial, and further research is needed to understand the local dynamics that influence the empowerment process.

Collaborative sustainable agriculture between farmers and researchers will reduce gaps, add practical insights and empirical knowledge, and improve well-being. In addition, the fostered community must encourage peer-to-peer learning and build trust,

indispensable to successfully adopting innovative methodologies. The diverse composition of the membership enhances the collaborative framework, facilitating a broad spectrum of perspectives that contribute to formulating effective solutions. When stakeholders face challenges such as agricultural consolidation and communication barriers, a focus on participatory practices ensures that research remains relevant and empowers farmers. Ultimately, the collaborative framework described in this article emphasizes the importance of stakeholder engagement in driving transformative change in agricultural practices, thus paving the way for a more sustainable and resilient agrarian landscape. This strengthens the capabilities of individual farmers but also improves the overall agricultural ecosystem, fostering resilience to external pressures such as climate change and market volatility [54]. Researchers are critical in facilitating discourse and researching data to inform policy developments, and innovative food system actors contribute a range of expertise to illustrate barriers and opportunities. Although policymakers are not explicitly referenced, their participation is critical to building a conducive environment that drives methodology. Collectively, these stakeholders ensure that the prospective framework is comprehensive and inclusive, ultimately realizing a sustainable transformation of food systems [55].

The results of this study show that the empowerment of agricultural communities in Indonesia is highly dependent on the proactive involvement of various stakeholders. Key stakeholders, which include local government agencies, agricultural organizations, non-governmental initiatives, the private sector, and educational institutions, have distinct but synergistic responsibilities that contribute to the efficacy of empowerment programs. Effective collaboration and coordination among these stakeholders not only facilitates inclusive participation but also fosters an environment conducive to decision-making aligned with the interests and well-being of agricultural communities. In addition, the voluntary involvement of individuals and organizations that invest in agricultural issues plays an important role in increasing the capacity and autonomy of farmers. Through formal legality and voluntary support, farming communities can strengthen their position against adversity and exploit existing opportunities. It is imperative to continue to undertake more research and development projects that focus on practicing effective empowerment strategies and increasing knowledge about the role played by individual stakeholders in achieving the sustainability and well-being goals of agricultural communities.

In the context of empowering agricultural communities, stakeholder involvement is very significant. The stakeholders involved in these enablement initiatives can be classified into two main categories: key and additional. Key stakeholders, including farmers, government entities, non-governmental organizations (NGOs), and private companies, each hold important responsibilities and functions in implementing empowerment programs, policy formulation, and technical assistance. Instead, additional stakeholders such as educational and research institutions, local communities, financial entities, and the media contribute to providing the moral, technical, and financial resources necessary to improve the well-being of agricultural communities; Collaboration among all stakeholders is urgently needed to realize sustainable empowerment, which not only increases agrarian productivity but also strengthens social and economic networks in the region.

In addition, the practice of Social Farming (SF), which underscores the social dimension of agriculture, offers avenues for marginalized groups to assimilate into society, create employment opportunities, and facilitate access to health and social services. With enhanced support from various stakeholders, it is anticipated that the empowerment of agricultural communities can be implemented effectively, promoting their Sustainability and well-being in the long term. The success of these initiatives also depends on adequate Education and training, enabling farmers to embrace modern and sustainable farming methodologies that increase yields while upholding environmental Sustainability; Continuing Education also plays an important role in fostering awareness of environmentally friendly practices, thus enabling farmers to implement methods that are not only economically beneficial but also maintain the balance of the ecosystem. As a result, collaboration between government agencies and the involvement of non-governmental entities and the private sector are essential to develop programs that promote innovation and facilitate access to cutting-edge agricultural technologies.

3.3. Collaboration Model for Empowering Farming Communities

This research will enrich the literature on collaboration in empowering farming communities by highlighting the role of each stakeholder. Although much research has been conducted to empower farming communities in several countries, including Indonesia, this study fills the gap by providing a new perspective on how organized collaboration can create a better synergistic effect than fragmented initiatives. These findings offer

a new perspective on the importance of proactive engagement of all relevant stakeholders, a topic underexamined in previous research efforts, especially capital sourced from farmer assets.

