

The Paradox of Public-Private Partnership Policy Dynamics and Food Security in Kenya

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Abstract

Different forms of Public-Private Partnerships (PPPs) have been utilized as strategies to enhance food security in many countries. Globally, the forms of PPP used in food security projects are categorized based on the types of relationships between partners, the asset management framework, and the nature of the contract. However, the choice of a form of PPP remains a paradox with which governments struggle. Hence, regardless of the form of PPP adopted, there were food security outcomes, either meeting expected results or falling below expectations. Therefore, the paper investigated the dynamics of public-private partnership policies and their impact on food production outcomes in Kenya. The paper discussed the dynamics of governance and food security to understand whether the form of a PPP matters in food production outcomes. The study purposively identified three (3) PPPs in Kenya based on their form and, using a comparative case analysis, examined whether the various forms had similar or divergent food production outcomes. The research data were obtained from forty (40) key informant interviews conducted in the three (3) irrigation schemes. Based on their performance outcomes, the Chakama Irrigation Scheme operated as a Community Initiative form of PPP, and it was a successful PPP. Perkerra Irrigation Scheme, which was a Public Enterprise form of PPP, was also successful, while Galana-Kulalu Irrigation Scheme, which operated as a Lease Contract, was unsuccessful. Therefore, the study found that it was not necessarily the form of a PPP, but rather the effectiveness of the governance arrangement, that affects food production outcomes.

Keywords

Public-Private Partnerships, Public Enterprise, Community Initiative, Food Security, Lease Contract, Governance

1. Introduction

Most governments utilise Public-Private Partnerships (PPPs) to promote irrigation development and ultimately enhance food security. As a framework for collaborative arrangements, PPPs describe the relationships between the public and private sectors in their efforts to design, construct, operate, and maintain infrastructure in ways that deliver essential public services. Therefore, PPPs involve delegating responsibilities to the private sector under an agreement to execute and manage a project or service, ensuring both desired results and a specified level of service performance. As a legal framework, PPP policies and regulations provide institutional security for investors and private partners against potential arbitrary actions by the government during long-term contracts. The PPP approach supplements limited public resources, fosters a more competitive environment, and helps improve efficiencies and reduce costs. Thus, the private sector can be attracted to a PPP project through mutually beneficial agreements that promote efficient resource utilisation, access to modern technology, improved project design and implementation, and enhanced operations, all of which contribute to delivering public services and goods more efficiently. Within a PPP framework, the private sector, rather than the government, assumes the primary role in investment in production activities to enhance service delivery.

Globally, different forms of PPPs have been used to incorporate a wide range of ingredients. Although the classification of PPP forms does not necessarily mean the same across all jurisdictions, it is primarily based on one of three main categories. The first category focuses on the types of relationships between partners involved in a PPP project, which, according to Skelcher, include five types: contracting out, public leverages, joint ventures, franchises, and strategic partnerships (Skelcher, 2009). The second classification emphasizes ownership and asset management frameworks, where partnerships may involve arrangements such as Build-Own-Operate (BOO), Build-Operate-Transfer (BOT), Build-Operate-Finance (BOF), Design-Build-Finance-Operate-Transfer (DBFOT), Operate and Maintain (O&M), and Design-Build-Operate (DBO) (Klijn & Koppenjan, 2016). The third category considers the types of public services and the nature of contracts between the partners, including Public Enterprises, Public Limited Companies (PLCs), Service contracts, Management contracts, Affermage contracts, Lease contracts, Concession contracts, hybrid arrangements, and Divestitures (Obosi, 2018). These differing categorizations imply that there is no standardized or linear approach to applying any particular PPP form. Governments may therefore adopt a specific form or variant of PPP based on factors such as cost-benefit analyses or public interests that influence collaborations with the private sector to deliver public services. A government's decision to assume particular responsibilities relative to private actors significantly influences the success of the targeted service delivery. For example, under PE, the government of Ethiopia in the Megech-Seraba Irrigation Project selected a foreign firm under the Design-Build-Operate (DBO) model of PPP, which successfully collaborated with the government and

smallholder farmers to enhance food production. Similarly, Egypt adopted the DBO model for a thirty-year contract in the West Delta Project, aiming to expand irrigated land to approximately 79,000 hectares (Baïetti & Abdel-Dayem, 2008), which ultimately contributed to improvements in food security. Fanadzo and Ncube argued that in South Africa, partnership efforts to improve food security focused more on investing in existing small-holder irrigation schemes than on constructing new ones (Fanadzo & Ncube, 2018).

