

THE IMPACT OF LARGE SCALE INVESTMENTS ON THE LIVELIHOODS OF SMALLHOLDER FARMING COMMUNITIES: THE CASES OF GREEN FUELS AND TONGAAT HULLETT ZIMBABWE



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ACRONYMS

ARDA	Agriculture and Rural Development Authority
BOOT	Build Own Operate and Transfer
BOT	Build Operate and Transfer
CAADP	Comprehensive Africa Agriculture Development Programme
EPZ	Export Processing Zone
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
FDI	Foreign Direct Investment
GoZ	Government of Zimbabwe
HDDS	Household Dietary Diversity Score
JV	Joint Venture
LSC	Large Scale
MTP	Medium Term Plan
MAMID	Ministry of Agriculture, Mechanization and Irrigation Development
MMEPIP	Ministry of Macro-Economic Planning and Investment promotion
MRDPPNHC	Ministry of Rural Development, Promotion and Preservation of National Heritage and Culture
DDC	District Development Committees
PDC	Provincial Development Committees
PPP	Public Private Partnerships
SIA	Special Initial Allowance
WB	World Bank
ZIA	Zimbabwe Investment Authority
ZIMASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZAIP	Zimbabwe Agriculture Investment Plan
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Scientists
ZELA	Zimbabwe Environmental Law Association
ZIC	Zimbabwe Investment Committee
ZSA	Zimbabwe Sugar Association
ZSS	Zimbabwe Sugar Sales

EXECUTIVE SUMMARY

The Government of the Republic of Zimbabwe adopted an open policy on Public, Private Partnerships alongside a wide array of investment incentives to promote domestic and foreign direct investment in agriculture, mining, infrastructure and energy. Under this policy, private and state-owned – local and international – agribusiness enterprises are expected to respond to rising commodity prices in mining and the strategic need to achieve food and energy security. This development has resulted in an increase in large scale investments in rural communities of Zimbabwe. Recent examples of large scale investments in post independent Zimbabwe in the rural areas include among others the Green Fuel Ethanol Project in Chisumbanje, Marange Diamond Mining and the Nuanetsi Ranch.

Despite this inflow of investment in rural communities, there are concerns among stakeholders over the likely negative impacts on local people's livelihoods, access to farming land, productivity, income levels, food security and access to social services. The effect of these large-scale investments depend on how the investment is implemented. The implementation models differ within communities and between communities and are dependent on the legal landscape in the investor's country of origin of the investor-community linkages and the nature of partnership with the governments. Against this backdrop, this study sought to understand how large scale investments impact on communities livelihoods using case studies of Green Fuel and Tongaat Hullet. This study had three objectives:

- i. To assess the investment models and investors-community linkages, partnerships and relations of large large-scale investments projects in the sugar industry.
- ii. To assess the impact of these large scale investments on the livelihoods and standards of living of rural farming communities.
- iii. To draw lessons and good practices on investment models with a view to informing policy on future large scale investment decisions.

RESEARCH METHODOLOGY

This research adopted a mixed methods approach to address the objectives of the study using a case study approach Green Fuels Ethanol Project in Chisumbanje and Tongaat Hullet in Chiredzi were identified as case studies of recent large scale investments in Zimbabwe that can adequately improve our understanding of how large scale investments impact communities' livelihoods. These two large scale investments were deemed representative investment models as they all are land based and involve investments along the whole sugarcane value chain, hence allow for comprehensive lessons to be drawn for future investment decisions and coordination. Under each case, the study used a mixed methods design that combines quantitative and qualitative data collection approaches. The quantitative method included a cross sectional survey of farming households surrounding the Green Fuels (wards 27, 27 and 28) and Haungat Hullet (wards 18, 19, 21, 27, 28 and 31). Quantitative data collected through the cross sectional survey was complemented with qualitative data from key informant and focus group discussions. Secondary data obtained through literature review of policy documents, published articles and reports from development partners were used to compliment the findings. The quantitative data collection was done using the Kobo collect software. Qualitative data from FGDS and Key informant interviews was collected through electronic recording with high frequent recorders. Quantitative data analysis was imported into the Statistical Package for Social Scientists (SPSS) version 22. Univariate analysis and analysis of variance were conducted on specific variables such as food consumption score, dietary diversity scores. The qualitative data analysis was done using thematic content analysis. Direct quotes are used to make inferences on the quantitative findings and also to give qualitative explanations to the quantitative results.

FINDINGS

LARGE SCALE AGRICULTURE INVESTMENT SUPPLY CHAIN

Zimbabwe has the key institutional infrastructure for promoting responsible large scale agriculture investments in the form of equity and non-equity joint ventures and public-private partnerships. The Constitution of Zimbabwe, the Zimbabwe Agenda for Socio-Economic Transformation (ZIMASSET), 10-Point Plan of Economic Growth (2016), Zimbabwe Investment Authority Act, Environmental Management Act, Indigenisation and Economic Empowerment Act and the Zimbabwe Agriculture Investment Plan (ZAIP) reflect a great deal of the domestication of the key principles of responsible investment outlined in the FAO Principles for Responsible Investment in Agriculture and Food Systems. The Investment Handbook and the Special Economic Zones Act spell out a complete packages of incentives available for companies in and outside Special Economic Zones. There is clear investment flow process at the national level through the Zimbabwe Investment Authority and the Ministry of Economic Planning and Investment Promotion. However, such a clear coordination system is missing at the provincial and district levels. Investments are by-passing provincial and district administration offices who are only approached to resolve conflicts between communities and communities.

TONGAAT HULLETT ZIMBABWE CASE STUDY

Investment Design and Value Chain Structure

Tongaat Hullet Zimbabwe operations comprise sugarcane production on 29 000 ha and sugar milling at Hippo Valley Estates and Triangle Estates. The company has a combined annual crushing capacity of approximately 4.8 million MT and installed raw sugar production capacity of about 640 000MT per season. There is a potential to increase production capacity to about 700 000MT. The operations also include sugar refining at Triangle with total refined sugar installed capacity of 140 000MT per year.

Value Chain Coordination Mechanism

The sugarcane value chain is coordinated through public private **partnerships**, **out grower** schemes and **government policy**. Tongaat Hullet limited owns 50.35% of Hippo valley estates and 100% of Triangle limited, who supply cane to the processing plant. Private independent shareholders of Hippo valley estate constitute 35% the issued share capital. The other 65% is owned by other investors who are Old Mutual Zimbabwe holding (14.85%), National Social Security Authority (5.84%), Mining Industry Pension Fund (1.03%) and the Catering industry pension Fund (0.4%). The partnerships spans from production through processing to marketing through the Zimbabwe Sugar Sales (ZSS) which is owned by Tongaat Hullet.

Tongaat Hullet has an out grower scheme with 16 000 ha and comprising of 813 out grower farmers. These farmers were resettled in 1982 under the A1 and A2 models. Other farmers were also resettled through government's Fast Track Land and Resettlement in 2000. The company provides inputs and buys all the cane produced by these farmers. This arrangement is necessitated by an agreement known as the Division of Proceeds (DoP) at a ratio of 23:77 in favour of farmers. The DoP is negotiated between farmers and the ZSS. Farmers have four sugar associations – Zimbabwe Sugar Association, Zimbabwe Sugar Commercial Farmers Union and Zimbabwe Sugar Development Association, and Zimbabwe Cane Farmers Association. However, the Sugar Act only recognizes the ZSA to which Triangle and Hippo Valley are also members. The Ministry of Industry and Commerce has an approval influence of the DoP. The out growers can supply up to 46% of the mill's requirements. If the out grower is increased to 37 000 ha as per the company's vision, this contribution will increase to about 59%.

Household Demography

The study interviewed a total of 501 respondent households comprising 72% male headed households and 28% female-headed households. The average household size is 6 members. The average age of the respondents was 49 years. The interviewed households. There were more female-headed households had primary and non-formal education compared to their male counterparts. The later had more secondary, university and vocational training education. Thirty four percent (34.2%) and 46.8% of male-headed households had primary

and secondary education respectively compared to 46.4% and 29% of the female headed households with primary and secondary education respectively.

Benefits Analysis

The investment benefited about directly benefitted about 55% of the surrounding households while 45% benefited indirectly. Those who benefitted directly benefitted through employment (contract and permanent employment) at the farm and the mill, dryland and irrigated land, market for agriculture and non-agricultural produce. Public benefits included access to all-weather roads, water sources and banking services. Communities also benefitted publicly programs that include rehabilitation of the Buffalo Range airport, construction and rehabilitation of schools and clinics, CSC cattle scheme, mosquito spraying programs and provision of transport for school children.

Impact of the Investment

• **Irrigated Land Ownership**

There was a significant relationship between the size of irrigated land owned and beneficiary status. About 89.8% of beneficiaries own irrigated land of more than 6 ha against 0%, 2.5% and 97.5% of non-beneficiary owning more than 6 ha, 3-6 ha and less than 2 ha respectively. Hence more beneficiaries own large pieces of irrigated land. This irrigated land ownership pattern was influenced by Government's land and resettlement initiatives in 1982 and 2000.

• **Crop Production and Productivity**

The overall productivity increased as a result of the investment, this was not across farming sectors. The productivity for maize (dryland) was higher for beneficiaries – A2 (2.6 t/ha), Old settlers (0.8 t/ha) – than for non-beneficiaries. The cereal productivity (irrigated) improved for the old resettlement beneficiaries but decreased drastically for the A2 farmers and non-beneficiary A1 farmers. While the investment improved maize and sugar beans productivity, there is need for interventions to improve sugarcane productivity.

• **Livestock Production and Productivity**

Beneficiary households owned more livestock before and after the project. However, livestock ownership for all classes decreased for both beneficiaries and non-beneficiaries, except for pigs for non-beneficiaries. The reduction in indigenous chicken from an average of 13 to 11 for non-beneficiaries and 23 to 16 for beneficiaries was as a result of an outbreak of new castle disease.

• **Average Household Income**

The results show that about 94% of beneficiary households had an income >US\$6 000 while 98.7% of non-beneficiaries are below the US\$3 000 average income category. This evidence suggests that the large scale investments increased the income of surrounding communities.

• **Access to Primary Education**

The investment project reduced both male and female child's access to primary education from male-headed households from 90% to 89% and from 94% to 83% respectively. The impact is opposite to that on children from female-headed households where male child's access improved from 63% to 72% and that of the female child improved from 65% to 81%. For both beneficiary and non-beneficiary households, both female and male children from male-headed households had better access to primary education than their female and male children from female-headed households. The study concluded that female-headed households' ability to send their children to primary school improved as a result of the investment project. The improvement is more pronounced for the female child where they are almost like their counterpart.

• **Access to Secondary Education**

Access to secondary education for female children from both male and female headed households improved from 34% to 37% and from 32% to 54% respectively. Male children from both male and female-headed

households were impacted negatively as access to secondary education reduced from 91% to 79% and 62% to 33% respectively. Male children go to work at the mill or farm in order to help for fend for the family. There was also a low secondary school attendance for female children from both male and female-headed households under both non beneficiary and beneficiary households. This was partly due to households' preference to send male children to school ahead of female children. Dropout rates for female children is high as a result of polygamous marriages.

- ***Water, Health and Diseases***

The main source of water for beneficiary households was borehole (34.3%), while other important sources were public tap (16.4%), protected well (15.6%) and water canal (21.1%). The main source of water for non-beneficiary households was also borehole (49.6%) followed by water canal (34.3%). In aggregate, a higher percentage of beneficiary households (68.8%) used safer water sources than non-beneficiary households (59.9%). The exposure to unsafe water was lower for beneficiary households (31.7%) than non-beneficiary households (40%). However both households used water canal as the second most common source. The water from the canal was regarded not safe for human consumption.

- ***Food Availability***

The study used food availability and food consumption score (FCS) indicators to measure the food security of beneficiary and non-beneficiary households. There were 67% of beneficiary households with enough food to meet family needs compared to 35% for non-beneficiaries. Among those that had some months of deficit, 77.4% were non-beneficiaries compared to 32.6% for beneficiary households. The results suggests that beneficiaries of the investment are better off than non-beneficiaries.

- ***Food Security***

There were more non-beneficiaries with poor (27.4%) to borderline (29%) FCS compared to 4.3% and 16.8% for beneficiaries. Among those with acceptable FSC, beneficiary households represent 51.2% of the population compared to 48.8% for non-beneficiaries. The analysis of individual benefits showed that not all benefits translated to food security. Sixty percent (60%) of households under all the various benefits had borderline and acceptable FCS. However, more non-beneficiary households (72.6%) had borderline and acceptable FSC under employed at farm permanent (60%) and renting irrigated land (65.6%). This results questions the adequacy of wages and productivity of irrigated land. Within the FCS category, resettled households (50%) and those with market for agriculture produce (42.4%) had the highest proportions with acceptable FCS whilst non-beneficiary households (91.6%) and renting irrigation (80%) had the highest proportions of those with poor FCS. This suggests that the investment project improved the food security of the surrounding community.

THE CASE OF GREEN FUELS

- ***Green Fuels Investment Model and the Value Chain Structure***

There are two core estates measuring 6 000ha and 3 500ha at Chisumbanje and Middle Sabi. On these estates, Macdom Investments and Rating Investments are conducting sugarcane production under irrigation. The company is working with an out grower scheme on 650ha of land. This out grower scheme comprises of 116 small-scale farmers on 400 ha and 125 War Veterans on 250 ha. In addition to producing ethanol at Chisumbanje, the Green Fuels plant produces about 18 kW of electricity. The electricity produced at Green Fuels is to power the plant with the surplus being transferred onto the national electricity grid.

