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# Challenges Faced by Smallholder Irrigation Farmers in Zimbabwe in Relation to Input Supply

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**Abstract: This study examines the challenges faced by smallholder irrigation farmers in Zvimba District, Zimbabwe, focusing on their access to essential agricultural inputs such as seeds, fertilizers, and irrigation equipment. Through a combination of online questionnaires and in-depth interviews with smallholder farmers, Irrigation Management Committees (IMCs), and Agritex officers, the study identifies key barriers, including high input costs, geographical constraints, inconsistent input supply, and limited access to financial services. These challenges significantly hinder the productivity and sustainability of smallholder irrigation farming, limiting farmers' ability to increase crop yields, improve food security, and contribute to poverty alleviation. The study emphasizes the need for targeted interventions that address these barriers and enhance input access to support smallholder farmers. The findings also offer recommendations for future research, including expanding the geographical scope of the study and conducting longitudinal research to assess the long-term impact of improved input access on farm productivity. This study provides essential insights for policymakers and stakeholders working to improve the conditions for smallholder farmers and foster agricultural development in Zimbabwe.**

***Keywords:*** *Smallholder Irrigation Farming; Agricultural Inputs; Input Access Challenges; Food Security and Poverty Alleviation.*

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## I. INTRODUCTION

Irrigation is a key factor in enhancing agricultural productivity and ensuring food security, especially in sub-Saharan Africa, where unpredictable rainfall and climate change challenges severely impact rain-fed farming systems (Klinnert et al., 2025). Smallholder irrigation farming is particularly important in regions like Zimbabwe, where the majority of farmers rely on irrigation to maintain their crop yields. In Zimbabwe, smallholder farmers face varying levels of success depending on their access to irrigation systems, with many struggling to secure consistent water sources and the necessary inputs for effective irrigation. As climate patterns become more erratic, the importance of irrigation as a tool to buffer against crop failure due to droughts or inconsistent rainfall has grown (Mahmood et al., 2015). This makes irrigation not only a vital strategy for increasing agricultural productivity but also for improving household incomes, particularly in areas that are arid or semi-arid.

However, the success of smallholder irrigation farming in Zimbabwe is significantly hampered by limited access to essential agricultural inputs, such as irrigation equipment, seeds, and fertilizers (Mupaso et al., 2024). Many farmers report that the cost of these inputs is prohibitively high, and the availability of quality inputs is inconsistent. High input costs are largely attributed to economic instability, the lack of adequate government support, and the monopolistic tendencies of input suppliers (Clapp et al., 2025). These factors contribute to a situation where even when inputs are available, they remain out of reach for most smallholder farmers, further exacerbating poverty and food insecurity.

This study focuses on smallholder irrigation farmers in Mashonaland West Province, specifically Zvimba District, Zimbabwe, to explore the challenges they face in accessing these critical inputs. Previous studies have shown that limited access to affordable and high-quality inputs is a major constraint to the productivity and sustainability of irrigation schemes. Without access to these resources, farmers are unable to maximize the potential of their irrigation systems,

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which in turn affects their crop yields and the overall sustainability of their farming operations. This study aims to analyze how these barriers to input access impact the sustainability of irrigation schemes, the productivity of smallholder farms, and their ability to contribute to food security and poverty alleviation in the region.

The study employs the PICO framework (Population, Intervention, Comparison, and Outcome) to guide the research (Eldawlatly et al., 2018). The population of focus includes smallholder irrigation farmers in Zvimba District, with the intervention focusing on their access to agricultural inputs, including irrigation equipment, seeds, and fertilizers. By comparing farmers with greater access to inputs to those with limited or no access, the study will assess the impact of input access on the sustainability of irrigation schemes and on productivity levels. The ultimate goal is to understand how access to inputs influences food security and poverty alleviation in smallholder farming communities.

This research utilizes a combination of primary data collected through online surveys and in-depth interviews with smallholder farmers, Irrigation Management Committees (IMCs), and Agritex officers (Mdemu et al., 2023). Secondary data from peer-reviewed articles, government reports, and case studies on smallholder irrigation and input access in Zimbabwe and other developing countries further enrich the analysis. The diverse data sources allow for a comprehensive understanding of the challenges faced by smallholder farmers and offer evidence-based recommendations for improving input access.