The study also comprehensively examines the methodology and consequences of smallholder community empowerment and the barriers faced during its implementation model emphasizing multi-stakeholder collaboration by prioritizing dialogue between farmers and extension workers and engaging the public and private sectors to address the challenges faced by smallholder communities, prioritizing key aspects such as dialogue and open communication between farmers and scientists, enable the integration of farmers' experiences and concerns into the technology design process [56]. An agricultural collaboration model that collects data through surveys to understand management practices and decision-making factors among stakeholders, with log-linear modeling, predicts the importance of collaboration in adopting sustainable practices [22]. This model shows that most farmers believe collaboration can improve the adoption of sustainable practices. Cooperation between stakeholders, combining knowledge and experience, developing effective and sustainable practices, and integrating scientific knowledge with practical experience, will result in successful initiatives to improve well-being [57]. A collaborative model that can enhance knowledge and skills and increase access to Resources will open up opportunities for farmers to actively participate in the decision-making process and ensure practical and relevant strategies to align sustainable practices with economic realities to help farmers increase green profitability and create stronger networks. This system plays a role in increasing farmers' confidence and willingness to adopt new practices that lead to farmer communities that are more resilient to the challenges of global change. The application of the collaboration model is also carried out in salmon farming, where this collaboration model involves partner companies to enable open innovation. The Company will combine resources and knowledge to overcome the challenges in this collaboration. The interaction between research institutions and corporate entities will add innovative capabilities that facilitate advancing public financing and promote the dissemination of inventions and innovations [38]. The informal collaboration paradigm offers the most optimal balance between benefits and potential harms [58].

One of the benefits of multi-stakeholder collaboration in the agricultural sector is the improvement of the economy. To support this increase, it is necessary to consider factors such as market prices and unexpected costs, which can affect farmers' incomes. The influence of multi-stakeholder collaboration on the social empowerment

of farmers is that collaboration can increase employment opportunities, especially for women farmers [30]. Collaborative networks involving interconnected and collaborative actors are essential for sustainable development in rural areas. In managing resources and addressing sustainability challenges, four key characteristics influence their effectiveness: cohesion (trust and cooperation), centralization (dominance of decision-making), fragmentation (sub-group division), and connectivity (relationships between sub-groups). When decision-makers are looking for collaborative solutions [59]. The informal collaboration paradigm offers the most optimal equilibrium between advantages and potential hazards [58]

Based on the analysis of the collaborative model of empowering farming communities, it is the best solution for decision makers [59]. The primary focus of the comprehensive role of the cooperation framework related to the empowerment of farming communities is on the importance of collaboration between all parties involved. Empowering porang farmers through a cross-sector collaboration model increases the productivity and economic value of porang commodities. The programme, which involves the Department of Agriculture, research institutions, farmer cooperatives, processing businesses, and financial institutions, has increased yields by an average of 60%. Farmers' income per season increased by 75%, with access to financing increasing to 68%. In addition, the number of active farmer group members increased significantly, and the number of technical training activities increased from 4 to 11 activities per year. Cooperation with local processing industries also boosted exports of processed porang products, with a 42% increase in export volume in the last two years. Nonetheless, challenges such as dependence on export markets and lack of post-harvest facilities are still significant constraints. Therefore, it is necessary to strengthen supporting infrastructure and institutional governance so that porang farmers can be more empowered and economically sustainable. This collaboration model has been implemented in the Pangkajene and Islands Regency of South Sulawesi Province. Fragmentation (division of sub-groups) and connectivity (relationship between sub-groups)

The Figure 1 above shows the flow. This model illustrates the collaborative empowerment of Porang farming communities for sustainable agricultural development and collaborative interaction between various stakeholders to improve agricultural practice capabilities. Each collaboration model has different goals and advantages, including formulating policies aligned with the needs of farmers, providing training and disseminating knowledge, facilitating access to financial resources, and improving fiscal competence. In addition, the close relationship between manufacturers and consumers fosters a