- ***Investment Value Chain Coordination Mechanism***

The Green Fuel value chain is coordinated through public-private equity partnerships, out grower scheme and government policy. As highlighted earlier on, Green Fuels owns both Macdom Investments and Rating Investments which are producing sugarcane in Chisumbanje and Middle Sabi. Green Fuel ferries and processes the sugarcane produced from the two estates into ethanol at a plant processing plant in Chisumbanje. Under the Green Fuel model, Macdom Investments developed land, established an irrigated sugarcane crop, maintains the crop and land. The company also conducts any related works and purchases sugarcane from settlers at

price of US\$4/T assuming an average yield of 150 MT/ha. The Government policy on mandatory blending of fuel is also a key coordination mechanism for the Green fuels value chain.

Household Demography

The study interviewed a total of 638 respondent households comprising of 60.2% male headed households and 39.8% female-headed households. These households had an average membership size of 6 members. The average age of the respondents was 45 years. About 42% of the household heads attained primary education, 38% secondary school and 19% had no formal education. At least 14.5% had primary education, 37.5% had secondary education, 19.4% had non-formal education, 1.1% vocational training, and 0.5% adult education.

Investment Impact Analysis

- **Dryland Ownership**

The average dryland holding for beneficiaries before and after the investment project reduced from 8.3 ha to 1.3 ha, while that for non-beneficiaries decreased from 5 ha to 3.5 ha. This was statistically significant at 5% statistical level of significance. About 54.5% of households owning equal or less than 2 ha of dryland are beneficiaries compared to 45.5% for non-beneficiaries. A high proportion of non-beneficiaries own more dryland under areas greater than 2 ha than beneficiaries. The non-beneficiary households represent about 71.7% of households with 2 – 4.9 ha, 68% with 5 – 9 ha and 67% with dryland of more than 10 ha. This result is explained by the fact that most beneficiaries had their dryland incorporated into the core estate.

- **Irrigated Land Ownership**

Beneficiary households own more irrigated land than non-beneficiary households. Non-beneficiaries represent about 63% households owning equal or less than 0.1 ha of irrigated plots as compared to about 37% for beneficiaries. Beneficiaries represent about 85.5%, 71.4% and 100% of households that own between 0.2 – 0.5 ha, 0.6 – 3.0 ha and 3.1 – 6.0 ha of irrigated plots. The investor allocated 0.5 ha of irrigation plots to some households that had their dryland area incorporated into the core estate while some households were still waiting for to be allocated the promised irrigation plots. The schemes were being under-utilised as the men consider these small sizes to be for women and too small to sustain a household's livelihood. Smallholder farmers indicated that they preferred to have dryland rather than irrigated land. This is because irrigation requires purchase of inputs which they said they cannot not afford as the investor was no longer providing inputs.

Crop Production and Productivity

The investment has settler sugarcane production on the core estate, where **Macdom** does everything and pays farmers for raw cane produced at a yield of 120 t/ha. On their own, the settlers were only able to reach a yield of 65t/ha against.

The Green fuels project drastically reduced smallholder farmers' production of cotton by dispossessing them of their dryland. Further, the Green Fuels investment enabled the introduction of maize and sugar beans production on irrigated plots. The average yields for maize, cotton and sugar beans remain below the respective crops' potential average yields – not less than 5 t/ha for maize under irrigation and up to 2 t/ha for sugar beans and cotton. Beneficiary households with a ready market for agricultural produce had the highest average maize yield. There was no improvement for those renting irrigation, while there was a decrease for those owning irrigation. Hence access to irrigation did not impact positively to average maize productivity as would have been expected. The investment did not follow-up to complement irrigation with input support. The investment however, impacted positively on maize productivity through ready market for produce suggesting a better paying market that enabled the farmers to access inputs.

Cotton average yields for non-beneficiaries (0.5 t/ha) were the same as for beneficiaries renting irrigated land (0.5 t/ha). The average yield for beneficiary households of permanent and contract employment at mill (0.3 and

0.3 t/ha) and farm (0.3 and 0.2 t/ha), and displaced from dryland (0.3 t/ha) and owning irrigated land (0.2 t/ha) are lower than non-beneficiary households. Most benefits from the investment thus impacted negatively on the average cotton productivity in Chisumbanje area in spite of the contract arrangements by cottco.

Sugar beans productivity increased from 0.2 t/ha for the non-beneficiaries to 1.6 t/ha for the displaced who were allocated 0.5 ha irrigation plots. There was no ready market for sugar beans. The investment impacted positively on the average sugar beans production through irrigation.

The study concluded that crop productivity vary between beneficiary status and among beneficiary households across different enterprise and benefits enjoyed by households. There is limited knowledge and skills transfer for both non-project crops (sugarcane) and non-project crops (sugar beans cotton and maize).

Livestock Production

There was a reduction in the numbers of cattle owned by both beneficiary and non-beneficiary households. Beneficiary households own slightly more cattle than non-beneficiaries. The greatest decrease was experienced in pig production for beneficiaries from owning an average of 12 pigs to 1 pig.

Income and Expenditure

About 98.2% of beneficiary households and 99.2% of non-beneficiary households were in the income category of less than US\$3 000 suggesting a limited positive impact on income by the investment. Within the US\$3 000 income categories, there was a larger proportion of non-beneficiary households spending less or equal to US\$3 000 (57.0%) than beneficiary households (43.0%). At the higher income category of US\$3 001 to US\$6 000 (63%) there is a larger proportion of beneficiary households (62.5%) than non-beneficiary households (37.5%). Hence the study concluded a positive income impact. The general feeling among farmers was that they had more money when they were growing cotton than currently when they have irrigated land.

Access to Primary Education

About 25% of beneficiary households had children not attending school compared to 30% for non-beneficiary households. The key reasons for not attending school were mainly lack of money for fees, illness, not interested in school and no birth certificate. The benefits from the investment did not translate into higher access to primary and secondary education.

Access to Secondary Education

Over 60% of beneficiary households were able to send their male children to secondary under each benefit showing an improvement in the percentage of households who are sending their male child to secondary than primary school. The farmers who were displaced from their dryland constituted a larger proportion of households who are not able to send 1, 2 and 3 of their male children to secondary school. As for the female child, the benefits enabled more households to send all their female children to secondary school. The study concluded that not all investment project benefits will improve access to education.

Water Health and Diseases

Exposure to unsafe water was high among non-beneficiary households (19.1%) compared to beneficiary households (4.7%). Water availability all year round was a challenge with 30.8% of beneficiary households and 28.2% of non-beneficiaries indicated that water in their areas was not available at all times. This resulted in some households drinking effluent waste from the mill, which they called “danda water.” The danda water bodies were causing water borne diseases such as malaria and dysentery. The study established fifty three percent (53.3%) of the non-beneficiaries indicated that they did not treat their water before drinking compared to only 0.4% for beneficiary households that did not treat their drinking.

Food Availability

There were more beneficiary households (86.4%) who experienced food shortages than non-beneficiary

households (85.4%). This implies a marginal negative effect of 1% by the investment on food security. The breakdown of individual benefits by food availability established that permanent employment at the mill and contract at the farm had a positive effect on food availability. All the other benefits – contract employment at the mill (92.2%), permanent employment at farm (88.9%), ready market for small projects, renting irrigation (100%), displaced from farmland (90.3%) and owning irrigated land (88.9%) – had more households that experienced food shortages than non-beneficiaries (85.4%).

Food Security

About 47.8% of beneficiary households had unacceptable FCS compared to 50.6% for non-beneficiary households. Of those with unacceptable FCS (28), about 58.1% are non-beneficiaries while 41.9% are beneficiaries. This position contradicts the finding based on food availability. The breakdown of benefits by FCS showed that the key benefits that drove food security were permanent employment at the mill, permanent and contract employment at the farm, and renting irrigation. These had more borderline and acceptable FCS.

CONCLUSION AND RECOMMENDATIONS

The Impact of Large Scale Investment and Lessons Learnt

The impact of large-scale investments in agriculture on the livelihoods of rural communities is a double edged sword whose net effect can be a zero sum game, negative or positive depending on the investment model, circumstances of both the business and the rural community, and the investment supply chain coordination mechanisms.

Impact Indicator	Impact	Lessons Learnt
Land Ownership	Large scale investment increase ownership of irrigated land and drastically reduce ownership of dryland.	The involvement of government is crucial to ensure equitable delivery of irrigation plots and minimise the negative impacts that may arise out of land dispossession or displacement.
Production and Productivity	The impact of large scale investments on crop productivity depends on the mix of investment benefits to the community, and the nature and adequacy of those individual benefits.	Government involvement is central to influencing the mix of investment benefits to the community as well as the nature and adequacy of the individual benefits. There is limited knowledge and skills transfer for both project crops (sugarcane) and non-project crops (sugarbeans cotton and maize).
Income and Expenditure	Large scale investments improve income and expenditure of the surrounding communities.	Not all the benefits necessarily translate to increased income and expenditure. There is need for viable and up-to-date payment of salaries and wages and profitable markets for produce from irrigation land.
Safe Water and Disease Occurrences	Large scale investments do not necessarily reduce water the prevalence of borne diseases.	Large scale investments reduce exposure to unsafe water sources, but the reduction in exposure to unsafe water does not translate to less prevalence of water born diseases. Households continue to use unsafe water because of distance and availability of water all year round. Large scale investments, for lack of compliance with EMA or public health standards, may result in open water bodies that create good breeding grounds for mosquitoes. This will increase the prevalence of water borne diseases or non-delivery of importance services to promote healthy surrounding communities.

Impact Indicator	Impact	Lessons Learnt
Food Security	Large scale investments may improve food availability and food security of surrounding communities depending on the structure and adequacy of benefits delivered.	Not all benefits delivered increased food availability and food security. There is need for viable and up-to-date payment of salaries and wages and profitable markets for produce from irrigation land.

Understanding the Impact Logic of Large Scale Agriculture Investments

Large scale investments deliver benefits or outputs to communities that influence each stage of the value chains of surrounding communities. These include access to land, farming inputs, employment, market linkages and deliverables from community projects. Depending on portfolio or mix of the benefits, the adequacy of each of them, how they are collectively delivered and used by the communities, the benefits may cause negative or positive effects on productivity and income. These may in turn cause a positive or negative impact on the standards of living of farming households in the surrounding communities, directly or indirectly, actively or passively in terms of food security and access to education, water and health.

Sustaining a Positive Vertical Logic of Large Scale Agriculture Investments

There is a clear national level large-scale agriculture investments supply chain institutional infrastructure. Achieving a systemic local level coordination of the large-scale agriculture investment supply chain will sustain a positive vertical impact logic by minimizing conflict between communities and large scale investments. Further, it ensures compliance which then minimize negative impacts. It also ensures delivery of relevant benefits to surrounding communities to maximize positive impacts.

Role of Coordination and Government Intervention in Sustaining the Vertical Logic of Large Scale Investments

The study concluded that local level coordination of large scale investment decisions and government intervention is an important component of the vertical logic required to guarantee a positive impact of large scale investments on the surrounding communities. Hence collaboration between government and the investor is key. Government intervention influences the identification of the investment, and the level of corporate social responsibility investment and its design in terms of the planned outputs to be delivered to surrounding communities and the delivery mechanisms.

Government monitors implementation of investment plans and enforce compliance and fulfillment of promises. Government thus influences the mix of outputs – land, value chain support arrangements, employment and corporate social responsibility programs – as well as the nature and adequacy of each of the outputs. Depending on options available, government can influence whether the large-scale investment will displace or resettle communities and the level of fair compensation for the affected communities or households.

Recommendations

1. Establish an investment coordination mechanism at provincial and district levels. This could be led by the Ministry of Rural Development and Promotion and Preservation of National Culture and Heritage with the Ministry of Macro-Economic Planning and Investment Promotion as the Secretariat through provincial offices.
2. Intensify government influence to ensure: (1) responsible investment; (2) compliance and fulfilment of promises by investors to affected communities; and (3) minimise negative impacts and maximise positive impacts:

Case	Areas of Possible Influence
Chisumbanje	<ul style="list-style-type: none"> i. Government intervention would have influence on the location of core estate to avoid massive displacement of farming communities, and or better relocation of the affected dryland farmers. ii. Ensure that promises of the irrigation plots are delivered to the remaining households. iii. Influence review of pricing of out grower sugar cane when farmers have fully paid for developments done by the company. iv. Enforce spraying programs for Malaria Control – EMA v. Ensure provision of sufficient input packages vi. Enforce rehabilitation of road infrastructure vii. Provide extension services, market linkages support and capacity building of irrigations schemes in order to dully utilize schemes and expand from sugar beans to horticulture and establish strong market linkages
Tongaat Hullet	<ul style="list-style-type: none"> i. Government policy resulted in the settlement of households under A1, A2 and Old Resettlement models. ii. The Ministry of Industry and Commerce announces the Division of Proceed and influences the price of raw sugar. iii. Develop farmers' capacity to negotiate sugar prices with Tongaat Hullet iv. Review of Sugar Production Control Act which only recognizes ZSA v. Ensure provision of adequate input packages vi. Provide support to sugarcane out growers to improve the yield of sugarcane

3. There is need more for collaboration between government and investors to achieve more inclusive models that respond to the demands for land by increasing the contribution of out-grower.

Model	Core Estate: Outgrower	Recommended collaboration
Chisumbanje	Core estate 9 500 ha Out grower 650 ha (7%)	<u>Implement of plans</u> Development of 40 000 ha at Chisumbanje to include out growers Development of 6 000 ha A2 out grower scheme at Middle Sabi
Tongaat Hullet	Core estate 29 000 ha Out grower 16 00 ha (46%)	<u>Implement of vision</u> Increase out growers to 37 000 ha (59%) using land at Tokwe Mukosi

The government should explore how it can ride on incentives such as special deductions to partner investors in financing irrigation development and promote a more inclusive model. Community share trusts need to be tailor made to specific investments so that they are the source of funding for irrigation development projects.

- 4. Review the Sugar Act which only recognises one sugar association, the Zimbabwe Sugar Association.
- 5. Partner the investor in provision of extension and specialist services support. This could include training in irrigation management, market linkages and awareness campaigns on safe drinking water to farming communities.
- 6. Do further research to ascertain the quality of water, viability of sugarcane in terms of area, yields and pricing, and explore scope of profitable market linkages for irrigation plot holders in Chisumbanje to enable them to do horticulture.