The findings of this study are expected to provide important insights into the barriers to input access faced by smallholder irrigation farmers in Zimbabwe. Addressing these barriers is crucial for improving the productivity and sustainability of irrigation systems. By identifying the key challenges and offering potential solutions, the study aims to inform policies and interventions that can enhance access to affordable and quality inputs, ultimately contributing to the overall sustainability of smallholder irrigation farming, improved food security, and poverty reduction in Zimbabwe.

## II. RESEARCH METHODOLOGY

The PICO analysis for this study is structured as follows (Chidewe, 2026; Miriti and Lambarraa-Lehnhardt, 2025): Population (P) – smallholder irrigation farmers in Mashonaland West Province, Zvimba District; Intervention (I) – access to agricultural inputs including seeds, fertilizers, and irrigation equipment; Comparison (C) – farmers with limited or no access to inputs versus those with better access; and Outcome (O) – sustainability of irrigation schemes, productivity levels, and contribution to food security and poverty alleviation. The study material selection involved peer-reviewed articles, government reports, and case studies focusing on smallholder irrigation and input access in Zimbabwe and similar developing countries (Fig. 1). Inclusion criteria comprised studies published within the last 15 years, conducted in sub-Saharan Africa, and focused on smallholder irrigation and input supply challenges. Exclusion criteria included studies outside Africa, non-peer-reviewed sources, and research not addressing input access or irrigation sustainability. This PICO framework guided both the formulation of the research question and the selection of relevant study materials to ensure a focused and evidence-based review (Martin, 2019).

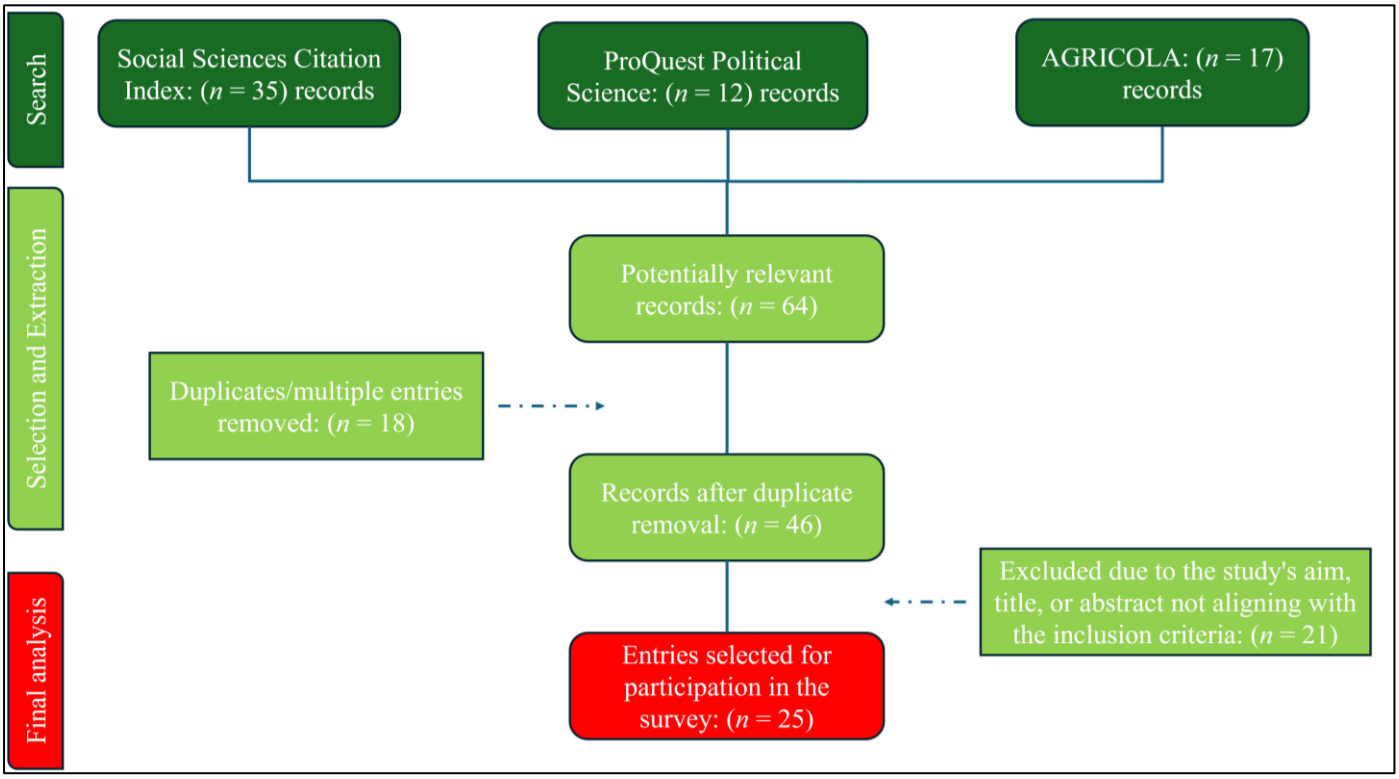


Fig 1 Selection Criteria for Agricultural Studies.