Conversely, in Türkiye, the government adopted the Operations and Maintenance (O&M) form of PPP to manage five irrigation schemes in the Gediz Basin, covering approximately 27,000 hectares, namely Batman-Silvan, Devegeçidi, Derik-Kumluca, Nusaybin-Cagdas, and Cinar-Goksu (Cakmak et al., 2004). However, due to high operational and maintenance costs, as well as the poor performance of the schemes, the Turkish government transferred management to the users. The farmers experienced improved operations and maintenance services, greater diversity in association practices, a stronger sense of ownership over resources, and increased accountability and transparency. In Mozambique, the government, faced with the challenge of perennial flooding that threatened the performance of the irrigation projects, used the Rehabilitate-Maintain-Transfer (RMT) form of PPP to ensure continuous rice production in the Chokwe Irrigation Scheme. The role of the government in the management of large-scale irrigation schemes was to maintain infrastructure, regulate farmers, and develop policies that allow the participation of more stakeholders in the maintenance of irrigation systems. In addition to local actors, efforts to improve the managerial and governance strategies involved incorporating two foreign investors from the French Development Agency and the Japanese government, who signed an agreement to finance the rehabilitation of the main canals at Chokwe Irrigation Scheme on a pilot area of 1000 hectares (Ducrot et al., 2018).

Kenya has faced food insecurity since the 1960s due to ongoing fluctuations in food availability. The situation worsened in 2010, when around 10 million people had limited access to food. By 2021, 14.5 million Kenyans still faced food and nutrition insecurity (KIPPRA, 2021). To combat food insecurity, the Kenyan government has adopted various forms of PPPs, including Public Enterprises, Lease contracts, and Community initiatives, in different proportions over time, either individually or collaboratively, through irrigation schemes. The National Irrigation Board (NIB) Act of 1969 (Government of Kenya, 1969) authorised the operation of national irrigation schemes as Public Enterprises (PEs) to encourage private sector participation in food production. The Act enabled private sector involvement in schemes at Mwea, Tana, Bura, Perkerra, Ahero, West Kano, and Bunyala. Another key strategy was the enactment of the Public-Private Partnership (PPP) policy of 2011, designed to utilise private sector investment, expertise, and innovation to achieve development goals. The 2014 PPP regulations, in conjunction with the 2013 and 2021 PPP Acts, established guidelines for stakeholder selection and contract management, thereby fostering collaboration between pub-

lic and private sector actors. To date, three types of PPP have been identified from strategies implemented by the Kenyan government: Public Enterprises (PE), Lease Contracts, and Community Initiatives. Due to changes in governance structures, irrigated agriculture now involves various public and private organisations, including foreign investors, civil society, non-governmental organisations, small-scale farmers, and communities, in differing proportions and levels. Although food insecurity remains, production at PEs has persisted, the Lease contract at Galana Kulalu has faced challenges, and Community initiatives have proven successful. Despite being commissioned in 2014 to boost maize production, the Galana-Kulalu Food Security Project had seldom succeeded in increasing food output by 2024. Nevertheless, communities have become more engaged in strategic partnerships and more accountable for their food production, leading to an increase in community initiatives. Consequently, some projects, such as the Chakama Small-Holder irrigation scheme, recorded growth between 2016 and 2024, with data showing an increase in cultivated land from 200 to 800 acres. Comparatively, the three schemes experienced different governance arrangements, which entailed diverse interactions between the state or its agents and the private partners. The nature of governance influenced the roles of government and private actors, contract enforcement, and stakeholder coordination, hence realizing different outcomes in terms of food production. The schemes that had networked interactions and clarity of roles had effective governance arrangements, hence registered better policy outcomes, while those with hierarchical interactions had weak governance arrangements and failed to meet production targets. Therefore, while both PE and Community Initiative are making progress towards increasing food production, the Lease contract continues to face difficulties in terms of production targets. Hence, the question: why did different PPP forms yield divergent outcomes despite similar goals? This paper, therefore, examined the significance of the choice of the PPP model in improving food security. Through a comparative case analysis of three different irrigation schemes under various PPP models with different outcomes, the paper argues that, beyond the government's role, the governance of partnership dynamics also influences production and, consequently, food security in Kenya.