1. BACKGROUND AND CONTEXT OF THE RESEARCH

1.1 INTRODUCTION

This report presents the results of a research on the impact of large scale investments on the livelihoods of rural farming communities of Chisumbanje and Chiredzi. The research was conducted by the Zimbabwe Environmental Law Association (ZELA) in collaboration with the Department of Economics and Markets of the Ministry of Agriculture, Mechanisation and Irrigation Development (MAMID) under the Natural Resources Programme component funded by the International Development Centre (IDRC). This report details the study findings, lessons learnt and best practices that can be used to inform on large scale investments in rural communities.

1.2 BACKGROUND

The Government of the Republic of Zimbabwe adopted an open policy on Public, Private Partnerships alongside a wide array of investment incentives to promote domestic and foreign direct investment in agriculture, mining, infrastructure and energy. Under this policy, the private and state-owned – local and international – agribusiness enterprises are expected to respond to rising commodity prices in mining and the strategic need to achieve food and energy security. This development has resulted in an increase in large scale investments in rural communities of Zimbabwe. Recent examples of large scale investments in post independent Zimbabwe in the rural areas include among others the Green Fuel Ethanol Project in Chisumbanje, Marange Diamond Mining and the Nuanetsi Ranch.

Despite this inflow of investment in rural communities, there are concerns among stakeholders over the likely negative impacts on local people's livelihoods, including access to farming land, productivity, income levels, food security and access to social services. The effect of these large-scale investments depend on how the investment is implemented. The implementation models differ within communities and between communities and are dependent on the legal landscape in the investor's country of origin, investor-community linkages and the nature of partnership with the governments depending on the business models in place, that is the combination of all the development initiatives defining the type of investors-community linkages, partnerships and relations. Against this backdrop, this study sought to understand how large-scale investments impact on communities livelihoods using case studies of Green Fuel and Tongaat Hullet.

1.3 PROBLEM SETTING

Bio-fuel energy production, and generates employment and growth in national income. The contribution of agriculture to the economy is more prominent in developing economies. In these countries, agriculture supports livelihoods more than two thirds of the population that resides in rural areas. Up-scaling large-scale investments in agriculture and agri-business in these countries is thus the most direct route to combating rural poverty, food insecurity and malnutrition as well as achieving national energy security within the broader national socio-economic development agenda.

In 2016, the Government of the Republic of Zimbabwe (GRZ) reaffirmed an economic development policy position that encourages FDI in the form of PPPs in agriculture, infrastructure, mining and energy. This was done through policies such as the 10-Point Plan of Economic Growth within the context of the Zimbabwe Agenda for Socio-Economic Transformation (ZIMASSET), the Comprehensive African Agriculture Development Programme (CAADP) and Sustainable Development Goals (SDGs), Goal number 1 and number 2. This deliberate policy position is expected to see an increase and up-scale of large scale investments in agriculture in rural communities of Zimbabwe. The upsurge is driven by private and state-owned – local and international –

agribusiness enterprises who are responding to rising commodity prices in the mining sector and the strategic need to achieve food and energy security for Zimbabwe.

The irony in the merit of this policy position is that, up-scaling of large scale investments in the agricultural sector raises concerns over the likely negative impacts on local people's livelihoods. A review of similar studies in Africa show that relocation and resettlement of families is a common borne of contention in setting up large-scale investments in agriculture (World Bank 2014, 2016). Once they are set up, large-scale agriculture investments influence the standards of living of local communities in three main ways:

- i. the extent and type of employment generated;
- ii. the development of linkages to other parts of the value chain through such programs as out grower schemes, warehouses, or processing operations; and
- iii. Implementation of community development programs on infrastructure, vocational training and programs that improve productivity and access to education, water, health.

The influence of the large-scale investments on communities is a double edged sword. Scholars observe that the influence of these large-scale investments in agriculture on food security, nutrition and livelihoods on the rural communities depends on the investment model and how it is implemented given the circumstances in the area (Kidido and Kuusaana, 2014). The effects thus differ within and between communities, investors and governments depending on the business models in place. . Positive impacts in terms of household productivity, income and food security are more likely to be realized where implementation of large-scale investment fulfills promises made to local communities taking into account their local institutions, norms and values.

1.4 RESEARCH PROBLEM

The benefits of large scale investments in the agricultural sector in Zimbabwe are evident and well understood in terms of direct foreign currency injection, fiscal revenue, and increased output of strategic commodities, employment generation, development linkages and technology transfers. However, at the local level there remains a huge grey area, which is the subject of considerable debate. While the impacts of large scale investments such as the construction of the Kariba dam in 1957 are well documented, little is known about how large scale investments such as The Green Fuel in Chisumbanje and Tongaat Hullet in Chiredzi impact on the livelihoods of surroundings communities. Given the increase in the number of large scale investments driven by FDI, it is interesting to note how the current projects are impacting surrounding communities. This information is very critical if the country has to learn from current projects and inform decisions on future projects. This study assessed the impact of large scale investments in the agricultural sector in Zimbabwe. The study focused on identifying benefits that large-scale investments deliver to the surrounding communities. Further, the research also assessed whether they have translated to better standards of living of surrounding rural communities in which they are located, and whether such benefits have had the same impact within and between communities, investments and stakeholders.

1.5 RESEARCH OBJECTIVES

This study sought to address the following objectives;

- i. To assess the investment models and investors-community linkages, partnerships and relations of large large-scale investments projects in the sugar industry.
- ii. To assess the impact of these large scale investments on the livelihoods and standards of living of rural farming communities.
- iii. To draw lessons and good practices on investment models with a view to informing policy on future large scale investment decisions.

1.6 RESEARCH QUESTIONS

This study addressed the following research objectives;

- i. What are the forms of investment and incentives in Zimbabwe?
- ii. How is the investment supply chain coordinated in Zimbabwe?
- iii. What are benefits delivered to rural communities by large-scale investments?
- iv. What is the impact of large scale investments on:
 - a. Dryland and irrigated land ownership?
 - b. Crop and livestock production and productivity?
 - c. Food consumption score of households
 - d. Households access to education, water and sanitation?
 - e. Household income and expenditure?
- v. What are the policy, programme and project recommendations to minimise negative and maximise positive impacts of large scale investments?

2. RESEARCH METHODOLOGY

2.1 INTRODUCTION

This chapter presents the research methodology that was adopted in addressing the research questions. The structure is arranged as follows; research design, case study selection, sampling approach, data collection methods and analytical framework.

2.2 RESEARCH STRATEGY AND DESIGN

The research adopted a case study approach to enable a detailed analysis of the impact of large scale investments on the livelihoods of surrounding communities. Two case studies along the sugar value chain were used that is Green Fuels and Tongaat Hullet. This approach enabled comparison of models and community circumstances against impact. –Selection of the two study sites was premised on an epistemological assumption that the impact of large-scale agriculture investments on smallholder farming communities can be measured objectively. Under each case study, the study used supply chain analysis to understand investment supply linkages. Further, a mixed methods approach was used to collect quantitative and qualitative data. The quantitative method included a cross sectional survey of farming households surrounding the selected large-scale agriculture investments.

The quantitative research approach was complemented by qualitative data collection approaches. These include a desk study, key informant interviews and focus group discussions. The purpose of the qualitative data collection was to give qualitative explanations to the quantitative findings.

2.3 CASE STUDY SELECTION

This study is premised on two case studies that is the Green Fuel in Chisumbanje and Tongaat Hullet in Chiredzi. These cases were selected based on the magnitude of investment and the completeness in terms of how the investment business model covers the whole value chain. The two sites were deemed representative of investment models of interest. This is because these two investments are 1) land based and 2) involve investments along the whole sugarcane value chain in each case. This criteria enabled the realization of a complete value chain perspective of issues. This approach allowed for comprehensive lessons to be drawn for future investment decisions and coordination. Further, the common focus on sugarcane allowed comparison between the two models.

The selected cases are all located in the agro-ecological low potential regions, which is Natural Farming Region V. The region receives an annual average rainfall of below 450 mm and temperatures are above 30°C. Meaningful farming in this region requires supplementary water supply through irrigation. The major source of livelihood for most households around Green Fuels is dryland cotton production. Households around Tongaat Hullet depend on sugarcane as their main livelihood crop.

2.4 SAMPLING

2.4.1 Target Population

For the purposes of assessing the impact of large scale investment on livelihoods of surrounding communities, the study only targeted wards of farming communities in Chisumbanje area, Chipinge District. The study focused on the wards that are around the Green Fuels Ethanol Project. In the case of Tongaat Hullet, the study targeted wards in Chiredzi and Triangle in Chiredzi District that immediately surround Tongaat Hullet.

With the assistance of the respective District Agriculture Extension Officers (DAEOs) in each study site, the study identified wards 26, 27 and 28 around Green Fuels with a total of 6 409 households. For Tongaat Hullet, the following wards were identified namely wards 18, 19, 21, 27, 28 and 31. The total number of households for the Tongaat Hullet catchment is 2 550. Farming sectors around Chisumbanje Ethanol Project include only communal and small-scale farming households. The Tongaat Hullet model is unique in that in addition to comprising communal and old resettled farmers, it also has A1 and A2 farmers.

2.4.2 Sampling and Sample Size

The study used a stratified sampling method based on gender of household head to identify households to be interviewed. This technique was used to ensure that estimates are made with accuracy and that comparisons can be made with equal statistical power since the sample size of each layer (strata) is proportional to the size of the layer (sample size of layer = size of whole sample/size of population x size of layer).

The study used a sample size of 638 from the wards around Green Fuels Case Study. In this area, about 60.2% of the households are male headed and 39.8% are female headed. The sample size for the Tongaat Hullet Case Study was 501 being 72.5% male and 27.5% female headed households. If the sample is categorized based on type of farming community, the Green Fuels study area comprised of 97% communal and 3% small-scale farming households. The Tongaat Hullet study area had 44.1% A1 farmers, 16.6% A2 farmers, 20.2% communal farmers and 19.2% old resettlement farmers.

2.5 DATA COLLECTION METHODOLOGY

This study used three data sources namely secondary and primary data. Secondary data was obtained through document reviews and primary data was obtained through household interviews, key informant interviews and focus group discussions.

2.5.1 Document Reviews

This was used to collect secondary data especially policy and regulatory issues on agriculture investment. The review once nitrated on primary sources of laws that guide large-scale investment in Zimbabwe such as: The constitution of Zimbabwe, various Acts, Zimbabwe Investment Handbook (2016), The Comprehensive Zimbabwe Agriculture policy Framework CZAPF) (2012 -20132), and the Zimbabwe Agriculture Investment Plan (ZAIP) (2013 – 2018). The study also reviewed studies on the Impacts of large-scale conducted in other countries.

2.5.2 Key Informant Interviews

Qualitative in-depth interviews were held with knowledgeable members of the community. These community experts, with their particular knowledge and understanding, provided insights on the nature of benefits, problems and gave recommendations for solutions. The KIIs were conducted with the help of interview checklists. Some of the key informants include traditional chiefs, village heads, DAEOs, knowledgeable farmers, District Administrators, officials from the MAMID, Ministry of Lands, Ministry of Local Government, Ministry of Rural Development and Preservation of National Heritage, farmers' associations, company representatives and NGOs working in the study sites.

2.5.3 Household Interviews

The household interviews were conducted using a structured questionnaire to explore benefits that accrued, their productivity, food security and income levels. The face to face interviews were conducted by trained enumerators. The household questionnaire was administered at the ward level by agricultural extension workers and data capture using tablets installed with Kobo collect software to capture the responses.

2.5.4 Survey implementation

The research was conducted over a period of 16 days in January 2017. The researchers 9 days in Chisumbanje study site and 7 days in Tongaat Hullet. Household data was collected through tablets on the Kobocollect

platform. The use of this platform minimized the errors that inherent in entering data as the software has logical skip patterns and restrictions. Key informant Interviews and Focus Group Discussions were conducted with the aid of interview checklists. The informed was collected electronically through the use of high frequency recorders.

2.6 DATA ANALYSIS FRAMEWORK

2.6.1 Quantitative data analysis

Quantitative data collected through the Kobocollect software was imported from the Kobocollect data base into SPSS version 22. Preliminary data cleaning was done with a particular focus on completeness. Univariate analysis of food consumption score, income levels, production and productivity, school attendance, water sources and disease occurrences was done and descriptive statistics were used to present the findings. The Chi-square test and analysis of variance was adopted for testing the impact of large scale investments on livelihoods of smallholders.

In the absence of baseline data for the two case studies, the study used two analytical frameworks in order to take a position on the impact of large scale investments under the two cases studies:

Comparison of the before and after investment situation of the various impact indicators, and

- i. Comparison of measures of various impact indicators between beneficiaries and non-beneficiaries.

There was more emphasis on analytical framework ii. The study used inferential statistical tools including the analysis of variance (Anova) and the chi-square (X^2) to test statistical significance in the difference between means of beneficiaries and non-beneficiaries.