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An online questionnaire survey and online in-depth interviews were conducted systematically between August 2024 and September 2025 to gather data from smallholder farmers in Mashonaland West Province, Zvimba District, Zimbabwe. The evidence for this research is drawn from a sample of 330 participants, which included 205 smallholder farmers, 68 members of Irrigation Management Committees (IMCs), and 57 Agritex officers. This sample was selected to ensure representation from a variety of stakeholders involved in irrigation farming in the Zvimba district. The geographic coordinates of Zvimba District are 17.6833° S, 30.1000° E, providing a specific geographical context for the study.

To ensure a robust data analysis, Origin 2021 software was used to generate the graphs and charts, enabling a clear visual representation of the findings (Chidewe, 2025). Furthermore, thematic framework analysis was employed to interpret the patterns identified from the farmer interviews, allowing for an in-depth examination of the challenges and experiences related to irrigation input access (Ahmed et al., 2025). This combination of quantitative and qualitative methods provides a comprehensive understanding of the factors affecting smallholder irrigation farmers in the region.

## III. RESULTS AND DISCUSSION

- *Demographic Profile and Questionnaire Responses of the Participants*

The demographic profile of the study participants included information on their gender, age, and occupation. These characteristics are crucial in understanding the challenges faced by farmers in accessing irrigation inputs. Evidence from the study reveals that 132 females (40%) and 198 males (60%) participated, highlighting a greater involvement of men in smallholder irrigation farming compared to women (Fig. 2). This gender disparity indicates that women may face more barriers to entry in irrigation farming, which could affect their overall productivity. Similar challenges have been observed in studies on female farmers in Northern Ghana (Bryan and Mekonnen, 2023).