2. Analytical Framework

The study utilised public choice theory to explain the choice of an appropriate form of Public-Private Partnership for attaining food security in Kenya. Public choice theory posits that the decisions of politicians, individuals, or bureaucrats depend on the rational choices of self-interested individuals/agents and the cost-benefit analysis of public goods or services. The key proponents of public choice theory sought to understand how elected officials made decisions on what governments should do or not do based on self-interest and cost-benefit analysis (Downs, 1957). The argument was that the decision maker, while pursuing the provision of public goods and services, pursued certain possibilities and opportu-

nities to their advantage within the strategic opportunities afforded by both decision rules and decision-making arrangements. To this end, Ostrom illustrated how public agencies/organizations were regarded as means for allocating decision-making capabilities to the management and use of common pool resources in order to provide public goods and services responsive to the preferences of individuals in different societal contexts (Ostrom, 2015). The key assumptions of the theory were: first, the elected individuals were self-interested and had preferences that affected the decisions they made, and also differed from individual to individual. Secondly, the elected individuals were rational actors and would be able to consider alternatives before they selected the best action. Thirdly, the elected individuals would employ maximizing strategies by consistently selecting the best alternatives. Fourth, the elected individuals had all the needed information to facilitate the selection of the best choices based on risk assessment, certainty, and uncertainties.

Based on the assumptions of the theory, Araral argued that government bureaucrats responsible for implementing PPP projects reflected self-interest when seeking to expand budgets or increase resource allocation. It was also observed that, in pursuit of self-interest, government bureaucrats may encounter conflicts of interest between different stakeholders, diversion of resources from PPP projects, poor coordination among various partnerships, or delays in decision-making, which can affect the project's performance (Obosi, 2018).

In this perspective, the study presented food security as a public good or service whose provision required resource allocation based on rational choice or cost-benefit analysis. However, the elected or representative individuals in the government bureaucracies and public agencies made decisions based on self-interest regarding the means and ways in which food security could be ensured for the benefit of all. The decisions were made based on the available options, ranging from full government responsibility to particular forms of PPP for specific projects at different times. As a result, the food security sector involves diverse stakeholders participating in PPP projects, either informally or as rationally contracted by government agencies to provide public goods. Based on the rational choice assumption, government decision-makers chose to contract with the private sector to deliver public services, thereby leveraging the financial capacity of private investors. The private sector participated in PPP projects due to the expected benefits through various modes of payment. The policy/decision makers in food security, therefore, based on their self-interests, influenced the choices from the alternative PPPs, based on the form of project ownership or the shares each partner should have, the nature of organizational management, the scope or categories of partners, and the type of contracts/agreements, either long-term or short-term, through different governance arrangements. The choices made by government agents were, therefore, responsible for the mixed outcomes on food production at Perkerra, Galana-Kulalu, and Chakama irrigation schemes operating under PE, Lease contract, and Community Initiative forms of PPPs, respectively. The existence of

more stakeholder engagement in Chakama and Perkerra facilitated a networked-governance mechanism through flexible and participatory partner interactions, hence successful food production at the schemes compared to the self-interested behavior of respective partners at the Galana-Kulalu irrigation scheme, leading to poor coordination, limited partner collaboration, and rigid partner interactions, hence poor food production at the scheme.

3. Methodology

The study used a Comparative Case Study (CCS) approach. According to Bartlett and Vavrus, CCS involves simultaneous horizontal, vertical, and transversal comparison of the cases being studied (Bartlett & Vavrus, 2016). A case study approach in political and policy sciences refers to an intense study of a specific unit, with an emphasis on how events interact with contextual factors (Gerring, 2006). We employed the approach of “multiple case studies,” which is suitable for studies where the phenomena of interest occur in multiple contexts, and leverages the similarities in context between the cases (Yin, 2013). The qualitative approach was suitable for this study because the research questions sought explanatory information necessary for a proper understanding of how the PPP policy dynamics affected food security. The qualitative approach provided the researcher with the opportunity to gather more detailed and contextual data on the operational mechanisms of PPP initiatives. The case study approach was also favoured because it could address a series of decisions that occur over a long period of time, with no clear beginning or end points, and outcomes whose direct and indirect implications are too complex for single-factor theories (Yin, 2013).

