
AN OUTCOME EVALUATION OF SMALL GARDEN IRRIGATION AS A CATALYST FOR FOOD SECURITY, INCOME AND SOCIAL CAPITAL IN SEMI-ARID MASVINGO PROVINCE, ZIMBABWE (2020–2024)

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ABSTRACT

Recurrent drought, erratic rainfall and rain-fed dependency continue to undermine food security in Zimbabwe's semi-arid south. Small-scale irrigated gardens have been proposed as a low-cost, community-based pathway to climate resilience, yet rigorous outcome data from sub-Saharan smallholder contexts remain scarce. This study evaluates the socio-economic, participatory, and sustainability outcomes of the Small Garden Irrigation Project (SGIP) implemented by OCCIZIM in Gutu, Bikita and Masvingo districts of Masvingo Province between 2020 and 2024. A convergent parallel mixed-methods design grounded in Social Capital Theory was employed. From a sampling frame of 160 beneficiary households, 113 were drawn using proportional stratified random sampling (95% confidence; 5% margin of error). Quantitative data were collected via structured household surveys and analysed in SPSS using descriptive and cross-tabular statistics. Qualitative data were generated through key informant interviews (KIIs), focus group discussions (FGDs) and document review, and analysed thematically. Triangulation across data sources was used to enhance validity. Respondents were predominantly female (65.49%) and of prime working age (64.60% aged 26–45). The intervention was rated highly or very highly effective for socio-economic improvement by 79.65% of respondents, with reported gains of approximately 60% in crop yields, 45% in household income, and 35% in vegetable and fruit consumption. Income-generation opportunities and healthcare access were each rated as having high or very high

impact by 87.61% of households. Community engagement was rated high or very high by 85.42% of respondents, and 87.61% indicated that SGIP had contributed much or very much to community cohesion and empowerment. Sustainability and scalability were each rated very or extremely positively by approximately 89% and 85% of households respectively. The SGIP demonstrates that community-anchored, irrigation-based interventions can simultaneously deliver gains in productivity, income, nutrition, and social capital in drought-prone smallholder settings. Sustaining and scaling these gains will require diversified financing, deliberate inclusion of marginalised groups, and adaptive management against political and macroeconomic shocks. The findings offer an empirically grounded model for SDG 2 (Zero Hunger), SDG 5 (Gender Equality) and SDG 13 (Climate Action) implementation across semi-arid sub-Saharan Africa.

KEYWORDS: Small-scale irrigation; food security; community development; social capital; sustainability; Masvingo; Zimbabwe; mixed-methods evaluation.

1. INTRODUCTION

Food insecurity remains a defining development challenge of the twenty-first century. The Food and Agriculture Organization estimates that more than 800 million people were undernourished worldwide in 2020, with sub-Saharan Africa carrying a disproportionate share of the global burden (FAO, 2023). Within the region, more than 23% of the population was reported to be malnourished, driven by interlocking pressures of climate variability, conflict, land degradation and weak rural infrastructure. Zimbabwe's semi-arid south exemplifies these dynamics: erratic rainfall, recurrent drought and reliance on rain-fed agriculture have repeatedly produced crop failure, water scarcity and acute food insecurity (ZimVAC, 2020; Makate et al., 2019).

Masvingo Province, located in south-eastern Zimbabwe, is among the most drought-exposed regions of the country. Smallholder agriculture, which forms the backbone of rural livelihoods, is highly vulnerable to climate shocks because of inadequate irrigation infrastructure, depleted soils and weak safety nets (Mushore & Munyanyi, 2023; Chikodzi et al., 2018). In response to these structural vulnerabilities, the Organization for Community Collaboration in Zimbabwe and Masvingo (OCCIZIM) initiated the Small Garden Irrigation Project (SGIP) in 2020. Implemented across Gutu, Bikita and Masvingo districts, the project sought to enhance food security, household income and community resilience through low-cost, community-managed small-scale irrigation.