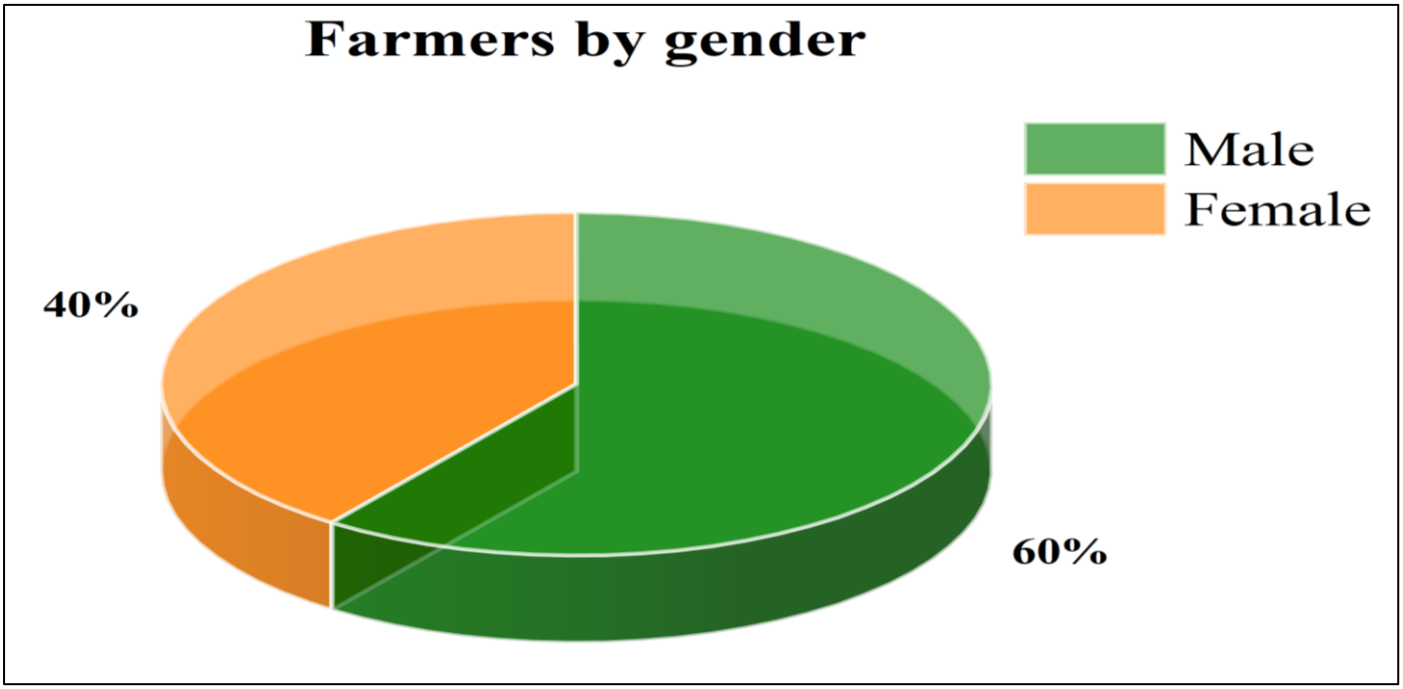


Fig 2 Respondents by Gender.

The age distribution of the participants shows that the 31-40 years age group was the most dominant, contributing over 50% of the respondents, followed by those aged 41 and above, and the 25-30 years group (Table 1). This age distribution suggests that middle-aged individuals are more actively involved in irrigation farming, possibly due to their greater experience and access to resources. In terms of occupation, smallholder farmers made up the largest group, with over 205 respondents, followed by irrigation specialists and Agritex officers (Fig. 3). This occupational breakdown highlights the involvement of various stakeholders in the irrigation system, with smallholder farmers being the primary group driving irrigation efforts (Lowder et al., 2025).

Table 1 Respondents by Age

| Age (years) | Frequency | Percentage (%) |
|---|---|---|
| 25-30 | 56 | 17% |
| 31-40 | 165 | 50% |
| 41 and above | 109 | 33% |
| TOTAL | 330 | 100% |

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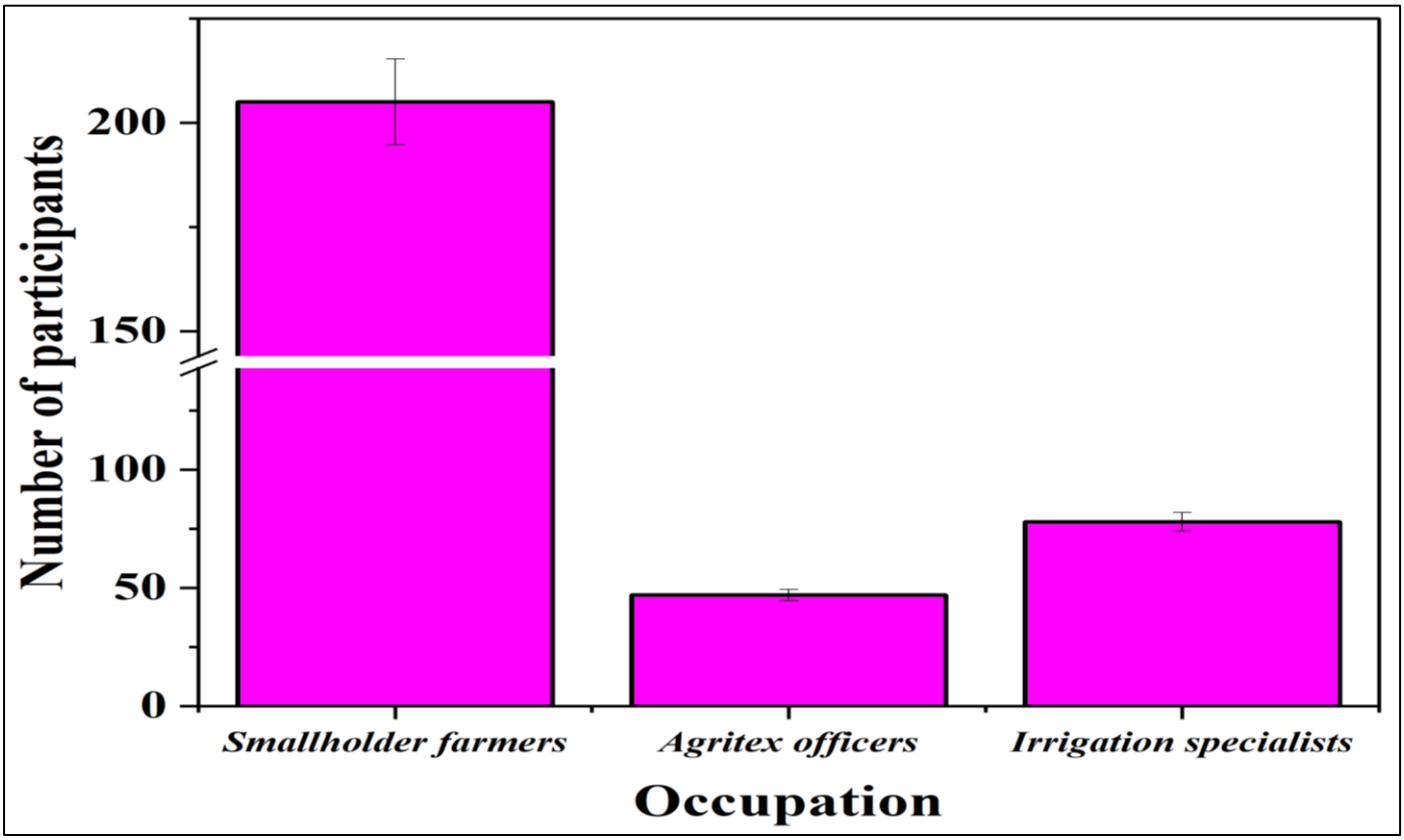