The data were collected from three irrigation schemes in Kenya, namely Galana-Kulalu, Perkerra, and Chakama, categorised as lease, public enterprise, and community initiative, respectively. Each of the three schemes was purposively selected as an unsuccessful lease contract, a successful PE, and a successful Community Initiative, respectively. The successful schemes (Perkerra and Chakama) met or exceeded production targets, while the unsuccessful one (Galana-Kulalu) did not. The Galana-Kulalu and Chakama Irrigation schemes are both located in Kilifi County in the coastal region of Kenya. Galana-Kulalu is the only lease contract in Kenya, covering approximately 1,700,000 acres of land, although only 10,000 acres have been developed for irrigation. The Chakama scheme, which spans 800 acres, is a community initiative supported by the government through the Coast Development Authority (CDA) to facilitate access to water and mitigate the effects of drought and climate change, thereby enhancing food security. It was randomly selected against the Wei Wei Irrigation Scheme in West Pokot County, another successful Community Initiative irrigation scheme in Kenya. The Perkerra scheme is located in Baringo County and has a gazetted area of 5800 acres, although the land under cultivation is approximately 1700 acres. The scheme draws its water from the river Perkerra. It was randomly selected from among the other five Public Enterprises in national irrigation schemes, namely: Mwea-Tabere, Tana, Bura,

Ahero, and Bunyala.

To determine the sample size, a non-probability sampling method was used to select key informants from relevant organisations and partners in each scheme to participate in the study. The non-probability sampling method was preferred because the study required respondents who had critical information concerning the performance and management of partnerships within the national irrigation schemes in Kenya. The respondents were selected based on their level of involvement in the partnerships on food security at the schemes. The organisations involved in food production at the schemes included government agencies, private investors, Self-Help Groups (SHG), and Community-Based Organisations (CBO). The interviewers targeted at least two respondents from each organisation. The snowballing method was used to allow respondents to refer the interviewers to other respondents who had the required knowledge and experience. The snowball sampling method was used to acquire the sample size, where key informants were asked to nominate other relevant respondents.

The data was collected using a Key Informant Interview (KII) guide. A total of 40 interviews were completed across the three irrigation schemes. The interviewees were well balanced between public partners (44.1%) and private partners (55.9%) across the three schemes: Galana-Kulalu (20.6%), Perkerra (52.9%), and Chakama (26.5%). The interviewers/researchers sought the consent of respondents before asking questions as per the interview guide. The respondents were contacted in advance to confirm availability based on the interview schedule. Most of the interviewees in Perkerra and Chakama were interviewed in the natural setting, that is, the farms, while those in Galana-Kulalu had diverse interview settings, as there was no activity on the farms apart from the water dam development project. All interviewee responses were recorded in notebooks as fieldwork notes and captured in Excel spreadsheets for data cleaning and organisation.

Thematic analysis helped identify recurring themes across the PPPs to establish what was similar, what differed, and why. The data, which were recorded in an Excel spreadsheet, were organised and transcribed. The key messages from each response were highlighted in relation to the respective research questions. The analysis of the reactions included both within-case and cross/comparative-case analysis across the schemes. The key messages and variables were compiled into an Excel sheet and used to generate tables that were analysed in relation to the research question and responses.

4. Results

The analysis of the data was based on the hypothesis that the greater the government's involvement in the scheme's activities, the higher the likelihood of improved food production. The level of participation of a partner was assessed by the number of responsibilities taken on relative to the other partner's roles. In short, the research aimed to determine whether public partners' greater responsibilities compared to those of private partners resulted in better food production

outcomes in the schemes. Therefore, the paper analysed the role of the government/public sector in the schemes, the role of private partners, and finally compared the roles of both public and private partners in each of the three schemes: Galana-Kulalu, Perkerra, and Chakama.

4.1. The Role of Government in Food Production in the Schemes

To establish the government's role in food production, interviewees were asked to explain the government's responsibilities under each of the three schemes: Galana Kulalu, Perkerra, and Chakama. The responses were as shown in **Table 1**. The number of responsibilities was given scores in the range of 1 - 10. The scores between 1 - 4 were considered low; 5 - 7 medium, while scores between 8 - 10 were regarded as high involvement.

Table 1. Responsibilities of the public/government as a partner in the three schemes.