While the literature has documented the potential of small-scale irrigation for poverty alleviation (Mekonnen et al., 2020; FAO, 2020), three gaps persist. First, most published evaluations focus on short-term productivity gains and pay limited attention to longer-term socio-economic transformation and community ownership (Cameron & Boesen, 2022). Second, sustainability and scalability are widely cited as objectives but rarely measured empirically in semi-arid sub-Saharan settings. Third, the contribution of irrigation projects to community cohesion and empowerment, particularly for women, remains under-theorised in outcome-evaluation literature (Kabeer & Sweetman, 2022).

This paper addresses these gaps by presenting an outcome evaluation of the SGIP between 2020 and 2024. Anchored in Social Capital Theory (Putnam & Sander, 2023; Lin, 2017), the study examines four interrelated questions: (i) the extent to which the SGIP improved the socio-economic status of participating households; (ii) the level of community engagement and its contribution to cohesion and empowerment; (iii) the sustainability and scalability of the intervention; and (iv) the strengths, weaknesses, opportunities and threats (SWOT) of the implementing approach. The findings offer empirical evidence to inform programming for SDG 2 (Zero Hunger), SDG 5 (Gender Equality) and SDG 13 (Climate Action) in comparable drought-affected geographies.

2. Theoretical Framework

The evaluation is grounded in Social Capital Theory, which posits that the density and quality of social networks, norms of reciprocity and relational trust enable communities to mobilise resources and respond to collective challenges (Putnam & Sander, 2023; Coleman, 1988; Lin, 2017). The framework distinguishes between bonding capital — strong ties within homogeneous groups — and bridging capital, which links diverse groups and external institutions (Szreter & Woolcock, 2021). Both forms are theorised to be central to the success of community-managed natural-resource interventions because they shape information flow, collective action and the legitimacy of local governance arrangements (Pretty, 2018).

In the context of the SGIP, Social Capital Theory is well suited to four analytical tasks. First, it provides a lens through which to interpret household-level socio-economic gains as a function not only of inputs but also of network access to markets, training and peer learning (Claridge, 2023). Second, it offers a vocabulary for assessing participatory governance arrangements such as garden committees, decision-making forums and community-led conflict resolution. Third, it links the sustainability of interventions to community ownership rather than to external support alone (Chen et al., 2022). Fourth, it underpins the SWOT

analysis by allowing strengths and weaknesses to be read as features of the underlying social fabric rather than as isolated project attributes (Carpiano & Fitterer, 2023).

3. METHODS

3.1 Study Design and Paradigm

A convergent parallel mixed-methods design was employed within a pragmatic paradigm (Creswell & Creswell, 2022; Johnson & Onwuegbuzie, 2023). Pragmatism was chosen because it foregrounds practical relevance for decision-making while accommodating the multiple realities of complex community interventions. Quasi-experimental logic guided comparison between treatment beneficiaries and indicative baseline conditions, with triangulation across quantitative and qualitative strands used to strengthen inferential validity (Shadish et al., 2021; Datta et al., 2023).

3.2 Study Setting and Population

The study was conducted in three districts of Masvingo Province: Gutu, Bikita and Masvingo. These districts share a semi-arid agro-ecological profile but differ in market access, infrastructural development and history of external assistance. The target population comprised all 160 households that had been registered as direct beneficiaries of the SGIP between 2020 and 2024.

3.3 Sampling

A proportional stratified random sample of 113 households was drawn using the finite-population correction formula with a 95% confidence level and 5% margin of error. The sample was allocated across districts as follows: Gutu ($n = 39$), Bikita ($n = 39$) and Masvingo ($n = 35$), reflecting the relative size of each district's beneficiary roster. Within each stratum, households were enumerated and selected using a random-number generator. Purposive sampling was additionally used to recruit 18 key informants (community leaders, OCCIZIM officers, agricultural extension workers and local government officials) and six focus group discussions comprising 6–10 participants each.

3.4 Data Collection

Three complementary instruments were used. A structured household survey covering demographics, programme participation and Likert-scaled outcome perceptions (five-point scales) was administered face-to-face in vernacular languages by trained enumerators. Semi-structured key informant interviews explored implementation processes, contextual constraints and perceived impacts. Focus group discussions probed community-level experiences of participation, cohesion and ownership. A structured document review of

programme reports, monitoring data and meeting minutes was conducted to triangulate primary data.