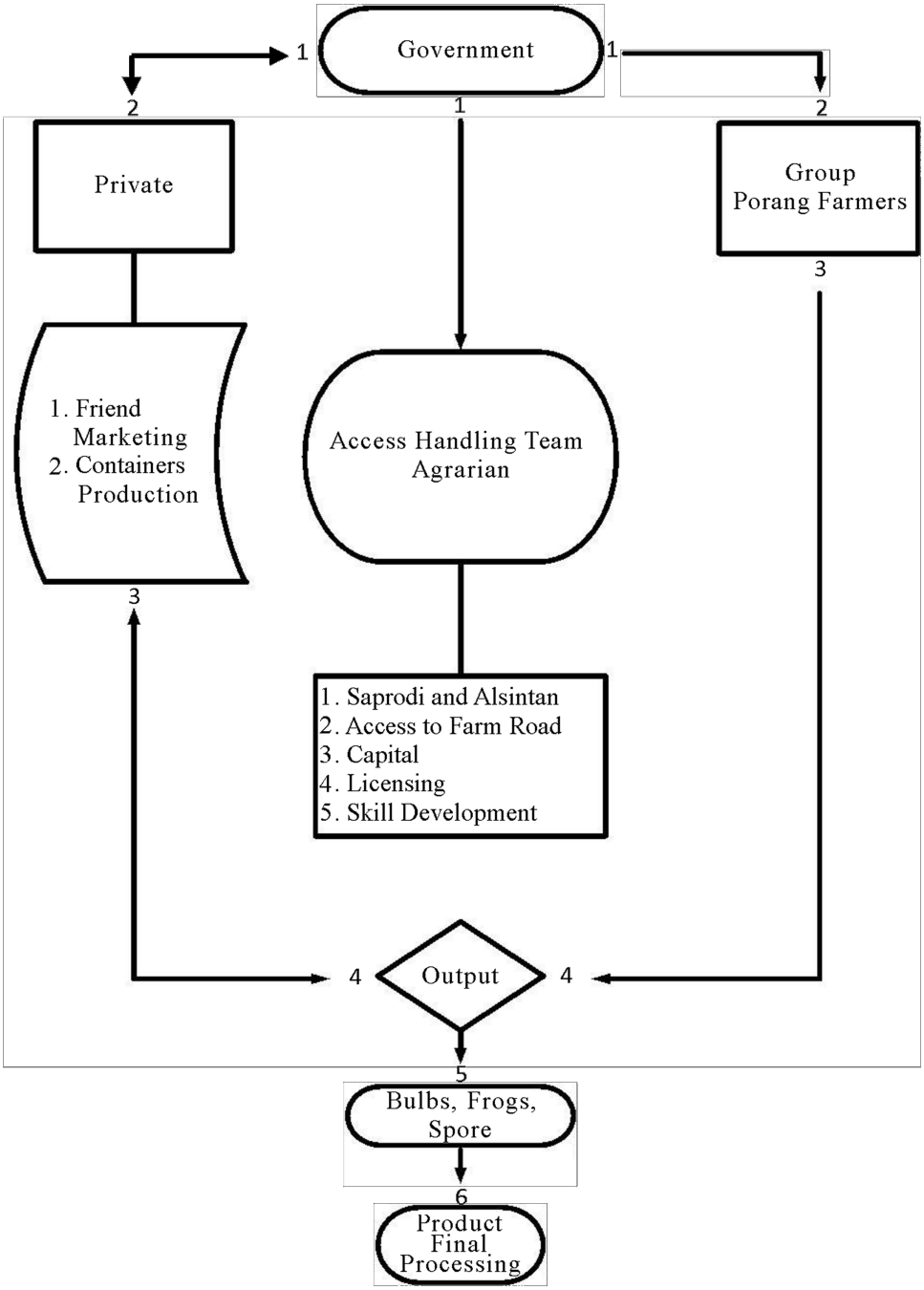

Figure 1: Agricultural Work Mechanism of Porang Agricultural Cooperative.

deeper understanding of market dynamics and product innovation. However, partnerships are essential and depend on good communication, trust from each stakeholder, and proactive participation from all parties involved. Therefore, it is crucial to understand the local context and implement the right collaborative frameworks that support the empowerment of farmers and drive their holistic well-being.