Fig 3 Respondents by Occupation.

In terms of input challenges, questionnaire responses showed that 60% of respondents cited high input costs as a major barrier to accessing inputs, particularly seeds, fertilizers, and irrigation equipment (Table 2). This finding underscores the financial strain that high input costs place on smallholder farmers, limiting their ability to improve productivity. Additionally, 15% of respondents reported difficulties in accessing inputs due to geographical constraints, with many farmers needing to travel long distances to purchase necessary resources. This suggests that poor infrastructure and limited access to markets further exacerbate the challenges faced by farmers.

Furthermore, 20% of respondents expressed frustration with the inconsistent supply of inputs, noting that delays or disruptions in the availability of inputs had negatively affected their farming schedules. This finding indicates the vulnerability of smallholder farmers to disruptions in supply chains, which can lead to delays in planting and harvesting, ultimately affecting yields. Other challenges included the lack of access to credit facilities (5%), limited availability of quality inputs, and inadequate government support. These barriers collectively highlight the multifaceted challenges that smallholder farmers face in Zimbabwe, which can impact their productivity, profitability, and overall well-being.

Table 2 Input Supply Challenges

| Input supply challenges | Responses (%) |
|---|---|
| High input costs | 60% |
| Geographical constraints | 15% |
| Inconsistent input supply | 20% |
| Lack of credit facilities and inadequate Government support | 5% |

➢ *Challenges Faced by Smallholder Irrigation Farmers*

The mindset of farmers, particularly their subsistence-oriented approach, plays a significant role in shaping the challenges they face. The age distribution of the participants revealed that older farmers tend to have more exposure to irrigation practices, informal networks, and traditional coping strategies. Younger farmers, on the other hand, are quicker to adopt new inputs or technologies (Miine et al., 2023). This age-based distinction influences physical ability, labor delegation, and how inputs and credit are managed within households. Older farmers often rely on more traditional, subsistence farming methods, while younger farmers are more likely to adopt modern farming techniques, which affects their productivity and engagement with commercial agriculture (Sutherland et al., 2019).

Occupation also plays a crucial role in understanding the dynamics of input access and adoption. The study highlighted that Agritex officers, who serve as supply intermediaries, offer valuable insights into procurement, distribution, and systemic bottlenecks that farmers face. Irrigation specialists, on the other hand, provide scientific knowledge to

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smallholder farmers, assisting them in managing irrigation systems. These two roles are essential for bridging the gap between smallholder farmers and the necessary agricultural inputs. Agritex officers help navigate policy and distribution issues, while irrigation specialists support the practical implementation of modern irrigation technologies.