3.5 Data Analysis

Quantitative survey data were captured and cleaned in SPSS. Descriptive statistics (frequencies, percentages, cross-tabulations) summarised respondent characteristics and outcome indicators. Qualitative data from KIIs and FGDs were audio-recorded with consent, transcribed verbatim, translated where required, and analysed using inductive thematic analysis following Braun and Clarke's six-phase framework. Themes were iteratively coded, refined and compared across data sources. Triangulation between survey, interview, focus group and document sources was used to assess convergence and identify divergent perspectives.

3.6 Ethical Considerations

The evaluation observed the four pillars of research ethics: informed consent, voluntary participation, confidentiality, and minimisation of harm (Bryman, 2022). Consent forms were issued in vernacular languages; participants were free to withdraw at any time without consequence. Data were anonymised at point of capture, stored on encrypted devices and accessible only to the research team. Ethical clearance was secured through the Department of Development Studies at Midlands State University and additional approvals were obtained from district administrative offices and OCCIZIM.

4. RESULTS

4.1 Respondent Characteristics

Of the 113 respondents, 74 (65.49%) were female and 39 (34.51%) were male, indicating that the project disproportionately reached women — a finding consistent with the gendered division of garden labour in rural Zimbabwe. Almost two-thirds of respondents (64.60%) were of prime productive age between 26 and 45 years. Educational attainment was modest but functional: 35.40% had attained secondary education and 30.97% had completed primary schooling, while 33.62% reported post-secondary qualifications (certificate, diploma or degree). The full demographic profile is presented in Table 1.

Table 1. Demographic profile of respondent households. (n = 113)

Characteristic	Male n (%)	Female n (%)	Total n	% of sample
Age: Under 18	2	8	10	8.85
Age: 18–25	4	11	15	13.27

Characteristic	Male n (%)	Female n (%)	Total n	% of sample
Age: 26–35	25	11	36	31.86
Age: 36–45	4	33	37	32.74
Age: 46–55	4	11	15	13.27
Education: Primary	12	23	35	30.97
Education: Secondary	12	28	40	35.40
Education: Certificate	10	11	21	18.58
Education: Diploma	0	8	8	7.08
Education: Degree+	5	4	9	7.96
TOTAL	39 (34.51%)	74 (65.49%)	113	100.00

Residency in the project area was longstanding: 75.22% of respondents had lived in their community for six years or more, providing a stable basis for assessing pre- and post-intervention conditions. With respect to occupation, 38.05% were self-employed (mostly in subsistence agriculture and small trading), 24.78% reported part- or full-time employment, and 21.24% identified as unemployed, the latter group disproportionately female.

4.2 Socio-Economic Outcomes

The SGIP was associated with substantial socio-economic gains. Three-quarters of respondents (79.65%) rated the intervention as very or extremely effective in improving their socio-economic status, with only 9.73% reporting little or no benefit. These ratings were corroborated by self-reported indicators of approximately 60% increase in crop yields, 45% increase in household income from surplus produce sales, and 35% increase in household-level consumption of vegetables and fruit — outcomes consistent with the joint productivity, income and nutrition pathway hypothesised by the project's theory of change.

Eighty-seven point six one per cent (87.61%) of respondents rated the impact of the SGIP on income generation as high or very high. Qualitative evidence from FGDs and KIIs converged on three mechanisms: (i) year-round cultivation enabled by reliable water access; (ii) training in modern farming techniques that improved yields and reduced losses; and (iii) facilitated access to local and regional markets. A female participant from Bikita observed:

"The training on modern farming techniques greatly transformed our lives. We now produce enough to cater for our needs, and there is a significant improvement in living standards of many participants."

Access to education and training and access to healthcare services were also rated highly, by 84.10% and 87.61% of respondents respectively. Improvements in healthcare access were attributed in qualitative accounts to road improvements and water-point installation that reduced travel time to clinics, as well as to maternal-health workshops co-organised by OCCIZIM. Infrastructure development was rated more modestly: 68.32% rated impact as high or very high, with 18.58% reporting low or very low impact, suggesting unevenness in physical-asset delivery across the three districts (Table 2).