Table 2.1: The Impact Analytical Tools

Analysis Objectives		Questions or Variables?	H ₀	H ₁	Statistical Tool(s)
To assess the investment models and investors-community linkages, partnerships and relations of large-scale investments in the sugar industry		Investment operations? Value chain players? Investor-community linkages? Government role? Challenges and opportunities?	The effect of large-scale investments on livelihoods of rural communities is the same regardless of the model and circumstances.	The effect of large-scale investments depends on the investment model and how it is implemented in the circumstances of the area.	Value Chain Analysis Chi-square analysis
To assess the impact of agriculture investments on household	Land Ownership	Area ownership before and after investment?	Land ownership is the same before and after investment	Land ownership is different before and after the investment?	Descriptive Statistics One-Way Anova Expenditure levels Food Consumption Score Household Dietary Diversity Score
	Crop and livestock productivity	Yields and total production?	Productivity of beneficiary and non-beneficiary households is equal.	Productivity of beneficiary and non-beneficiary households is not equal.	
	education, water and health	Water sources? Distance to source? Children going to school? Water-related diseases?	Access to education, water and health for beneficiary and non-beneficiary is the same.	Access to education, water and health for beneficiary and non-beneficiary is different.	
	income levels	Income and expenditure levels?	Income of beneficiary and non-beneficiary are equal.	Incomes of beneficiary and non-beneficiary different.	
	food security	Food requirements? Consumption patterns?	Food security of beneficiary and non-beneficiary is same.	Food security of beneficiary and non-beneficiary different	
To evaluate the importance of benefits of large-scale investments on standard of living of rural communities?		Effect of benefits on standard of living?	Influence of different benefits on standards of living is equal.	Influence of all or some benefits on standards of living is different.	Chi-square Analysis One-way
To evaluate the influence of household characteristics on the impact of large scale investments		Household size and sex, age and education of household head?	The impact is the same across sex, age and education levels and household size.	The impact is different across household characteristics.	

3. LARGE SCALE INVESTMENT SUPPLY CHAIN

3.1 FORMS OF AGRICULTURE INVESTMENTS

Large scale agriculture investments can take many forms such as Public Private Partnerships (PPPs), equity and non-equity partnerships, Build Own Operate and Transfer (BOOT), Build Operate and Transfer (BOT), joint ventures (JVs), contract farming, and green field businesses. These are dependent on the investment area and the type of investor.

3.2 SUPPLY CHAIN COORDINATION MECHANISM

3.2.1 National Principles of Responsible Investment

This study established that Zimbabwe has the relevant institutional infrastructure – policies and investment incentives – for promoting responsible large scale agriculture investments in all their forms. In this regard, the 10-Point Plan of Economic Growth (2016) places private sector investment at the center of reviving agriculture and the agro processing value chain. The Constitution of Zimbabwe, the Zimbabwe Agenda for Socio-Economic Transformation (ZIMASSET), Zimbabwe Investment Authority Act, Environmental Management Act, Indigenization and Economic Empowerment Act and the Zimbabwe Agriculture Investment Plan (ZAIP) reflect a great deal of domestication of the key principles of responsible investment outlined in the FAO Principles for Responsible Investment in Agriculture and Food Systems and the Guiding Principles for ACP Countries' Investment Policy Making.

Table 3.1: National Framework for Responsible Investment in Zimbabwe

Institutional Infrastructure	Responsible Investment Principles – Large scale Investments are expected to:
Constitution Of Zimbabwe	Observe human rights and freedoms, and recognize the inherent dignity and worth of each human being, equality of all human beings, and gender equality; promote a sustainable, just, free and democratic society in which people enjoy prosperous, happy and fulfilling lives; and lead to attainment of national development, empowerment and employment creation, food security and better access to education, shelter and health services.
Zimbabwe Investment Authority Act	Develop the local populace; transfer skills and technology for the benefit of Zimbabwe and its people, rather than merely focusing on profit-making. Create employment opportunities, develop human resources and deal with adverse consequences the investment is likely to have on the environment.
Environment Management Act	Put in place measures to address identified potential environmental, social and economic impacts of projects in mining water supply, irrigation, agriculture, waste treatment, power-generation, oil and gas exploration, various industries, infrastructure development, forestry, dams and housing projects on the community or the nation as a whole.
Indigenization and Economic Empowerment Act	Empower communities to attain developmental goals from the proceeds of natural resources found in their localities not to hide under the voluntary nature of corporate social responsibility.
Zimbabwe Agenda For Sustainable Socio-Economic Transformation	Empower society and grow the economy through judicious exploitation of the country's abundant human and natural resources anchored on indigenization, empowerment and employment creation.

Institutional Infrastructure	Responsible Investment Principles – Large scale Investments are expected to:
Zimbabwe Agriculture Investment Plan	Increase production and productivity through improved management and sustainable use of land, water, forestry and wildlife resources; increase participation of farmers in domestic and export markets through development of an efficient agricultural marketing system; increase food supply, reduce food insecurity and malnutrition among vulnerable people, and strengthen responses to food crisis; and improve agricultural research, technology dissemination and adoption.

3.2.2 Investments Incentives

Table 3.2: Investment Incentives in Agriculture

Category	Form of Agriculture Investment	Incentives Structure
Income Tax	BOOT, BOT Contractors contracted by state or Statutory Corporation, construct infrastructure and operate or control for a specified period and transfer ownership or control to the state or statutory corporation	Tax holiday for first 5 years Taxed at 15% for the second five years
	Exporting Manufacturing Processing Companies exporting 50% or more	Special rate of 20% per annum
	Expenditure on construction of new industrial buildings, farm improvements, railway lines, staff housing and tobacco barns.	Special Initial Allowance at a rate of 25% of cost from year one
	Expenditure on fencing, clearing and stamping land, sinking boreholes, wells, aerial and geophysical surveys	Farmers' Special Deductions over and above the normal deductions
Value Added Tax	Importation of farming inputs and equipment such as animal feed, animal remedy, fertilizer, plants, seeds and pesticides and equipment or machinery used for agricultural purposes	Zero rated for VAT
	Importation of capital equipment for exclusive use in agricultural and whose investment generally relies on imported capital	The whole amount becomes due within 90 days from the date of deferment

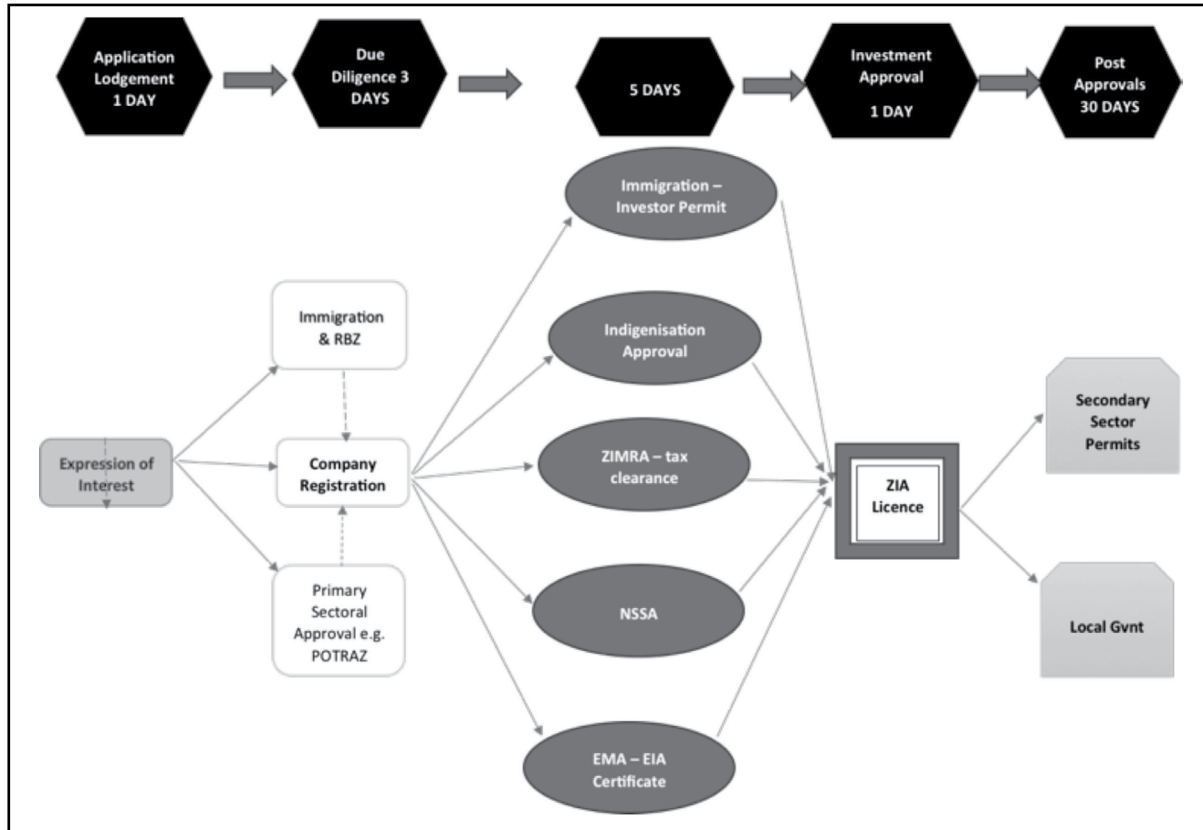
Table 3.3: Incentives for Companies in Special Economic Zones

Category	Incentive Structure
Income Tax	Corporate tax of 15%, after the tax holiday.
	Exemption from liability to pay Non Resident Shareholders' Tax (NRST) on dividends distributed to non- residents.
	No liability for branch profits tax on a branch of a foreign registered company.
	No liability for withholding tax with regard to dividends distributed locally by a company licensed to operate in an EPZ.
	Exemption from withholding taxes on management & technical fees, remittances and royalties for a person operating in an EPZ.
	No liability for tax on any capital gains arising from the sale of property forming part of an investment in an EPZ.
	Exemption on fringe benefits for persons employed by a licensed EPZ investor to the extent of 50% of the employee's other taxable income from the investor.
Value Added Tax	Duty free importation of raw materials and capital goods.
	Refund of VAT paid on procurement from customs.

3.2.3 Investment Flow Process

The study established that there are clear investment promotion procedures at the national level as depicted in figure 3.1.

Figure 3.1: National Investment Flow Chart



Source: MMEPIP

All investment applications are lodged with the Zimbabwe Investment Authority (ZIA). The ZIA then coordinates and facilitates the acquisition of the requisite permits and licences from relevant primary and secondary sectors. Although this investment flow is very clear at the national level, is missing at the provincial and district levels. Consequently, investments by-pass provincial and district administration offices. The provincial and district level administrators are only called in to resolve conflicts with communities. As remarked by one of the key informants;

“In most cases we only hear from the ground that there is now an investor doing such and such. These investors by pass and establish their businesses in the community without our knowledge. However, they only look for us when they run into problems on the ground”

These sentiments were highlighted by key informants in the two study sites. They reflect that investors have no respect for local government offices. In fact, they only recognise the importance of such offices when they run into problems.

Key further informants further highlighted that such challenges could be averted by establishing investment promotion and coordination structures at a local level. For instance one of the key informants from Chisumbanje had this to say;

“The issue of being by passed by investors can only be solved if we the authorities establish investment promotion and coordination structures at a lower level. That way, Provincial and District Development Committees will be accorded their due respect by investors”.

3.3 KEY AGRICULTURE INVESTMENTS IN MANICALAND AND MASVINGO PROVINCES

3.3.1 MANICALAND PROVINCE

Perspectives of Priority Investment Areas	Key Investment Projects on the Ground				Challenges	
	Title	Benefits to Local Communities*	Specific to investment	General	Specific to investment	General
1. Forestry There are currently 120 ha under forestry. There is room for expansion as there are conducive climatic conditions.	Zimbabwe Consolidated Mines (Chiadzwa)	Houses, Piped water system, Irrigation Schemes	Resettled families in Transau are discontent. Irrigation not functioning.	The introduction of investment projects to communities by passed local coordination structures. Investors are personalized by politicians and some investments politicized.		
	Chisumbanje Ethanol Project (Green Fuels)	Dryland farming area for 1 060 households incorporated in core estate. Settlers Scheme with 241 households on 650ha. 172 households allocated 0.5 ha irrigation plots School rehabilitation and feeding programs 22 borehole drilled	The dispossessed households re-allocated dryland farming area 12 km away from their homesteads. 888 households still await allocation of 0.5ha of irrigation plots. Stagnant water in canals is promoting the spread of malaria.	There is need for investment flow guidelines for investors like the PVO Act, which guides NGOs in order to improve coordination and monitoring of investments at the local level. Currently coordination is through the Provincial Development Committee and the ZIMASSET Value Addition and Beneficiation Cluster.		
3. Market Linkage Promotion of market linkages for horticulture produce	Horticulture Produce: Cairns Foods. Gold and Tabasco Chilli project.	Out grower schemes				
	Howeth Coffee Production, Vumba	Out grower services to 20 small-scale farmers with 2-5 ha. Market linkages with Zimbabwe Coffee Mills.				The projects usually come to the PDC when they have already started where the PA have supported technical committees of the cluster mainly in dispute settlement.
4. Resuscitation of Industry Resuscitation of the Mutare board and paper mills.	Banana Production: Matanuska and Makandi Estates	In 2016 Matanuska subdivided 14 ha to smallholder farmers. Provides suckers, training and a guaranteed market.				Farmers in irrigation schemes do not have adequate knowledge on fertilizer application and on the right seed.
	Tea, Coffee and Macademia: Tanganda, Busi Estates and Southdowns (Ariston).	Out grower scheme Market linkages Tanganda has 5 estates with factories, Tingamira, New year's Gift, Rattlehoeck, Jersey and Zona. Ariston has 2 factories, Clear Water and Southdowns.				Access to irrigation water is a challenge.
5. Diamond and Gold processing	Avocado: Busi Estates company					
	Maize: Makandi Holdings (300Ha yielding 9-10 tons/Ha)					
	Dairy: Dairiboard Zimbabwe Limited (DZL) supported by large-scale commercial farmers					

*There has been a lot of support from private sector on education water and sanitation.