Government Responsibilities	Irrigation Schemes		
	Galana Kulalu	Perkerra	Chakama
Develop and maintain irrigation systems	√	√	
Lease land to private companies or individuals	√	√	
Provide capital for farm inputs		√	
Issuing licenses and permits	√	√	
Regulate water use	√	√	
Extension services, i.e., soil testing, technological and agro-chemical services, crop inspection		√	√
Regulate and monitor cropping programs		√	
Provide subsidised fertiliser, seeds, and other farm inputs		√	√
Provide farm equipment, i.e., water pumps, pipes, powered LPG, petrol, or diesel		√	√
Total number of responsibilities/roles	4	10	3

Source: Author, 2025.

Table 1 shows that the roles of government varied according to food production outcomes in the three schemes. Of the ten responsibilities or roles identified, the government performed all of them, with the highest at Perkerra (PE), four at Galana-Kulalu (a Lease Contract), and at least three at Chakama (a Community-Based initiative). Both Perkerra and Chakama, which had the highest and lowest government involvement, respectively, saw improved food production, while Galana-Kulalu, with low government involvement, experienced low or poor food production. The variation in food production reflected differences in the level of intervention by the government and/or private partners in each scheme. Whereas

the government supplied water pipes and pumps to the Chakama scheme, at both Perkerra and Galana-Kulalu irrigation schemes, the government was involved in the development of extensive infrastructure, including water dams and canals that transported water from the main rivers to the farms.

The development of irrigation infrastructure in both the Perkerra and Galana-Kulalu schemes increased the government's responsibilities and involvement in the two schemes, unlike in Chakama, where private partners were responsible for infrastructure development and water regulation on the farms. Additionally, in both Perkerra and Galana-Kulalu, the government owned the land. It leased it to farmers according to the terms of the contract agreement, whereas in Chakama, land ownership was held by individual farmers. Whereas the government provided farm inputs to farmers in the Chakama and Perkerra irrigation schemes, in Galana-Kulalu, it did not, as this was expected to be the function of the lessee.

An emerging scenario involved varying levels of government involvement, which led to high production outcomes; however, medium involvement resulted in lower production. This suggested that factors beyond the form of a PPP influenced production. These factors could include the number of partners, both public and private, as well as the collaboration and linkages established. Regardless of the form, there were more frequent and enhanced interactions and collaborations among partners, leading to increased activities in both the Perkerra and Chakama irrigation schemes. Overall, the governance of these interactions played a significant role in shaping the production outcomes. In the Perkerra scheme, government responsibilities extended beyond regulation to facilitation, in accordance with its legal mandate. Additional roles such as infrastructural development, extension services, and dispute resolution were more prominent in schemes where land was owned by the government, as in Perkerra, followed by leased land as in Galana-Kulalu, and least in Chakama, where land was privately owned. Consequently, the PE model of PPP, exemplified by Perkerra, attracted more government intervention than lease contracts like Galana-Kulalu or community initiatives like Chakama. The government's role was clearer in Perkerra, which contributed to better food production performance compared to Galana-Kulalu, which had scarcely taken off.

The number of roles and responsibilities of the government alone was not enough to guarantee production. Equally important was the governance of engagements involving private partners in the schemes. Therefore, clarity in the terms of reference and the operationalisation of key performance indicators through formal contracts ensured improved food security. Where contracts were unclear, as in Galana-Kulalu, conflicts and misunderstandings were likely to arise, leading to compromised production and/or discontinuation of partnerships. However, where there was mutual trust, such as in community initiatives, combined with government support and personal accountability, production still increased. To that extent, the higher the government's involvement, the greater the chances of enhanced food production, provided vibrant private sector participation is allowed.

4.2. The Role of Private Partners in Food Production at the Schemes

To establish the roles played by private partners in the three schemes of Galana-Kulalu, Perkerra, and Chakama, respondents were asked to describe the roles of private partners in each scheme. The responsibilities of the private partners across the schemes were summarised and presented in **Table 2**. Scores of 1 - 10 were used to interpret the level of involvement of the private partners, where a score of 1 - 4 was considered low, a score of 5 - 7 medium, while a score of 8 - 10 was considered high.

Table 2. Roles of private partners in the three irrigation schemes.

Private Responsibilities	Irrigation Schemes		
	Galana Kulalu	Perkerra	Chakama
Production/planting/seed multiplication	√	√	√
Technology and innovation	√	√	√
Irrigation infrastructure sustenance	√		√
Advancing farm inputs	√	√	√
Transactional, i.e., entering into contracts	√	√	√
Providing fertilizer and agrochemicals	√	√	√
Developing cropping programme	√	√	√
Mobilising farmers for training and kilimo biashara		√	√
Land			√
Total	7	6	8

Source: Author, 2025.