Table 2. Key outcome ratings on five-point Likert scales. (n = 113)

Outcome Indicator	High / Very High (%)	Moderate (%)	Low / Very Low (%)
Socio-economic status improvement	79.65	10.62	9.73
Income-generation opportunities	87.61	—	12.39
Access to education and training	84.10	9.70	6.20
Healthcare services	87.61	7.08	5.31
Infrastructure development	68.32	13.27	18.58
Community engagement level	85.42	13.27	5.31
Community cohesion & empowerment	87.61	8.85	3.54
Intervention sustainability	89.35	5.30	5.30
Scalability to other communities	85.42	13.27	5.30
Overall programme effectiveness	88.49	6.19	5.30

4.3 Community Engagement, Cohesion and Empowerment

The SGIP recorded strong community engagement. A majority of respondents (59.30%) reported that they always participated in project activities, with a further 24.80% participating often. Engagement levels were rated as high or very high by 85.42% of respondents. These quantitative patterns were reinforced by qualitative testimony emphasising inclusive planning, regular community meetings and visible incorporation of beneficiary feedback into project design. One key informant remarked:

"The high level of engagement is a testament to our commitment to inclusivity and transparency. We give first priority to community involvement in all our planning and execution phases."

Engagement translated into perceived gains in community cohesion and empowerment, with 53.10% of respondents reporting that the SGIP had contributed extremely to cohesion and a further 34.51% reporting a substantial contribution — a combined 87.61%. Crucially, no respondent reported a complete absence of cohesion effects, suggesting near-universal recognition of the SGIP as a community-binding force. Findings from FGDs emphasised the role of joint labour at the gardens, shared problem-solving in garden committees and rotating leadership as concrete vehicles for the accumulation of bridging social capital.

4.4 Sustainability and Scalability

The SGIP was perceived to be highly sustainable. A combined 89.35% of respondents rated the intervention as very or extremely sustainable, with no respondent reporting that it was not at all sustainable. KIIs attributed this perception to three design features: (i) strong community ownership and visible local-leadership investment; (ii) explicit exit strategies built into the implementation plan; and (iii) routine capacity-building in irrigation maintenance, agronomy and basic financial literacy. As one village head noted:

"Projects with strong community buy-in usually tend to have a long life, since they are well supported by local structures."

Scalability ratings mirrored those for sustainability: 85.42% of respondents considered the intervention very or extremely scalable. Both implementers and beneficiaries cautioned, however, that replication elsewhere would require contextual adaptation. A focus group participant observed that "different farming regions have different needs, so even if the projects are good, there is need to make some alterations."

4.5 SWOT Analysis

Integrating quantitative ratings on transparency, resource allocation, inclusivity, partnerships and threat exposure with qualitative testimony yielded the strategic picture presented in Table 3. The dominant strengths were participatory decision-making (82.30% agreement), multi-stakeholder collaboration (86.80%) and the provision of resources and training (77.00%). The principal weakness identified was initial dependency on external technical and financial support, alongside residual communication gaps with the most marginalised sub-groups. The most striking opportunity domains were leveraging emerging technologies (89.38% agreement), expanding institutional partnerships (84.10%) and diversifying funding sources (84.10%). Threats were external rather than design-based: macroeconomic instability (89.40%), political uncertainty (87.30%) and socio-cultural barriers to inclusivity (84.07%).

Table 3. SWOT synthesis of the SGIP community-development approach.

Strengths	Weaknesses	Opportunities	Threats
Effective community engagement in decision-making (82.30% agree)	Initial dependency on external technical and financial support	Expansion of partnerships with government & NGOs (84.10% agree)	Political instability and policy uncertainty (87.30% agree)
Strong collaboration with local stakeholders (86.80% agree)	Communication gaps with marginalised sub-groups	Leveraging digital and climate-smart technologies (89.38% agree)	Macroeconomic instability & funding fluctuations (89.40% agree)
Provision of valuable resources & training (77.00% agree)	Seasonal dependence on water availability	Diversification of funding sources (84.10% agree)	Socio-cultural barriers to inclusivity (84.07% agree)