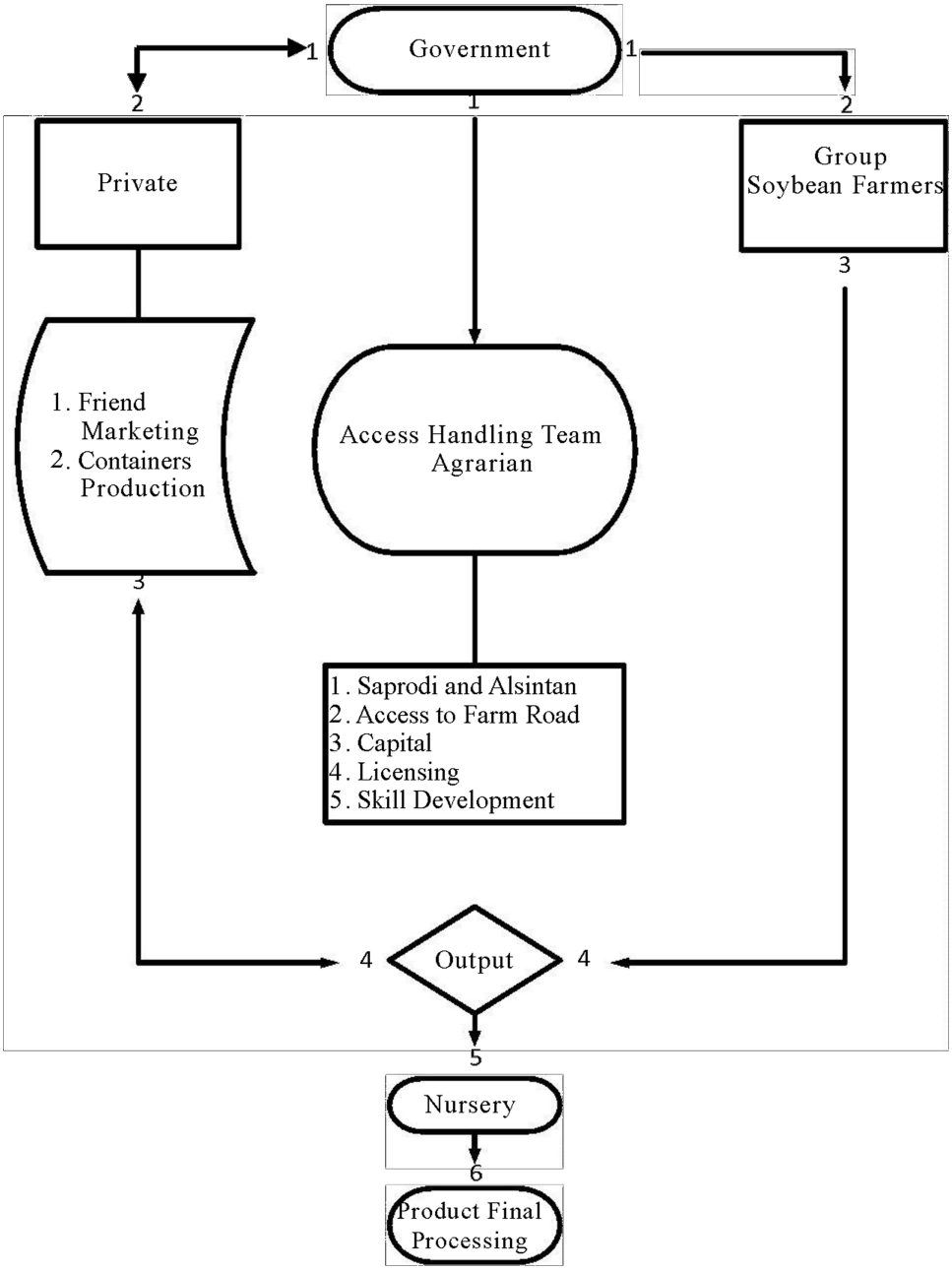

Figure 2: the framework mechanism for cooperation among soybean farming communities.