3.3.2 MASVINGO PROVINCE

Perspectives of Priority Investment Areas	Key Investment projects on The Ground			Challenges	
	Title	Benefits to Communities	Specific to Investment	General to the Province	
1. Agro-processing for citrus in Mwenezi and Chiredzi districts 2. Resuscitation of CSC operations in the province 3. Irrigation Development (Tokwe Mukosi has capacity to irrigate more than 25 000Ha). 4. Market development for small grains 5. Rehabilitation and construction of Small irrigation schemes 6. Construction and rehabilitation of dip tanks 7. Water and sanitation Projects 8. Sugarcane Production Establishment of Mill in Mkwesine and Tokwe Mukosi	Sugar Cane - Tongaat Hullet Tourism: Wildlife and Conservancies - Save valley, Malilangwe and Chiredzi river Livestock - cattle production Irrigation Schemes - mainly supported by development partners Crocodile and fish farming	Provide inputs to farmers who pay at marketing. Yield is about 130 tonnes/ha. 8 tonnes of raw cane convert to 1 tonne of sugar @ \$550/tonne. Waste water managed through sewer ponds back by a stringent mosquitos spraying program There are two hospitals in Triangle	Mixed views on viable area for sugarcane. High transport cost for farmers 40km away from the mill. Division of Proceeds (DOP) determined by Ministry of Industry and Commerce. MAMID not involved. Currently at 23:77 compared to 25:75 regionally. Tongaat controls price through Zimbabwe Sugar Sales, which is wholly owned by Triangle and Hippo Valley. The Sugar Act is only recognizes one sugar association.	Investments coming into the Province haphazardly. There is no broader framework to guide operations of investment in provinces and district. Ideally the PA's office introduces investors to the district and coordinates government departments in identification of potential areas of cooperation. Government departments should provide policy advice and extension support and project monitoring and evaluation while Non-Governmental Organizations focus on project implementation.	
	Contract farming Schemes - Northern Farming, Delta Cotton production Seed - Zimbabwe Super Seeds (sugar beans, cowpeas)	Market linkages with Rencho mine, Mashava mine and Bikita minerals.			

The study established mixed views on the viability of sugarcane. While farmers are crying for an increase in land holding for sugarcane production arguing that 115 ha is ideal to be viable, there are views that the ideal area for breaking even is dependent on yield, 70 tonnes/ha and below is not viable. The major cost drivers for sugar were singled out as follows:

- i. Labor – 25-30% (1 labor unit =2-3Ha which is around \$160/month)
- ii. Transport – once the distance exceeds 10km it is no longer viable there will be need for rail
- iii. Irrigation related costs-bulk water cost and conveyance
- iv. Land preparation-work on a 10% plough out and replant
- v. Transport costs 5km radius - \$20-22, From Mkwazine a 70km radius -\$40-50 per bundle.

TONGAAT HULLET ZIMBABWE CASE STUDY

1.1 THE VALUE CHAIN ANALYSIS

1.1.1 Investment Model and Value Chain Structure

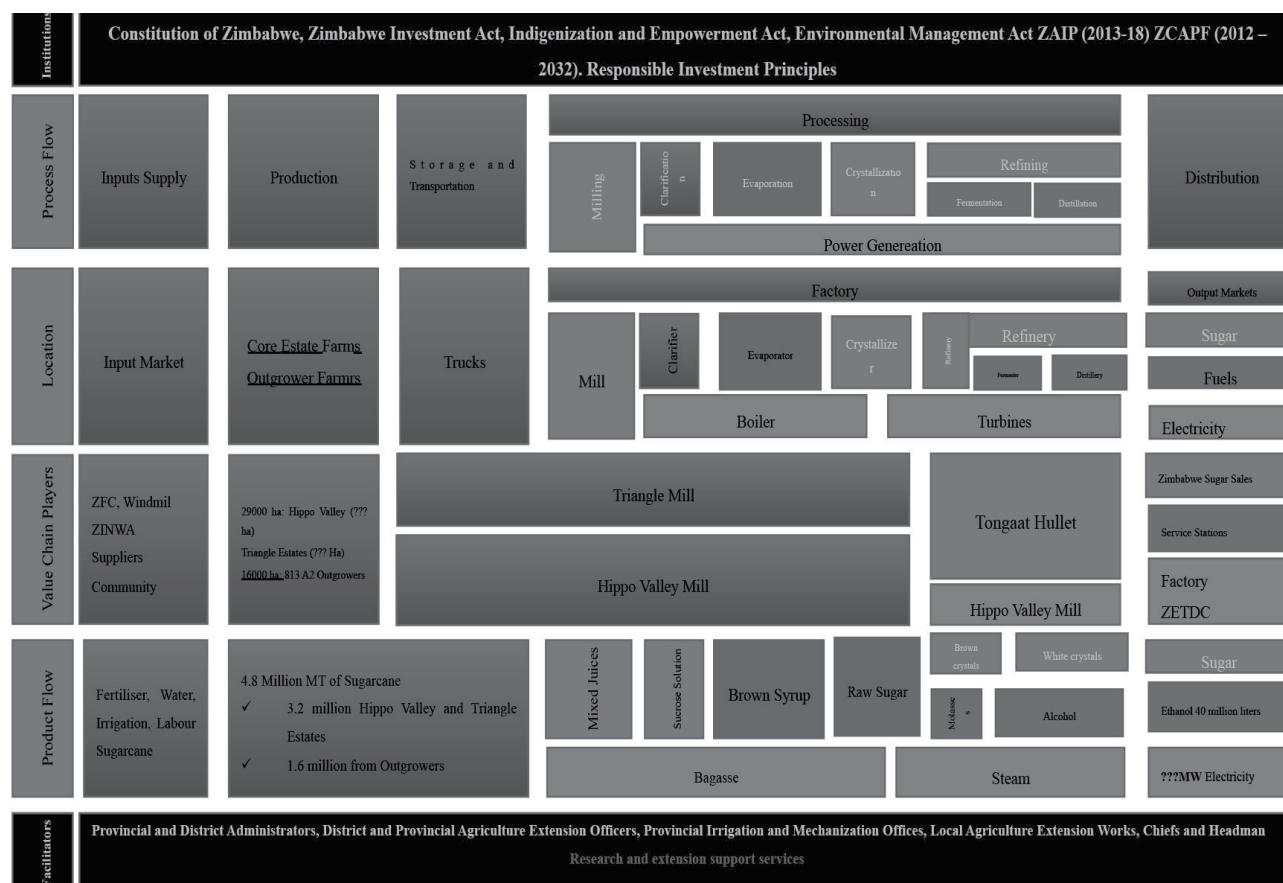
Tongaat Hullet Zimbabwe is a subsidiary of Tongaat Hullet Limited which is listed on the Johannesburg Stock Exchange (JSE). The Tongaat Hullet investment model in Zimbabwe comprises of sugarcane production and processing operations at Hippo Valley and Triangle Estates and sugar refining to produce refined sugar at Triangle Estate. The model also include low levels of ethanol and electricity production at Triangle.

Table 4.1: Tongaat Hullet Zimbabwe Investment Model

Sugarcane production	The company has 29 000 ha producing in excess 3.2 million MT of sugarcane per annum at Hippo Valley and Triangle Estates. There are also 813 resettled out grower sugarcane farmers with 16 000 ha, with a potential to produce a further 1.6 million MT of cane per year.
Sugarcane milling	The Triangle and Hippo valley Estates have a combined annual crushing capacity of approximately 4.8 million MT of cane per year. Total refined sugar installed capacity is 140 000MT per year. Installed raw sugar production capacity is 640 000MT per season, with a potential to increase production capacity to 700 000MT through efficiency improvement initiatives.
Sugar Refining, and ethanol production	The Triangle Estates ethanol plant has an installed capacity of 40 million litres over a 48 week production season.

Figure 3.1 shows the value chain structure of the Tongaat Hullet Zimbabwe investment. It shows the players and facilitators and their roles; processes and product flows, and their location; and key institutions that promotes and guide large-scale agriculture investments.

Figure 4.1: Tongaat Hullet Sugar Value Chain Structure



Tongaat Hullet Zimbabwe is represented at each stage of the supply chain through equity partnerships and membership of relevant farmer structures. There is wider supply base comprising of Triangle, Hippo Valley and 813 out grower farmers. This puts farmers on a better footing to negotiate the price of raw sugarcane. This is irrespective of the fact that the out growers supply about 46% of the throughput to the mills. The opposite is true for price negotiation for the final product – raw sugar. The market is duopoly for milling (Triangle and Hippo Valley) and a monopoly for refining (Triangle). Tongaat enjoys an equity partnership with the Zimbabwe Sugar Sales in the pricing and marketing of refined sugar.

1.1.2 Value Chain Coordination Mechanism

The study sought to explore how products, finance and information are coordinated along the sugar value chain. Further this study also sought to single out challenges and document lessons learnt. The study that established the flow of products, finance and information along the value chain for the Tongaat Hullet case is coordinated through public private partnerships, out growers and government policy.

1.1.2.1 Public and Private Equity Partnerships

Tongaat Hullet Limited owns 50.35% of Hippo Valley Estates and 100% of Triangle Limited, who supply cane to the processing plant. The Mtrikwi Sugar Company is a joint venture sugar cane production company between Triangle Limited (51%) and Nuanetsi Ranch (49%) which is owned by Development Trust of Zimbabwe a state owned enterprise. Private independent shareholders of Hippo Valley Estate constitute 35% while the remaining 65% of the shares are owned by these comprise collective ownership schemes. These collective ownership schemes include Old Mutual Zimbabwe Holding (14.85%), National Social Security Authority holding (5.84%), Mining Industry pension fund owning (1.03%) and the Catering industry pension fund holding (0.4%). Tongaat Hullet partnerships span from production through processing to marketing level through the Zimbabwe Sugar Sales (ZSS). The ZSS is owned by Tongaat Hullet and does all the price negotiation with farmers. At the negotiation, the farmers only have one seat.

1.1.3 Out grower Scheme

Tongaat Hullet has 813 out grower farmers comprising old resettled farmers in 1982 and A1 and A2 farmers resettled through government's Fast Track Land and Resettlement in 2000. These out growers have total of 16 000 ha supply 46% of the mill requirements by area. Key informants interviews established that the company has a vision to increase out grower area to about 37 000 ha and increase its contribution to the mill to 59%.

Tongaat Hullet provides inputs to farmers and buys all the cane produced. Farmers are paid on the basis of sugar assuming a conversion ratio of cane to sugar of 8:1 and an agreed Division of Proceeds (DoP). This study established that out growers were not satisfied with the DoP of 25:75. In fact, they were preferring a DoP of 23:77 in favour of the farmers which was later confirmed by the Minister of Industry and Commerce.

1.1.4 Government Policy and Regulations

There are three sugar associations in Zimbabwe. Amongst the three, only Zimbabwe Sugar Association (ZSA) is recognized by The Sugar Act only recognizes the Triangle and Hippo Valley Estates are also members of the association by virtue of being producers.

1.2 DEVELOPMENT PROGRAMMES

1.2.1 Resettlement of Households

The 813 out grower farmers for Tongaat Hullet comprising of old resettled farmers resettled in 1982, and A1 and A2 farmers resettled in 2000 through government's Fast Track Land and Resettlement. This is evidence of collaboration between Government and the investor.

1.2.2 Community Programmes

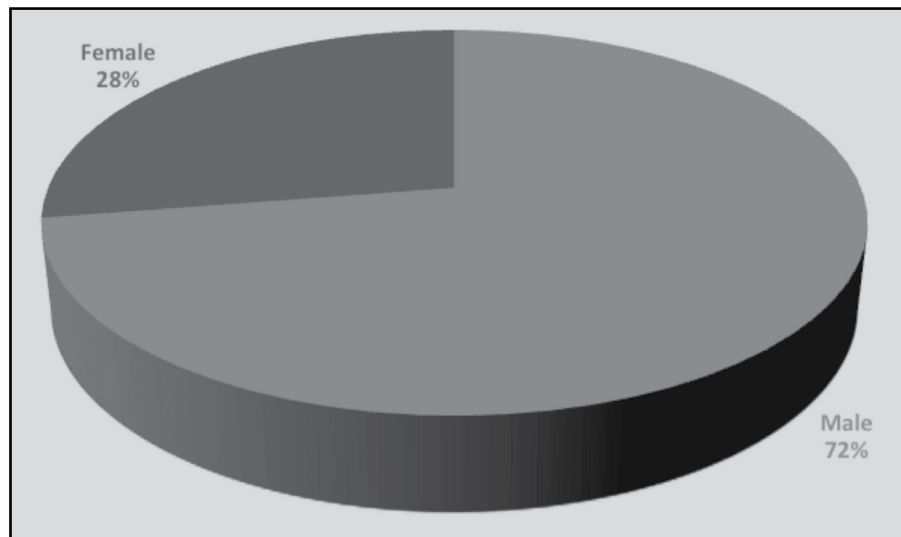
The major investor-community linkages for Tongaat include the rehabilitation of the Buffalo Range airport, construction and rehabilitation of schools and clinics, implementation of a CSC Cattle Scheme, implementation

of a mosquito spraying programme, and provision of transport to school for children of its employees in Hippo Valley Estates.

1.3 HOUSEHOLD DEMOGRAPHICS

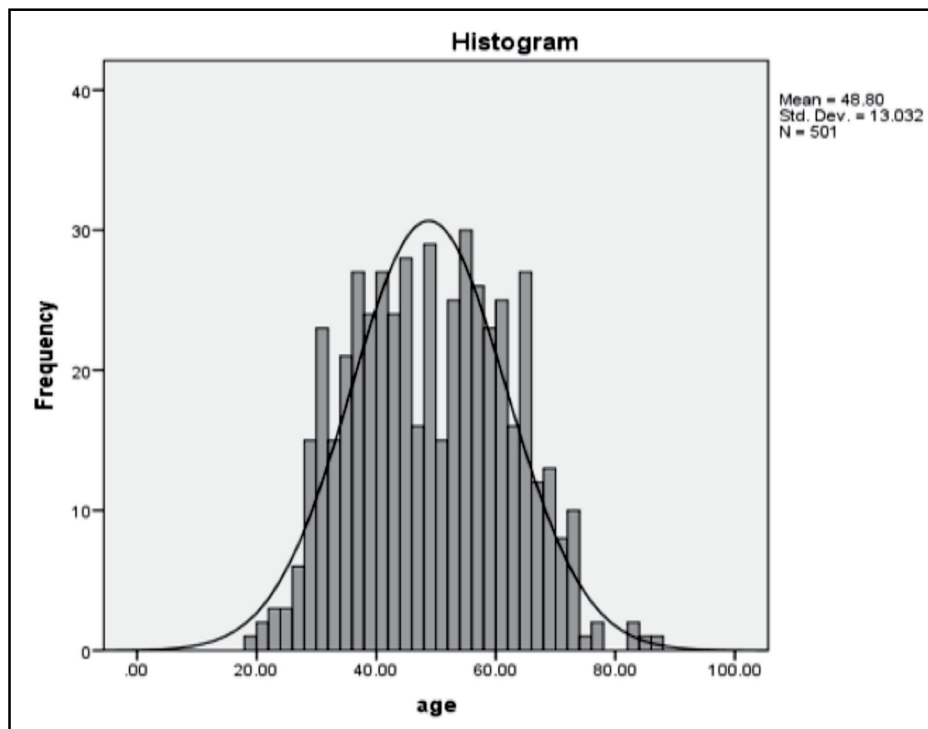
The study interviewed 591 households comprising of 72.5% male headed households and 27.5% female-headed households (see Figure 5.2). The sampled households had an average household membership size of 6.