Zimbabwe's agricultural sector is characterized by a dual structure, with a large communal smallholder sector and a smaller commercial sector (Makate and Hanyani-Mlambo, 2025). Communal lands in Zimbabwe account for around 42% of land use, while commercial farms cover about 36.2% of land use. In districts like Zvimba, smallholder farming is predominant, contributing 80-90% of production. The economy of Zvimba is largely subsistence-based, with crops like maize, vegetables, and groundnuts being central. This reliance on subsistence farming restricts farmers from participating in larger commercial markets, limiting their opportunities for income generation and sustainable agricultural development. These dynamics reflect the broader pattern in Zimbabwe, where the majority of farmers operate at a subsistence level, leaving a small minority to engage in market-oriented farming. This trend is similar to that seen in South Africa, where the agricultural sector is also dualistic, with a small number of commercial farmers dominating production and a much larger number of subsistence farmers making up the majority of agricultural households. In South Africa, commercial farms account for a small percentage of the total, while millions of households are engaged in subsistence farming, reflecting the challenges that smallholder farmers face in both countries.

Limited access to affordable inputs remains one of the most significant challenges for smallholder irrigation farmers in Zimbabwe. A large majority of respondents (60%) identified high input costs as the primary barrier. They attributed the high costs of seeds, fertilizers, and irrigation equipment to economic instability, lack of government support, and monopolistic tendencies among input suppliers. These findings underline how financial barriers prevent farmers from accessing essential resources, which in turn restricts their ability to increase productivity and sustain their farms.

Geographical constraints also exacerbate these challenges. About 10% of respondents reported that the lack of reliable transportation networks and input supply stores in rural areas made it difficult for them to access inputs. This geographical isolation forces many farmers to travel long distances, which delays their ability to plant crops on time, affecting their yields and farming schedules.

Inconsistent supply of inputs was another challenge, with 20% of respondents expressing frustration over the unpredictability of input availability. These inconsistencies often caused delays and disruptions, making it difficult for farmers to plan their agricultural activities effectively. Without a reliable and steady supply of seeds, fertilizers, and irrigation equipment, farming operations become less predictable, leading to lower productivity and financial losses.

Moreover, 5% of respondents highlighted the lack of access to credit facilities and insurance services, which further compounded their difficulties. Without access to credit, farmers are unable to purchase the necessary inputs in the first place, and the absence of insurance leaves them vulnerable to risks such as droughts, floods, or pests. This lack of financial support reduces farmers' ability to invest in modern technologies or manage unforeseen risks effectively.

The challenges highlighted by the respondents underscore the urgent need for targeted interventions to improve the accessibility of affordable inputs. These challenges also point to the necessity for more supportive policies and programs to enhance the overall sustainability and productivity of smallholder irrigation farming in Zimbabwe. By addressing the barriers to input access, such as high costs, geographical constraints, inconsistent supply, and lack of credit, it would be possible to improve the livelihoods of smallholder farmers and foster long-term agricultural development.

## IV. CONCLUSION

This study has highlighted the significant barriers faced by smallholder irrigation farmers in Zvimba District, Zimbabwe, particularly the challenges related to accessing essential agricultural inputs such as seeds, fertilizers, and irrigation equipment. The findings reveal that high input costs, geographical constraints, inconsistent input supply, and limited access to financial services are the primary obstacles preventing farmers from optimizing their irrigation systems and enhancing productivity. These challenges not only limit the farmers' ability to increase crop yields but also hinder the sustainability of irrigation schemes, thus affecting food security and contributing to poverty in the region.

Given the critical role of irrigation in improving agricultural productivity, especially in areas vulnerable to climate change, addressing these barriers is essential for the long-term viability of smallholder irrigation farming. The study has underscored the need for targeted interventions that reduce input costs, improve infrastructure, ensure a more consistent supply of agricultural resources, and expand access to credit facilities for smallholder farmers.

## RECOMMENDATIONS FOR FUTURE STUDIES

Expand Geographical Coverage: Future research should expand to include smallholder farmers in other regions of Zimbabwe and sub-Saharan Africa, comparing the challenges faced by different farming communities. This would provide a broader understanding of how regional differences in infrastructure, economic conditions, and policy impact smallholder irrigation farming, thus allowing for more tailored and context-specific interventions.

Longitudinal Studies on Input Access and Farm Productivity: Long-term studies should be conducted to assess how changes in input access over time influence the sustainability of irrigation systems and the productivity of smallholder farms. Such research would provide valuable

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insights into the effectiveness of interventions aimed at improving input access and could help track progress towards achieving food security and poverty alleviation in rural areas.

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