3.3.1. Work Mechanism of Soybean Agricultural Cooperative Cultivation

The Figure 2 above shows the framework mechanism for cooperation among soybean farming communities. The results of research and in-depth studies on the purpose of empowerment are to improve the welfare and independence of farmers. The methodology used in this empowerment also includes various stakeholders, including local government entities, business entities, community organizations, academic institutions,

and farmers and their families, to encourage the achievement of goals. The collaboration method is similar to the collaborative method of empowering porang farming communities, where collaboration is the cooperation of stakeholders, including government entities, commercial companies, community-based organizations, educational institutions, and agricultural producers and their households, to encourage collaborative efforts in achieving common goals. By assimilating social, economic, cultural, and environmental dimensions, the framework prioritizes optimizing the inherent potential of existing resources to realize a sustainable and competitive agricultural paradigm.

With the application and technical support developed, farmer community organizations, and the provision of business capital, it is hoped that it can foster a conducive environment for the farming community. However, the challenges in implementing this framework, including differing interests and resource constraints, require sustained efforts to develop trust and collaboration among stakeholders. The study further analyzes the conditions affecting grapefruit cultivators who have become symbolic figures in the region, in addition to the steps taken by the Government to establish a task force for empowering micro, small, and medium enterprises (MSMEs). Through this scientific investigation, we aspire to provide in-depth insights into the efficacy of collaborative models in empowering farming communities and their role in boosting local economies.

This research shows that the framework of cooperation between soybean farmers based on cross-sector collaboration is efficacious in improving the welfare of farmers. Collaboration between local governments, R&D institutions, cooperatives, financial institutions, and farmers has increased average production by 50% and increased farmers' income per season (up 70%). Access to financing also increased by an average of 76%, and the number of active farmers in cooperatives grew by 128.6%. The technical training provided increased almost threefold in the same period. Thanks to the support of the MSME task force. The main obstacle still lies in weak institutional governance and market access, so it is necessary to strengthen local institutions and sustainable collaborative strategies to actualize agricultural potential.

The active involvement of all stakeholders, Education, training, and access to technology are important elements in increasing the capacity of farmers to adapt to market challenges. The synergy between Education, technology, and multi-stakeholder collaboration will create a productive and competitive agricultural ecosystem. The active involvement of government agencies, the private sector, and educational institutions will drive agricultural innovation, increase farmers' incomes, and create opportunities

for the younger generation to engage in sustainable agricultural practices. A comprehensive training program and guidance from experienced practitioners will strengthen an adaptive and collaborative community of young farmers. Stakeholder cooperation is described in the following chain (Figure 3);

Figure 3: A chart of stakeholder collaboration in empowering farmer communities. Source: Researcher Data Processing

This study provides a comprehensive analysis of the role of each stakeholder in collaborating to empower farming communities. One important shortcoming recognized in the existing literature is inadequate investigation into each stakeholder's roles in collaborative processes. Through this research, the contribution and role of each party can be clarified. The Government plays a role in policy formulation, the private sector in funding and technology, and non-governmental organizations in community empowerment and advocacy. These findings answer the second gap by outlining how each stakeholder can work synergistically and effectively to create farmer self-reliance. This research also provides evidence that cross-sector collaboration can create an ecosystem that sustainably supports farmers' independence.

3.4. Collaboration Models That Can Empower Farming Communities

The results show that although the current collaboration model contributes, gaps still hinder the effectiveness of supporting farmers' independence. The study refined the model by identifying key elements of collaboration, such as open communication, transparent role allocation, and continuous feedback mechanisms. This approach emphasizes the importance of developing long-term competencies for farmers, not just short-term outcomes, to achieve self-sufficiency and sustainable welfare.

The collaborative paradigm in smallholder empowerment, facilitated by multi-stakeholder engagement and regulatory support, has significantly improved farmers' quality of life. Every stakeholder—including governments, research institutions, and the private sector—has a strategic role in providing knowledge and resources, creating a constructive exchange of experiences. This research also confirms that collaborative implementation supported by a clear regulatory framework can increase the effectiveness and Sustainability of empowerment programs.