Table 2 shows that private partners played different roles, either as food producers or farm input suppliers, in all three irrigation schemes. It indicates that Chakama had the highest number of roles performed by private partners, with eight (8), followed by Galana-Kulalu with seven (7), and finally Perkerra with six (6). This suggests that while both Galana-Kulalu and Perkerra had medium involvement of private partners, Chakama experienced high involvement. With high private sector involvement, Chakama also achieved high food production. Although both Perkerra and Galana-Kulalu irrigation schemes exhibited medium levels of private sector involvement, only Perkerra showed an improvement in food production. The emerging scenario indicates that other factors beyond medium private sector involvement influenced food production. These factors included the governance of the collaborations and interactions within each scheme. The private partnerships involved mobilisation of small-scale farmers for training to build their capacity for agri-business (locally referred to as *Kilimo Biashara* in Swahili), pooling resources for water piping to cover a wider planting area, as seen in Chakama; and supplying farm inputs to farmers, such as seed multiplication, fer-

tilisers, and agrochemicals, as typical for Perkerra. In Galana-Kulalu, private partners were engaged in food production and irrigation infrastructure maintenance, aiming to increase maize production in the country. In both Perkerra and Galana-Kulalu, private partners participated in sustaining irrigation infrastructure.

The roles of the private sector in various forms of PPP initiatives mainly involve production and capital investment. The roles of partners also shape the nature of arrangements between private actors, whether need-based, informal, or formal, with different levels of success in achieving food security outcomes. The roles of private partners in each scheme vary depending on the form of PPP. For example, the roles of private partners in the lease model of PPP at Galana-Kulalu differ from those of the PE at Perkerra, where multiple private sector actors influence each partner's role. In the PE, stakeholders perform specialised roles ranging from planting to harvesting, while in the lease model of PPP, a single private entity is responsible for various functions during the production stages. Conversely, the community-based PPP shows that most private partners are active during the planting and harvesting phases. Overall, private sector roles mainly include maintaining irrigation infrastructure, providing farm inputs, and production. The involvement of private partners is greater at Chakama, followed by Galana-Kulalu, and least at Perkerra, where private sector activities are closely linked with government operations. In the schemes at Perkerra and Chakama, private partners contribute subsidised fertilisers and other farm inputs; however, only at Chakama are private actors involved in regulating water supply throughout the cropping season and repairing irrigation infrastructure. As a result, the number of stakeholders active in a given scheme influences the role of private partners. Therefore, a public enterprise such as the Perkerra scheme is likely to attract fewer private partners with diverse roles compared to either a lease contract like Galana-Kulalu or a community initiative like Chakama. Additionally, farmers in the Chakama irrigation scheme enjoy greater participation in decision-making, which enables higher output compared to those in Perkerra and Galana-Kulalu.

Furthermore, the form of PPPs shaped the role of private partners, thereby influencing food production as long as suitable governance structures were in place, such as clear terms of reference and the operationalisation of key performance indicators through formal contracts, as well as the number of partners involved in the schemes. However, in cases where contracting authorities were unclear, like in Galana-Kulalu, conflicts and misunderstandings arose, leading to reduced production and/or termination of partnerships. Similarly, in situations with non-contractual arrangements lacking clear key performance indicators, such as during the second planting season in Perkerra, performance was also hindered. Conversely, where mutual trust existed, as in the community initiative with collective responsibility, production continued to increase. To that extent, the clearer the roles of private partners, the greater the likelihood of increased food production. Conversely, greater government involvement often reduced the likelihood of roles and responsibilities being fulfilled by private partners, thereby decreasing food

production.

4.3. Comparative Analysis of the Roles Played by Public and Private Partners in Food Production at the Schemes

Public and private partners played different roles in various capacities within the schemes. These roles, whether taken individually or jointly, influenced food production outcomes. To understand how the mix of public and private involvement in an enterprise affected food production in the three schemes of Galana-Kulalu, Perkerra, and Chakama, a comparative analysis of the responsibilities of public and private partners at each scheme was conducted, with the findings shown in **Table 3**. The analysis used a score ranging from 1 to 10 based on the identified roles. These scores were then grouped into categories of low (1 - 4), medium (5 - 7), and high (8 - 10) to describe the levels of involvement or responsibility of public and private partners in the three schemes.

Table 3. A comparative analysis of responsibilities of public and private partners in the three schemes.