Figure 4.2: Proportion of Male and Female Households Interviewed



Source: survey data

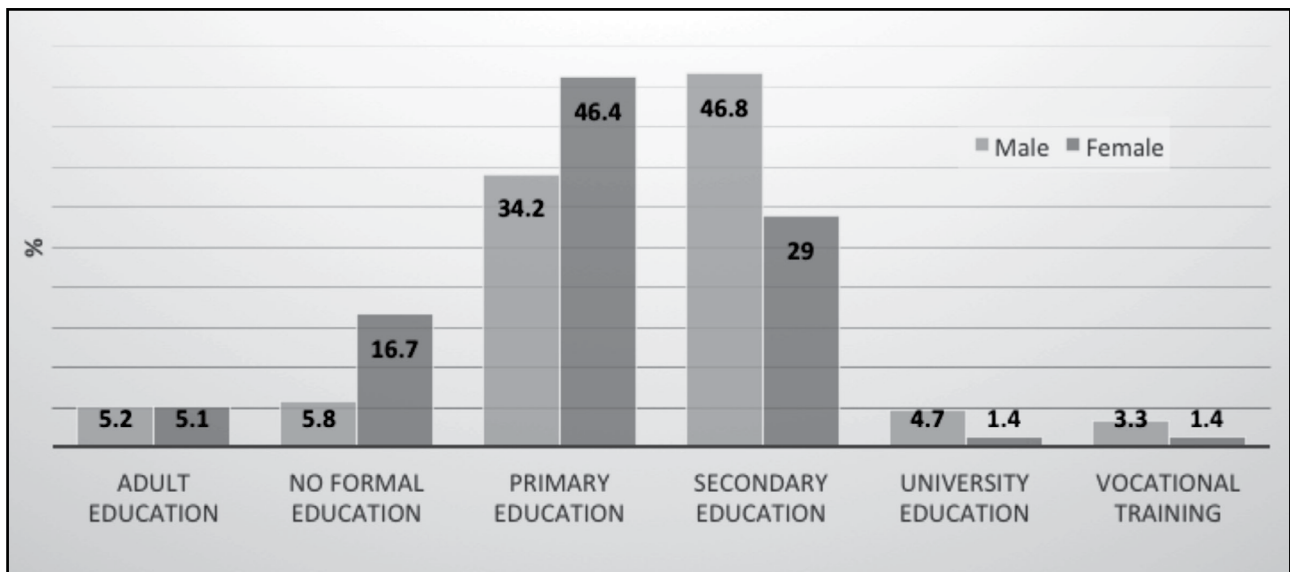
Figure 4.3: Distribution of Age of Household Head for Interviewed Households



Source: Survey data

The average age of the respondents was 49 years. The age structure followed a normal distribution curve.

Figure 4.4: Education level of household head



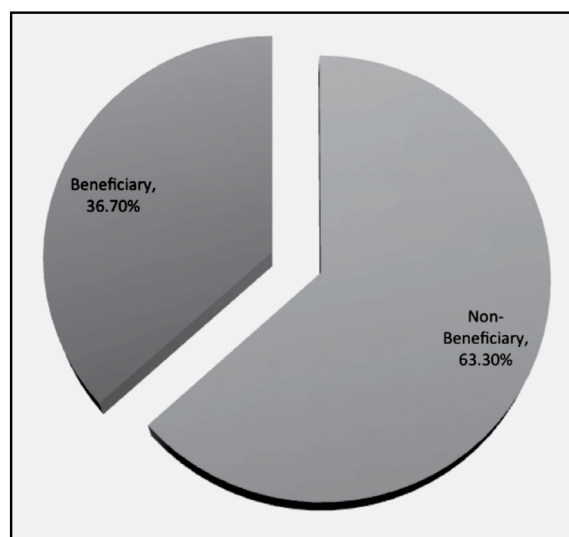
Source: survey data

More female-headed households had primary and non-formal education levels compared to their male counterparts. The male-headed households had more secondary, university and vocational training education than female-headed households. About 34.2% and 46.8% of male-headed households had primary and secondary education respectively compared to 46.4% and 29% of the female headed households with primary and secondary education respectively.

1.4 INVESTMENT BENEFITS ANALYSIS

The Tongaat Hullet model had more non-beneficiaries than beneficiaries. About 36.7% benefited directly compared to 63.3% did not benefit directly. The results in Figure 5.5 showed that the proportion of beneficiary female-headed households (40.6%) and that of male-headed households (35.5%) are less than those of non-beneficiary female (59.4%) and male (64.7%) headed households respectively. The Chi-square results however, confirmed that the difference in the proportions was not statistically significance at 5% level of significance. Hence, the Tongaat model benefited equal proportions of male and female headed households and can be said to have been gender sensitive.

Figure 4.5: Proportion of Beneficiary and Non-beneficiary Households by Sex of Household Head

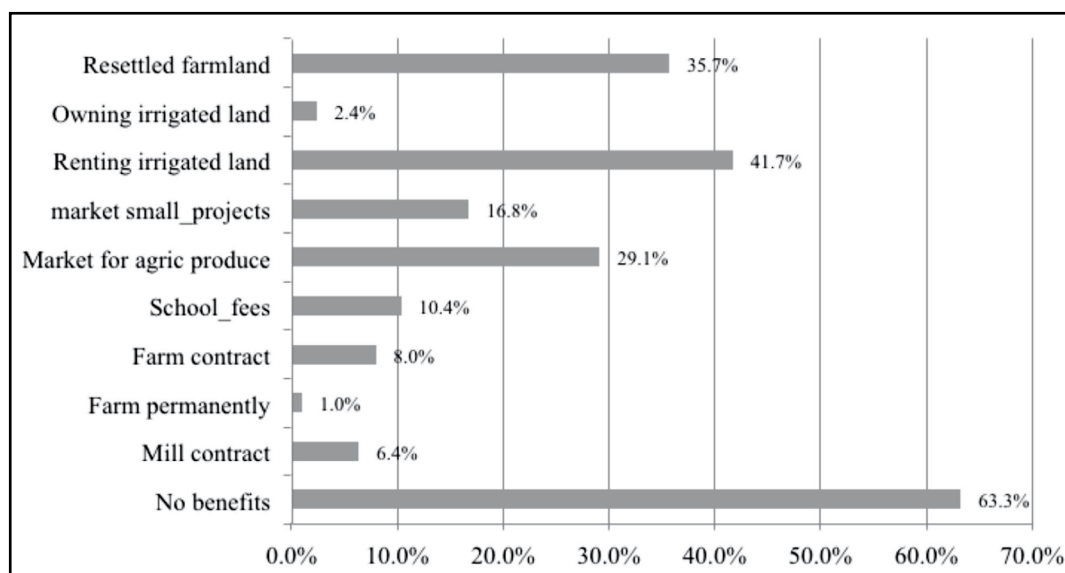


Source: survey data

Benefits of large scale investments

The benefits that were identified by farmers were renting irrigation (41.7%) resettled farmland (35.7%), and ready market for agricultural produce (29.1%) and small projects (16.8%). Only 1% of the respondents indicated permanent employment at the sugarcane farm with 8.0% under contract employment at the farm. None of the respondents were permanently employed at mill. Only 6.4% of the respondents were employed under contract at the mill. The renting of irrigation is indicative of a high demand for irrigation that remains in the area.

Figure 4.6: Type of Investment Project benefits

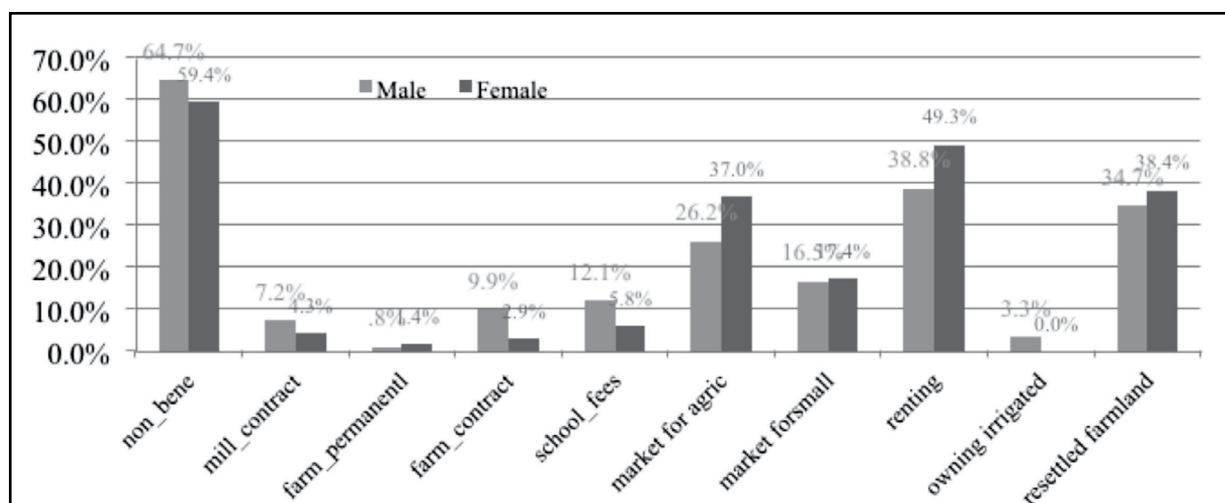


Source: Survey data (multiple response)

Distribution of Households Benefits by Gender

Results from the survey show that for both male and female headed households, the benefits that accrued to the highest proportion of households was renting irrigated (38.3% and 49.3%), resettled on farm land (34.5% and 38.4%) and market for agriculture produce and small projects respectively. There are no female-headed households owning irrigation. Employment on the farm and mill only benefit small proportions of the surrounding communities. This suggests that the level of employment that an investment will generate may have very minimal benefits to the community.

Figure 4.7: Frequency Distribution of Households Benefits by Gender



Source: survey data (multiple response)

Table 4.2: Distribution of Benefits from LSC Investment and Age Groups – Youth, Adult and Aged

Benefits	15.00 - 34.00			35.00 - 64.00			65.00+		
	Count	Within Benefit %	Within Group %	Count	Within Benefit %	Within Group %	Count	Within Benefit %	Within Group %
Non beneficiary	62	19.6%	81.6%	232	73.2%	64.8%	23	7.3%	34.3%
Mill contract	7	21.9%	9.2%	23	71.9%	6.4%	2	6.3%	3.0%
Farm permanent	0	0.0%	0.0%	5	100.0%	1.4%	0	0.0%	0.0%
Farm contract	3	7.5%	3.9%	34	85.0%	9.5%	3	7.5%	4.5%
School fees	16	30.8%	21.1%	33	63.5%	9.2%	3	5.8%	4.5%
Ready market for agriculture produce	12	8.2%	15.8%	99	67.8%	27.7%	35	24.0%	52.2%
Ready market small projects	5	6.0%	6.6%	57	67.9%	15.9%	22	26.2%	32.8%
Renting irrigated land	40	19.1%	52.6%	149	71.3%	41.6%	20	9.6%	29.9%
Owning irrigated land	3	25.0%	3.9%	8	66.7%	2.2%	1	8.3%	1.5%
Resettled farmland	13	7.3%	17.1%	124	69.3%	34.6%	42	23.5%	62.7%

Source: Survey data

Benefits from LSC Investment and Sex of Household Head

The row result show the percentages of each sex that benefited from each benefit. The result is consistent with the fact that there are more male-headed households in the sample. Hence more of them benefited. The column results (with each sex of household head) the model benefited a larger proportion of female-headed households compared to their male counterparts under each benefit. There are no female-headed households owning irrigated land, which goes well with higher proportion of female-headed households renting land (49.3%), reflecting a higher demand for land among women in the area. The result suggests that benefits from LSC investments benefit male and female head households to different levels.