The framework highlights the importance of synergy between governments, NGOs, academic institutions, the private sector, and the farming community in creating an ecosystem conducive to advancing the agricultural sector. This comprehensive approach is believed to encourage innovation, adoption of best practices, increased productivity, food security, and environmental Sustainability. The initiative also opens up new economic opportunities, strengthens farmers' bargaining positions in the market, and expands their access to essential technologies and resources. By designing programs responsive to local needs, this collaborative model becomes an important foundation for efficient, inclusive, and sustainable agricultural transformation, enabling farmers to implement collaborative models that can empower those farming communities (Figure 4).

The stages of collaborative and cooperative empowerment of agriculture are as follows:

3.5. Government.

Government entities play an important role in encouraging collaborative agriculture through cooperatives. Through various institutions, it is necessary to create an environment supporting farmers' empowerment and village welfare. Agrarian reform, resource

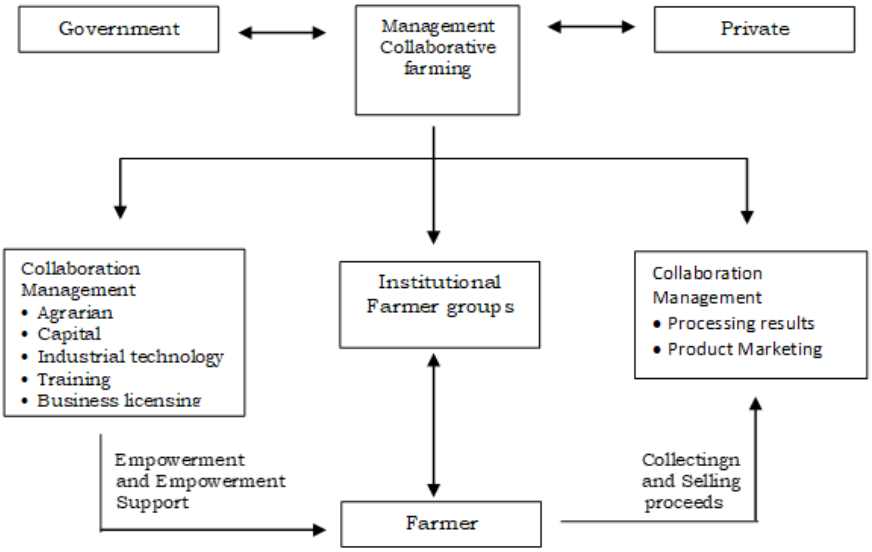

Figure 4: Cooperative Farming Collaborative Model. Source: Researcher Data Processing.

access, and working capital are important to increase productivity and independence. Collaboration between stakeholders and a participatory approach drive the success of the program. Continuous Education and extension are also important for the adoption of technology and the improvement of agricultural yields.

3.6. Farmer

Function of agricultural producers in the context of collaborative agricultural cooperatives. Agricultural producers are key in collaborative agricultural cooperatives due to their direct involvement and expertise. These cooperatives include various groups of farmers, including smallholders and women. Their contributions need to be valued as knowledgeable partners in the collaborative process. The active participation of farmers at every stage is essential to achieving sustainable and empowering outcomes.

3.7. Farmer Community Institution

Collective agricultural institutions through collaborative agricultural cooperatives are an effective mechanism to improve the welfare of farmers through the formation of systematic farmer groups and cross-sectoral partnerships. The formation of this collective involves the cooperation of farmers to achieve common goals, exchange knowledge,

share resources, and manage risks. Institutional Sustainability and collaborative dedication are essential to strengthening farmer groups in facing challenges and achieving the expected empowerment.

3.8. Expert

The involvement of specialists in collaborative agricultural cooperatives is important to provide technical insights and direction in supporting farmer empowerment. Specialists from agriculture, environment, economics, sociology, and technology serve as a source of knowledge that strengthens collaboration between farmers, governments, NGOs, and the private sector. This role is crucial to improving the effectiveness and Sustainability of empowerment initiatives.