Government Responsibilities	Irrigation Schemes					
	Galana Kulalu		Perkerra		Chakama	
	Public	Private	Public	Private	Public	Private
Development of irrigation infrastructure, i.e., water dam and conveyance systems	√		√			√
Lease land to users, i.e., production companies and individuals	√		√			√
Mobilization of capital for production		√	√	√		√
Regulation—Licensing and issuance of permits	√		√			
Regulating the supply of water throughout the cropping season	√	√	√			√
Extension, i.e., soil testing services, technological and agro-chemical services, inspecting crops		√	√	√		√
Monitoring of cropping programs		√	√	√		√
Provision of farm inputs, i.e., fertilizer, seeds		√	√	√	√	√
Provision of technology and innovation		√	√	√		√
Provision of farm equipment, i.e., water pumps, pipes, powered LPG, petrol, or diesel				√	√	√
Total number of responsibilities/roles	4	6	9	6	2	9
Level of responsibilities/roles	Low	Medium	High	Medium	Low	High

Source: Author, 2025.

Table 3 illustrates varying levels of responsibility among public and private partners across the three schemes: Galana-Kulalu, Perkerra, and Chakama. It indicates that Perkerra, a Public Enterprise (PE), had a high level of government responsibility and moderate involvement from private partners in production, resulting in increased food output. Chakama, a community initiative, exhibits low

government involvement but high private sector participation in production. Conversely, Galana-Kulalu, with low government involvement and moderate private sector engagement, recorded low food production. This suggests that government responsibility in irrigation schemes is unavoidable and should be complemented by the appropriate duties of private partners. The table clearly shows that the presence of irrigation infrastructure and regulatory functions had a significant impact on food production within the schemes. Inadequate irrigation infrastructure and regulatory oversight contributed to poor yields at Galana-Kulalu, where unclear government roles hindered progress. The partial and indirect state involvement in these functions at Chakama correlated with improved food production. While limited government responsibility benefited Chakama, it proved detrimental at Galana-Kulalu. Meanwhile, effective government operations in managing the responsibilities of both public and private partners in Perkerra contributed to enhanced production at that scheme.

Therefore, it was not necessarily the level of state responsibility in a partnership per se, but the effectiveness of governance that affected food production within schemes. There was no direct link between the level of government responsibility and food production in the scheme. That is why government effectiveness succeeded in Perkerra, while its ineffectiveness was responsible for the failure at Galana-Kulalu, where private partners could not replace the role. However, the absence of a government regulatory role allowed the private partner to proceed with the status quo, thereby increasing food production in Chakama.

5. Discussion of Findings

The paper's findings highlight the governance of public-private partnerships within the framework of public choice theory, which is based on self-interest and cost-benefit analysis. The government established governance structures that brought together different interest groups and actors. These could include public entities, private companies, civil society groups, individual farmers, smallholder farmer associations, and non-governmental organisations. They collaborate in varying proportions, numbers, and capacities under public-private partnerships to deliver services in food production that the government might not have been able to achieve on its own. Such arrangements create different levels of involvement for both the public and private sectors, serving as strategies employed by governments to foster valuable collaborations with the private sector for the delivery of public services and infrastructure development (Greve & Hodge, 2013). Within this context, the study's discussions indicated that proper governance of partner interactions, alongside government responsibility rather than ownership of the enterprise, determines the success of food production. The less the government is involved in governance and production, the greater the food output, as evidenced by community initiatives involving appropriate private sector interventions.

The effectiveness of the government's role depended on its capacity to set and enforce rules, policies, and regulations. However, sometimes the government had

limited capacity. The more involved the government was in the scheme, the more regulations and procedures there were, which led to duplication of roles and unclear responsibilities, ultimately failing to deliver the expected policy outcomes. This finding aligns with the argument by Rodrigo that policy implementation may fail due to conflicts of interest, especially when public regulatory agencies tend to take on multiple roles as both regulators and service providers (Rodrigo et al., 2009). The argument was further supported by Callens & Kljin, who noted that continuous adjustments to project provisions often caused delays due to the dynamic nature of contracts (Callens & Kljin, 2024), resulting in deviations from planned or scheduled outcomes. Similarly, Kaan & Liese found that, despite government support and policy development, the challenge to effective lease implementation was the failure of governance to set and enforce food security policies and regulations. For example, in Southern African states such as Malawi, Zambia, Zimbabwe, Lesotho, and Mozambique, the poor implementation of food and agricultural policies led to the failure of these policies, creating conflicts between the interests of ruling elites and the welfare of citizens (Kaan & Liese, 2011). In the same vein, Egypt successfully utilised a lease form of PPP through Design-Build-Operate (DBO) for thirty years to increase food production in the West Delta Project (Baietti & Abdel-Dayem, 2008). Similarly, the Ghanaian government successfully partnered with the private sector under the voucher-based system to provide fertiliser subsidies to small-scale farmers, thereby increasing food production in 2008 (Nuhu et al., 2023).