Table 4.3: Benefits from LSC Investment and Sex of Household Head

Benefits	Sex of Household Head					
	Male			Female		
	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	235	74.1%	64.7%	82	25.9%	59.4%
Mill contract	26	81.3%	7.2%	6	18.8%	4.3%
Farm permanent	3	60.0%	.8%	2	40.0%	1.4%
Farm contract	36	90.0%	9.9%	4	10.0%	2.9%
School fees	44	84.6%	12.1%	8	15.4%	5.8%
Ready market for agriculture produce	95	65.1%	26.2%	51	34.9%	37.0%
Ready market small projects	60	71.4%	16.5%	24	28.6%	17.4%
Renting irrigated land	141	67.5%	38.8%	68	32.5%	49.3%
Owning irrigated land	12	100.0%	3.3%	0	0.0%	0.0%
Resettled farmland	126	70.4%	34.7%	53	29.6%	38.4%

Source: Survey data

1.5 BENEFITS IMPACT ANALYSIS

Dryland Land Holding

Table 5.4 presents the results of the distribution of land sizes by beneficiary type. About 28.1% of non-beneficiary households owned less than 2 ha dryland compared to 77.7% under beneficiaries. Hence more non-beneficiaries (71.9%) have large dryland ownership (greater than 2 ha) than beneficiaries (22.3%). The ownership structure within each land size favours beneficiaries for within the ≤ 2 ha land size and 10+ ha where 61.6% and 90% are beneficiaries. Under 2.1 – 5.0 ha and 5.1 – 10.0 ha, 77.8% and 93.8% are non-beneficiaries respectively. This result is consistent with the result of the analysis of dryland ownership by sector. This showed that the average dryland owned before the households were allocated sugarcane plots increases except for A2 farmers. The ownership before the investment was 1.9 ha for old settlers, 1.6 ha for A1 farmers, 2.5ha for A2 farmers and 2.5 ha for communal. Currently old settlers own an average of 3.6 ha, which surrounds the homestead, A1 farmers 4.6 ha, A2 farmers 2.2 ha. The result for A2 farmers is due to the fact that they benefited larger pieces of irrigated area where their main enterprise is and they are fully engaged in sugarcane. The results are consistent with the objectives of Phase 1 and 2 of the land reform and resettlement programme of increased access to land and access to productive resources respectively.

Table 4.4: Size of Dryland Landholding by Beneficiary Status

	Size of Dryland Landholding (Ha)											
	≤ 2.0			2.1 - 5.0			5.1 - 10.0			10.1+		
	Count	With Status %	Within Land %	Count	With Status %	Within Land %	Count	With Status %	Within Land %	Count	With Status %	Within Land %
Non beneficiary	89	28.1%	38.4%	77	24.3%	77.8%	150	47.3%	93.8%	1	.3%	10.0%
Beneficiary	143	77.7%	61.6%	22	12.0%	22.2%	10	5.4%	6.3%	9	4.9%	90.0%

Source: Survey data

Dryland Land ownership by age category

The average dryland ownership for beneficiaries increased by 42% from 2.1 ha to 2.9 ha while it increased by 121% for non-beneficiaries from 1.9 ha to 4.2 after the investment. The increase was for all the non-beneficiary and beneficiary age groups, except the 65+ year's beneficiary group which actually had a decrease in dryland ownership. This reflects a labour challenge since they are out of the economically active group.

Table 4.5: Distribution of dryland Land ownership by age category

Beneficiary status	Age category	Dryland before (Ha)	Dryland after (Ha)
Non beneficiary	15.00 - 34.00	1.3	4.2
	35.00 - 64.00	2.0	4.2
	65.00+	2.3	4.4
	Total	1.9	4.2
Beneficiary	15.00 - 34.00	1.6	4.0
	35.00 - 64.00	1.6	2.5
	65.00+	3.8	3.6
	Total	2.1	2.9

Source: survey data

Table 4.6: Distribution of Irrigation Ownership by Beneficiary Status

	Size of Irrigation Landholding (Ha)														
	<= 0.5Ha			0.5 – 3			3 - 6			6 - 12			12.+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	309	97.5%	95.4%	0	0.0%	0.0%	8	2.5%	88.9%	0	0.0%	0.0%	0	0.0%	0.0%
Bene	15	8.2%	4.6%	3	1.6%	100.0%	1	.5%	11.1%	96	52.2%	100.0%	69	37.5%	100.0%

Source: Survey data

Irrigation Owned Before and After Investment by age Category

The results of the layered chi-square confirm that non-beneficiaries own less than 0.5 ha of irrigated land, with the largest land sizes (0.3 ha) owned by the 64+ age group and the least 0 ha) for 15-34 age group. The result show that beneficiaries own an average of 15 ha of irrigated land, with the largest land area being owned by the elderly (15.4 ha), 35-64 age category owning 14.7 ha and the 15-34 age group owning an average of 12.6 ha.

Table 4.7: Distribution of Irrigation Owned Before and After Investment by age Category

Beneficiary status	Age category	Irrigation owned before	Irrigation owned after
Non beneficiary	15.00 - 34.00	0.00	0.00
	35.00 - 64.00	0.00	0.20
	65.00+	0.00	0.30
	Total	0.00	0.20
Beneficiary	15.00 - 34.00	0.00	12.60
	35.00 - 64.00	0.33	14.70
	65.00+	0.36	15.40
	Total	0.31	14.70

Source: Survey data

Table 4.8: Distribution of Irrigated land owned by sector

Beneficiary status	Sector	Irrigation owned before and After Project	
		Before (Ha)	After (Ha)
Non beneficiary	A1	0	0.2
	Communal	0	0.0
	Total	0	0.2
Beneficiary	A1 (before 2000)	2	9.8
	A2 (Before 2000)	0.6	20.9
	Old settlers (in 1982)	0	9.6
	Total	0.3	14.7

Source: Survey data

Crop Production and Productivity

The investment introduced sugarcane production to smallholders and increased productivity of maize and sugar beans for some benefits. Non-beneficiaries had the lowest crop yields for all crops. Different benefits drove productivity differently across crops. The productivity of sugarcane varied below its potential yield of 120 T/ha across all investment benefits. The productivity is high for the employed at mill contract and farm permanent, and low for resettled and markets for agriculture and small projects. This suggests better knowledge and skills transfer to the employed which makes them more productive than those with other benefits.

The results suggests that LSC investment improve productivity of sugarcane, maize and sugar beans. However, there is still need for interventions to raise sugarcane, maize and sugar beans productivity to their potential maximum yields. The issue of viable sugarcane land sizes came out during focus group discussions. There was no consensus. Where others indicated that a sugarcane farmer needed not less than 100 ha of land to be viable, others argue that the issue of viability all rests on productivity. This later view was confirmed by key informants who strongly had the view that farmers should produce not less than 80 T/ha.

Table 4.9: Analysis of Crop Yields versus Benefits form LSC Investment

	Sugarcane	Maize	Sugar beans
Non beneficiary	0.00	0.35	0.01
Mill contract	84.64	0.94	0.00
Farm permanent	100.00	0.67	0.00
Farm contract	52.68	0.76	0.01
School fees	100.00	0.14	0.00
Ready market for agriculture produce	64.53	1.80	3.77
Ready market small projects	55.50	2.22	2.75
Resettled farmland	58.37	2.14	2.48

Source: Survey data

Table 4.10: Distribution of Cereals Productivity by Beneficiary Status and Sector

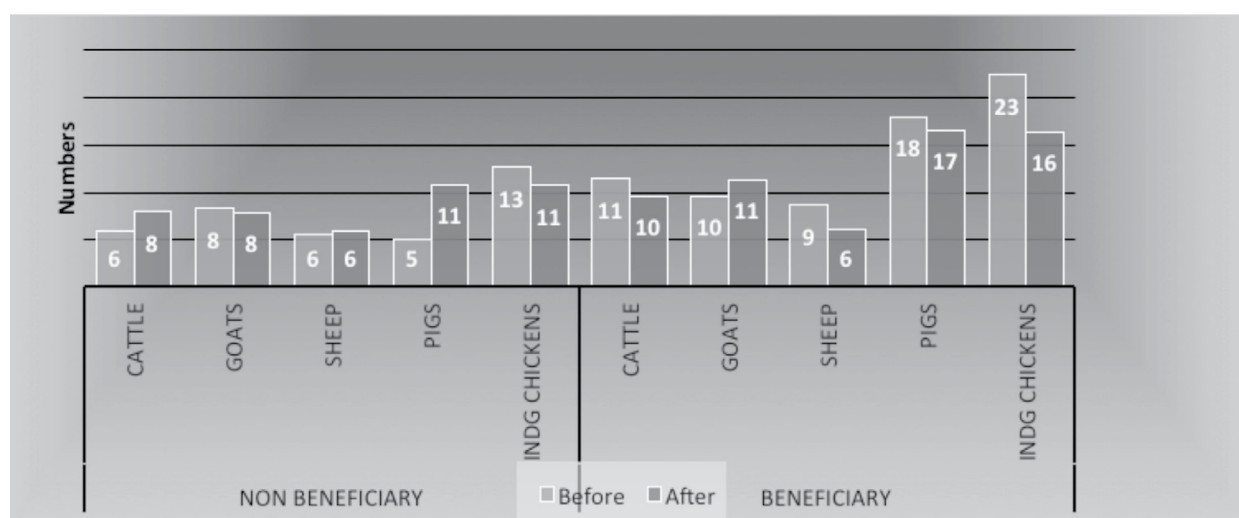
Beneficiary status	Sector	T/HA				
		Maize dryland	Maize irrigation	Sorghum	P Millet	Rapoko
Non beneficiary	A1	0.6	0.5	0.0	0.1	2.0
	Communal	0.0	0.0	0.1	0.1	0.1
Beneficiary	A2	2.6	0.4	0.1	0.0	0.0
	Old settlers	0.8	2.0	0.1	0.0	0.5

Source: Survey data

Livestock Ownership Before and After the Investment Project

The results show that beneficiaries owned more livestock before and after the project. However, livestock ownership for all classes of livestock decreased for both beneficiaries and non-beneficiaries, except for pigs for non-beneficiaries. The reduction in indigenous chicken from an average of 13 to 11 for non-beneficiaries and 23 to 16 for beneficiaries was caused as a result of an outbreak of new castle disease.

Figure 4.8: Livestock Ownership Before and After the Investment Project



Source: Survey data

1.5.1 Income and Expenditure

The row results show that more non-beneficiaries are below the US\$3 000 income category while beneficiaries are more above the US\$6 000 income categories. This is also reflected in the column results. These show that beneficiaries have higher proportion of households under each income category above US\$6 000. The study concluded that large scale investments increased income. The study broke down the individual benefits and cross-tabulated the benefits and income categories to see if all benefits translate to higher income and expenditure.

Table 4.11: Expenditure by beneficiary status

Beneficiary status	<= 3000.00			3001.00 - 6000.00			6001.00 - 12000.00			12001.00+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	313	98.70%	97.80%	4	1.30%	50.00%	0	0.00%	0.00%	0	0.00%	0.00%
Beneficiary	7	3.80%	2.20%	4	2.20%	50.00%	63	34.20%	100.00%	110	59.80%	100.00%

Source: Survey Data

Table 4.12: Benefits by Expenditure Categories

Beneficiary Status	Total Expenditure											
	<= 3000.00			3001.00 - 6000.00			6001.00 - 12000.00			12001.00+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	313	98.7%	97.8%	4	1.3%	50.0%	0	0.0%	0.0%	0	0.0%	0.0%
Mill contract	24	75.0%	7.5%	0	0.0%	0.0%	0	0.0%	0.0%	8	25.0%	7.3%
Farm permanent	4	80.0%	1.3%	0	0.0%	0.0%	1	20.0%	1.6%	0	0.0%	0.0%
Farm contract	17	42.5%	5.3%	0	0.0%	0.0%	0	0.0%	0.0%	23	57.5%	20.9%
School fees	51	98.1%	15.9%	0	0.0%	0.0%	0	0.0%	0.0%	1	1.9%	.9%
Ready market for agriculture produce	27	18.5%	8.4%	3	2.1%	37.5%	53	36.3%	84.1%	63	43.2%	57.3%

Beneficiary Status	Total Expenditure											
	<= 3000.00			3001.00 - 6000.00			6001.00 - 12000.00			12001.00+		
Ready market small projects	2	2.4%	.6%	4	4.8%	50.0%	24	28.6%	38.1%	54	64.3%	49.1%
Renting irrigated land	209	100.0%	65.3%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Owning irrigated land	11	91.7%	3.4%	0	0.0%	0.0%	0	0.0%	0.0%	1	8.3%	.9%
Resettled farmland	7	3.9%	2.2%	4	2.2%	50.0%	58	32.4%	92.1%	110	61.5%	100.0%

Source: Survey Data

Average income from permanent/casual employment per year (2016)

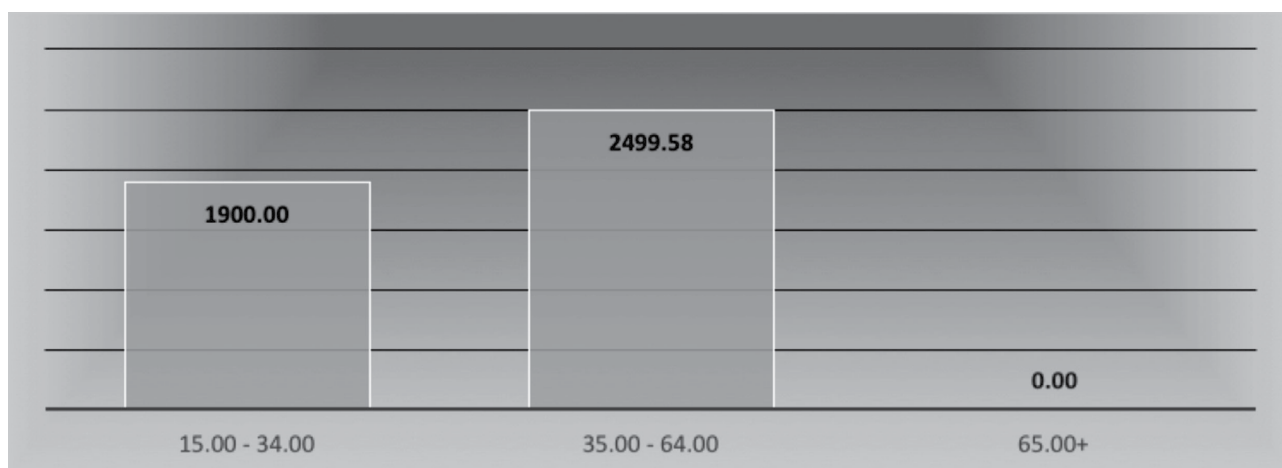
The results show that income from casual employment is generally lower than that from permanent employment. Male headed households earn more income than female headed households under both permanent and casual employment. The permanent (contract) employment average income is US\$3 393 (US\$485) for male headed households and US\$3 176 (US\$413) for female headed households. Both male and female headed households earn less than US\$500 per year under contract, which translates to US\$37 per month.