3.9. Media

The media plays an important role in collaborative agricultural cooperatives by disseminating information, advocating, and providing Education to support farmer empowerment. Media helps increase public awareness, strengthen engagement, and bridge stakeholder communication. Effective use of media can expand the positive impact on sustainable agriculture and farmers' well-being.

3.10. Business World

Partnerships between companies and economic stakeholders have great potential in promoting sustainable agriculture and improving farmers' welfare. The business sector can contribute by providing resources, expertise, and market access. Their active involvement in collaborative agricultural cooperatives creates a more productive, inclusive, and sustainable ecosystem, as long as the collaboration is built based on mutual interests and benefits.

The advantage of the Cooperative Agriculture Collaboration Model is the collaboration of farming communities that not only gain better access to markets and technology but can also develop more adaptive strategies to global market changes. This insight has not been widely used in previous research, where cooperation has increased farmers' capacity to survive and prosper in global economic volatility. The contemporary value of the collaborative cooperative agriculture model is juxtaposed with its

predecessors, in particular, 1) The presence of communal agricultural assets in the form of land tenure certificates derived from national strategic initiatives, which can be used as capital for empowerment efforts, 2) There is a structured organization of professional farmers dedicated to the management of agricultural enterprises, 3) There is support from stakeholders related to capital injections, technological advancements, educational initiatives, and regulatory compliance for business operations, 4) There are guarantees given to farmers post-harvest regarding yield optimization and product commercialization, and 5) There is a commitment to Sustainability and improvement of farmers' collective farming efforts.

This research makes an important contribution to overcoming uncertainty related to the mechanism for measuring the impact of stakeholder collaboration on farmers' welfare. Through a results-based evaluation approach, this study proposes relevant indicators to measure the effects of collaboration, such as increased farmers' incomes, access to technology, and capacity building in resource management. These results address the latter gap by offering an evaluative approach that can be used to monitor and evaluate the long-term success of collaborative programs.

4. Conclusion

This study offers a Cooperative-Collaborative Farming model, an empowerment framework that integrates farmer cooperatives, multi-stakeholder participation, digital technology, and an adaptive participatory approach to sustainably improve farmers' welfare and independence. It explicitly highlights the importance of cooperation among various stakeholders. These results underscore several important elements that increase the effectiveness of empowerment strategies. The importance of collaborative governance is emphasized in this study, underlining the criticality of effectively meeting the community's needs. Involving all stakeholders in policy formulation and program implementation ensures that community expectations are appropriately met. This collaborative paradigm fosters a sense of belonging and accountability among community members, which is critical for sustainable development. Empowerment as a Diverse Process: Empowerment is a nuanced and heterogeneous process that requires the active participation of government entities, civil society organizations, and the private sector. This analysis states that empowerment is not just about improving individual competencies and knowledge; Empowerment requires a conducive environment that encourages active engagement from all sectors.

Resource Optimization: This journal explains how effective collaborative empowerment can optimize resource utilization. By combining specialized resources and knowledge, stakeholders are better equipped to address various social, economic, and environmental issues facing marginalized communities. This method supports the program's Sustainability and improves the community's overall quality of life. Adaptation to Climate Change: This study emphasizes the importance of a stakeholder-centered methodology in formulating strategies to mitigate the impacts of climate change. Integrating indigenous peoples' knowledge and expertise into food, energy, and water systems can substantially increase stakeholders' adaptive capacity, fostering resilience in environmental challenges.

The Role of Communication and Trust: Effective stakeholder communication is essential for empowerment. The study underscores the need for open dialogue to overcome barriers to empathy and understanding, which can hinder collaborative initiatives. Building trust through transparent dialogue is essential to maintain an environment of cooperation. Innovative Solutions through Openness: The journal concludes by stating that promoting a culture of openness can stimulate innovation and improve problem-solving skills among stakeholders. This academic inquiry offers a significant perspective on the importance of multi-stakeholder collaboration in farmer empowerment and self-reliance. The collaboration models identified in this study, including transparent role allocation and sustainable feedback mechanisms, provide a customizable framework to ensure the future Sustainability of farmer community empowerment.

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