Therefore, while in the PE form of PPP, the role of government was greater, production was high due to the vibrancy of the private partners' activities in the scheme. This finding supports the conclusion by Callens & Kljin (2024) that the governance structure affects the coordination and management of partnership activities by providing a "shared participant-governed" structure, which fosters trust among partners for all stakeholders, thereby increasing participation and accountability. Additionally, Loriente argued that partners operated within a legal framework, but the partnership was unregulated (Loriente, 2015). To this end, the success of the PE form of PPP depended more on the governance structure than on the contract agreements. In Perkerra, the management of production activities was decentralised down to the block level, all of which were coordinated by the National Irrigation Authority (NIA), with clear lines of accountability and responsibility among all stakeholders and actors. The scenario resonated with the case in Türkiye, where positive results were realised when the government adopted Operations and Maintenance (O&M) in five irrigation schemes, Batman-Silvan, Devegeçidi, Derik-Kumluca, Nusaybin-Cagdas, and Cinar-Goksu, in the Gediz Basin, transferring the management of the schemes to users (Cakmak et al., 2004). Production was negatively affected in instances where accountability and responsibility lines were not agreed upon, especially regarding who between NIA and Marigat Farmers Cooperative Society (MFCS) could sign contracts with seed merchants and farmers.

The more cooperative the relationships among the partners, the higher the chances of increasing food production. To achieve policy outcomes in a PPP, governments implement regulatory tools such as legal regulations, monitoring and evaluation frameworks, and information-sharing strategies to ensure transparency among partners (Hodge & Greve, 2007). Despite challenges in partner relationships, efforts to coordinate stakeholder activities in PPP initiatives are essential for successful food production. As Obosi (2018) notes, once PPPs are implemented, they need to be regulated to incentivise the private sector and protect consumers from monopolistic abuse, which can be costly and challenging. The roles of government actors and private partners depend on the capital needed, the contractual nature, and government policy. While roles are allocated based on the contract, it is impossible to predict the outcomes of certain agreements and partner behaviour. This aligns with Verhoest et al.'s (2024) argument that governance structures influence the coordination and management of partnership activities, with equal engagement and contribution from all stakeholders enhancing participation and accountability. Therefore, the success of the PE form of PPP relies heavily on its governance structure. In community-based PPPs, the government's role includes providing irrigation equipment, farm inputs, and extension services, including training for farmers as needed, supporting Loriente's view that the community form of PPP aligns with public benefits, as the government's role varies with the number of involved actors or stakeholders (Loriente, 2015). Consequently, private partners primarily focus on infrastructural maintenance and food production. The number of active stakeholders influences partners' roles and their capacity for faster decision-making, thereby improving service delivery through increased diversity and initiatives within the project. This explains why community initiatives often produce faster and more effective outcomes compared to either a Public Enterprise or a Lease contract.

6. Conclusion

The article concludes that, although the paradox of PPP policy dynamics is obscured by the ownership and responsibilities of partners in the food production process, the core issue lies more with the governance of interactions within partnerships than with control among the partners. It also concludes that, regardless of the form of PPP adopted, some level of government involvement is necessary, whether low, medium, or high. However, the most successful arrangements are those with more private sector involvement and at least a medium level of responsibility for the public partner(s), creating conditions that enable well-coordinated, flexible interactions with clear contractual arrangements among partners in the food production process. This leads to resource mobilization, sharing of technology, sharing of risks, and reduced conflicts. Although it emerges that government responsibilities mainly covered infrastructure development, regulation, and land ownership, and the roles of private partners were primarily facilitative and innovative in terms of technology, the study did not establish which factors or respon-

sibilities most significantly influenced production. Therefore, the paper recommends further research into how partner responsibilities affect production outcomes. It is further recommended that policymakers should prioritize the design of robust governance frameworks over the selection of a specific PPP model.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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