5. DISCUSSION

This evaluation contributes empirical evidence to three live debates in the literature on small-scale irrigation in semi-arid sub-Saharan Africa. First, the magnitude of the reported productivity and income gains — approximately 60% in yields and 45% in household income — is broadly consistent with prior estimates that community-managed irrigation can deliver step-changes in smallholder welfare (Mekonnen et al., 2020; FAO, 2020), and it strengthens the case that water access, not land per se, is often the binding constraint in semi-arid contexts. The simultaneous 35% increase in vegetable and fruit consumption supports a productivity-to-nutrition pathway that has been theorised but inconsistently demonstrated in earlier work.

Second, the convergent finding that community engagement, cohesion and sustainability all received approval ratings above 85% suggests that, in the SGIP, social capital and physical infrastructure co-evolved rather than competed for project attention. This pattern is interpretable through Social Capital Theory: garden committees acted as nodes for bonding capital, while OCCIZIM's facilitation of partnerships with government extension services, NGOs and markets provided bridging capital (Putnam & Sander, 2023; Szreter & Woolcock, 2021). The implication for programming is that small-scale irrigation is most usefully framed not as a technical intervention with social side-effects, but as a socio-technical intervention in which institutional design is constitutive of impact.

Third, the gender composition of the sample — 65.49% female — is itself a substantive finding. In rural Zimbabwe, women shoulder the bulk of horticultural labour while holding

weaker tenure and market positions (Kabeer & Sweetman, 2022). That women constituted the majority of active SGIP participants suggests that low-input, community-anchored irrigation modalities can serve as practical entry points for gender-responsive food-security programming, particularly where they are coupled with deliberate training, group savings mechanisms and market-access facilitation.

Several caveats should be registered. First, perceptual indicators may be inflated by social-desirability and recall biases, particularly where enumerators are perceived to be affiliated with the implementer. The convergence of survey, KII and FGD findings reduces but does not eliminate this risk. Second, the absence of a counterfactual non-beneficiary sample limits causal attribution: the design supports plausible, not definitive, claims of impact. Third, the four-year evaluation window is short relative to the timescales over which sustainability and scalability are ultimately judged. Fourth, although three districts were included, findings should be generalised to other semi-arid settings only with attention to local agro-ecology, governance and market structure.

6. CONCLUSIONS AND RECOMMENDATIONS

The Small Garden Irrigation Project in Masvingo Province offers strong evidence that community-based, low-cost irrigation can deliver simultaneous gains in food security, income, nutrition and social capital in drought-prone smallholder settings. Approximately four-fifths of beneficiary households reported substantial improvements in socio-economic status, and over 85% reported strong community engagement, cohesion and confidence in the project's sustainability. The intervention's centre of gravity is its socio-technical architecture: a coupling of water access with participatory governance, training and partnership brokering. Six recommendations emerge for OCCIZIM and comparable implementers in semi-arid sub-Saharan Africa:

- Strengthen resource-allocation transparency through routine audits, public expenditure tracking and digital reporting accessible to beneficiaries.
- Deepen inclusivity through targeted outreach to youth, persons with disability and the elderly, supported by communication in vernacular media.
- Institutionalise sustainability by accelerating handover of operations and maintenance responsibilities to community-led garden committees within defined transition timelines.
- Expand partnerships with line ministries, agricultural research institutes and private agribusiness to widen market access and technical capacity.

- Diversify financing through climate-smart agriculture funds, blended finance instruments and community savings groups to reduce dependence on single donors.
- Build adaptive risk management against political and macroeconomic volatility through contingency planning, currency-resilient procurement and continuous monitoring.

Future research should pursue counterfactual designs, longer follow-up horizons, and disaggregated analyses of how gains are distributed by gender, age and socio-economic position within beneficiary households. Such work is essential to determine not only whether small-garden irrigation works, but for whom, under what conditions, and for how long.

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Conflicts of Interest

The author declares no conflicts of interest. The evaluation was conducted independently of programme management decisions.

Data Availability

De-identified survey data and coded qualitative transcripts are available from the corresponding author on reasonable request, subject to participant-confidentiality safeguards.

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