Table 4.13: Average income from permanent/casual employment per year (2016)

B1. Gender of Household Head		Average (USD)
Male	Permanent employment	3 393
	Casual	485
Female	Permanent employment	3 176
	Casual	413

Source: Survey data

Figure 4.9: Income from permanent employment by age category

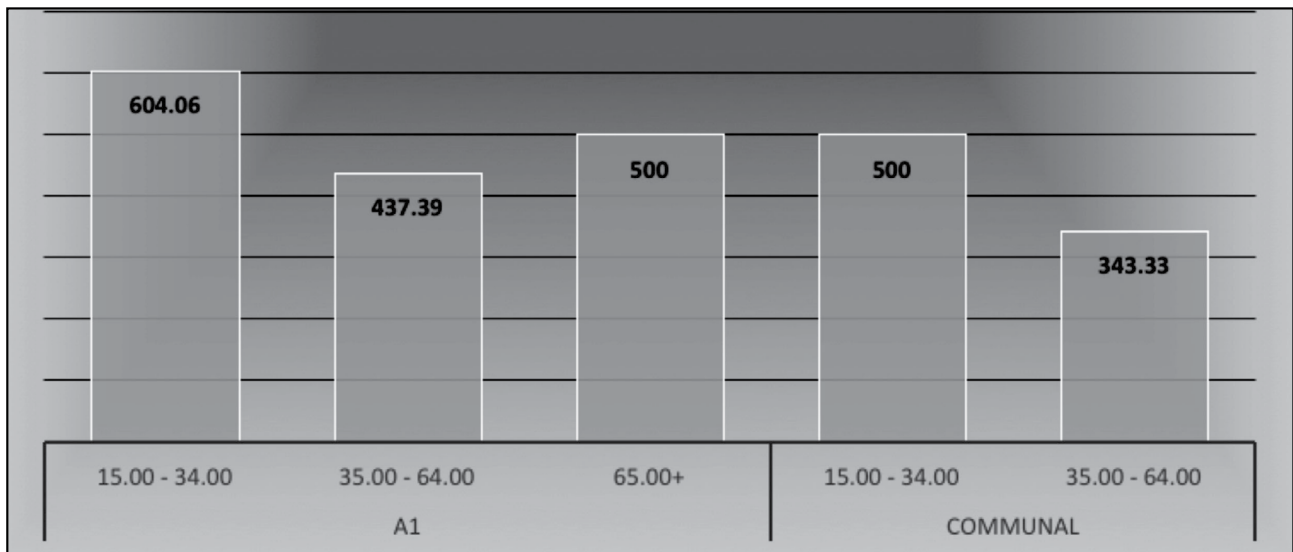


Source: Survey data

Income from casual employment by age category and Sector

The average income for A1 farmers across all age groups ranges from US\$437 to US\$604 per year, the lowest amount earned is for the 35-64 age category which translates to US\$36 per month. For the communal farmers, the average amount earned per year ranges between US\$343 to US\$500 per year for the 15-34 and 35-64 age categories respectively. The amount earned translates to US\$42, US\$29 per month for both categories.

Figure 4.10: Income from casual employment by age category and Sector

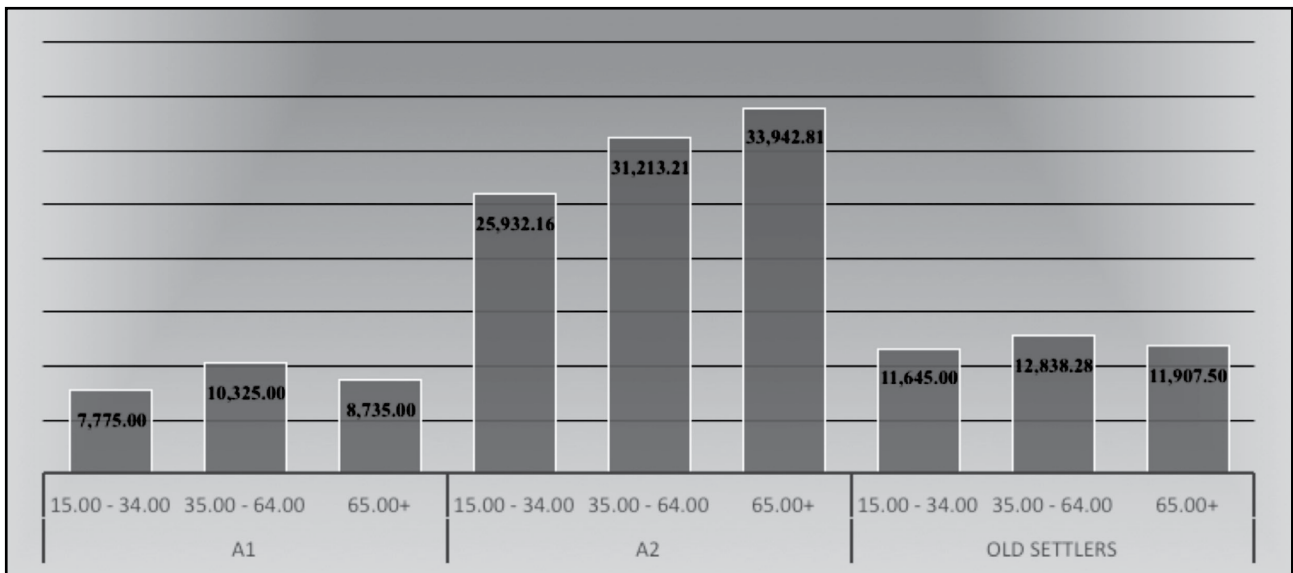


Source: Survey data

Total expenditure by Age Category and Sector

The A1 sector has the lowest expenditure for both beneficiaries and non-beneficiaries, the least amount of expenditure per year is for the 15-34 category (\$7 775). For old settlers the age group with the least expenditure is the 15-34 age category (\$11 645).

Figure 4.11: Total expenditure by Age Category and Sector



Source: Survey data

1.5.2 Access to Primary and Secondary Education

Table 4.14: Households Sending Children of Primary School Going Age to School

Beneficiary status	Type of Household	Sex of Child and % of Households with children attending school	
		Female	Male
Non beneficiary	Male Headed Household	94%	90%
	Female Headed Household	65%	63%
Beneficiary	Male Headed Household	83%	89%
	Female Headed Household	81%	72%

Source: survey data

Households Sending Children of Secondary School Going Age to School

The results show a low secondary school attendance for female children from both male and female-headed households under both non beneficiaries and beneficiaries. The explanation from key informant interviews was that families prefer to send male children to school over females and dropout rates for the females is high as a result of polygamous marriages.

The results however, show that access to education for female children from both male and female headed households improved as a result of the investment project improving from 34% to 37% for male-headed households and from 32% to 54% for female-headed households. Male children from both male and female-headed households were impacted negatively as access to secondary education reduced from 91% to 79% and 62% to 33% respectively. This is explained by the fact that male children are going to work in the mill or sugarcane farm in order to help the female-head to fend for the family.

Table 4.15: Households Sending Children of Secondary School Going Age to School

Beneficiary status	Type of Household	Sex of Child and % of Households with children attending school	
		Female	Male
Non beneficiary	Male Headed Household	34%	91%
	Female Headed Household	32%	62%
Beneficiary	Male Headed Household	37%	79%
	Female Headed Household	54%	33%

Source: Survey data

Table 4.16: Number of Male Children Not Attending Primary School by Project Benefit

Benefits	Number of Male Household Members Not Attending Primary School											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	287	90.5%	61.6%	17	5.4%	94.4%	11	3.5%	73.3%	2	.6%	100.0%
Mill contract	31	96.9%	6.7%	0	0.0%	0.0%	1	3.1%	6.7%	0	0.0%	0.0%
Farm permanent	4	80.0%	.9%	0	0.0%	0.0%	1	20.0%	6.7%	0	0.0%	0.0%
Farm contract	38	95.0%	8.2%	1	2.5%	5.6%	1	2.5%	6.7%	0	0.0%	0.0%
School fees	47	90.4%	10.1%	3	5.8%	16.7%	2	3.8%	13.3%	0	0.0%	0.0%

Benefits	Number of Male Household Members Not Attending Primary School											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Ready market for agriculture produce	143	97.9%	30.7%	0	0.0%	0.0%	3	2.1%	20.0%	0	0.0%	0.0%
Ready market small projects	83	98.8%	17.8%	1	1.2%	5.6%	0	0.0%	0.0%	0	0.0%	0.0%
Renting irrigated land	187	89.5%	40.1%	13	6.2%	72.2%	7	3.3%	46.7%	2	1.0%	100.0%
Owning irrigated land	12	100.0%	2.6%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Resettled farmland	174	97.2%	37.3%	1	.6%	5.6%	4	2.2%	26.7%	0	0.0%	0.0%

Source: Survey data

Number of Female Children Not Attending Primary school

The row results show that more than 85% of households under the different benefits sent all their female children to school. The column results compares the proportion of each benefit. The benefit with the highest proportions is the worst while the one with the least proportion is better. The column results show that households that did not benefit and those that benefited from renting land and school fees have high proportion of households with 1, 2 and 3 children not accessing primary education. Hence these benefits fail to send children to school.

Table 4.17: Number of Female Children Not Attending Primary school

No. of Female Household Members not Attending Primary School												
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	285	89.9%	61.4%	23	7.3%	85.2%	8	2.5%	100.0%	1	.3%	100.0%
Mill contract	31	96.9%	6.7%	1	3.1%	3.7%	0	0.0%	0.0%	0	0.0%	0.0%
Farm permanent	5	100.0%	1.1%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Farm contract	37	92.5%	8.0%	1	2.5%	3.7%	2	5.0%	25.0%	0	0.0%	0.0%
School fees	44	84.6%	9.5%	5	9.6%	18.5%	2	3.8%	25.0%	1	1.9%	100.0%
Ready market for agriculture produce	144	98.6%	31.0%	2	1.4%	7.4%	0	0.0%	0.0%	0	0.0%	0.0%
Ready market small projects	82	97.6%	17.7%	2	2.4%	7.4%	0	0.0%	0.0%	0	0.0%	0.0%
Renting irrigated land	189	90.4%	40.7%	15	7.2%	55.6%	5	2.4%	62.5%	0	0.0%	0.0%
Owning irrigated land	12	100.0%	2.6%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Resettled farmland	174	97.2%	37.5%	4	2.2%	14.8%	0	0.0%	0.0%	0	0.0%	0.0%

Source: Survey data

Table 4.18: Number of Male Children Not Attending Secondary Secondary school

Benefits	Male household members not attending secondary school								
	0			1			2		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	309	97.5%	62.8%	7	2.2%	87.5%	1	.3%	100.0%
Mill contract	32	100.0%	6.5%	0	0.0%	0.0%	0	0.0%	0.0%
Farm permanent	5	100.0%	1.0%	0	0.0%	0.0%	0	0.0%	0.0%
Farm contract	38	95.0%	7.7%	1	2.5%	12.5%	1	2.5%	100.0%
School fees	51	98.1%	10.4%	1	1.9%	12.5%	0	0.0%	0.0%
Ready market for agric produce	146	100.0%	29.7%	0	0.0%	0.0%	0	0.0%	0.0%
Ready market small projects	84	100.0%	17.1%	0	0.0%	0.0%	0	0.0%	0.0%
Renting irrigated land	203	97.1%	41.3%	5	2.4%	62.5%	1	.5%	100.0%
Owning irrigated land	12	100.0%	2.4%	0	0.0%	0.0%	0	0.0%	0.0%
Resettled farmland	178	99.4%	36.2%	1	.6%	12.5%	0	0.0%	0.0%

Source: Survey data

Female household members not attending secondary school

The row results show a very high secondary school attendance for female children with more than 96% of households under each benefit sending all their female children to school. There are no benefits that have 2 or 3 female children going to school, while less than 4% have 1 child who is not attending secondary school. The column results show that renting irrigation, school fees and non-beneficiaries have the highest proportion of households that cannot send 1 child of secondary school going age. The high proportion of households for the resettled and benefit explains that access to land does not guarantee access to education.

Table 4.19: Female household members not attending secondary school

Benefits	Female Household Members not Attending Secondary School											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	307	96.8%	62.9%	9	2.8%	81.8%	1	.3%	100.0%	0	0.0%	0.0%
Mill contract	32	100.0%	6.6%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Farm permanent	5	100.0%	1.0%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Farm contract	39	97.5%	8.0%	1	2.5%	9.1%	0	0.0%	0.0%	0	0.0%	0.0%
School fees	52	100.0%	10.7%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Ready market for agricultural produce	144	98.6%	29.5%	2	1.4%	18.2%	0	0.0%	0.0%	0	0.0%	0.0%
Ready market small projects	83	98.8%	17.0%	1	1.2%	9.1%	0	0.0%	0.0%	0	0.0%	0.0%

Benefits	Female Household Members not Attending Secondary School											
	0			1			2			3		
Renting irrigated land	200	95.7%	41.0%	8	3.8%	72.7%	1	.5%	100.0%	0	0.0%	0.0%
Owning irrigated land	12	100.0%	2.5%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Resettled farmland	176	98.3%	36.1%	2	1.1%	18.2%	0	0.0%	0.0%	1	.6%	100.0%

Source: Survey data

Average distance to primary and secondary school

The average distance to the nearest primary school for beneficiary and non-beneficiary households is 3.13 km and 3.59 km respectively. The analysis of variance shows that this difference is insignificant at 5% significant level. For secondary school non beneficiary households are a bit further away (9km) than beneficiary households (6km). The significance test shows that the difference is statistically significant at 5% significant level.

Table 4.20: Average distance to primary and secondary school

Beneficiary status	Distance to primary school	Distance to secondary school
Non beneficiary	3.59	8.95
Beneficiary	3.13	6.16
Average	3.42	7.93

Source: Survey data

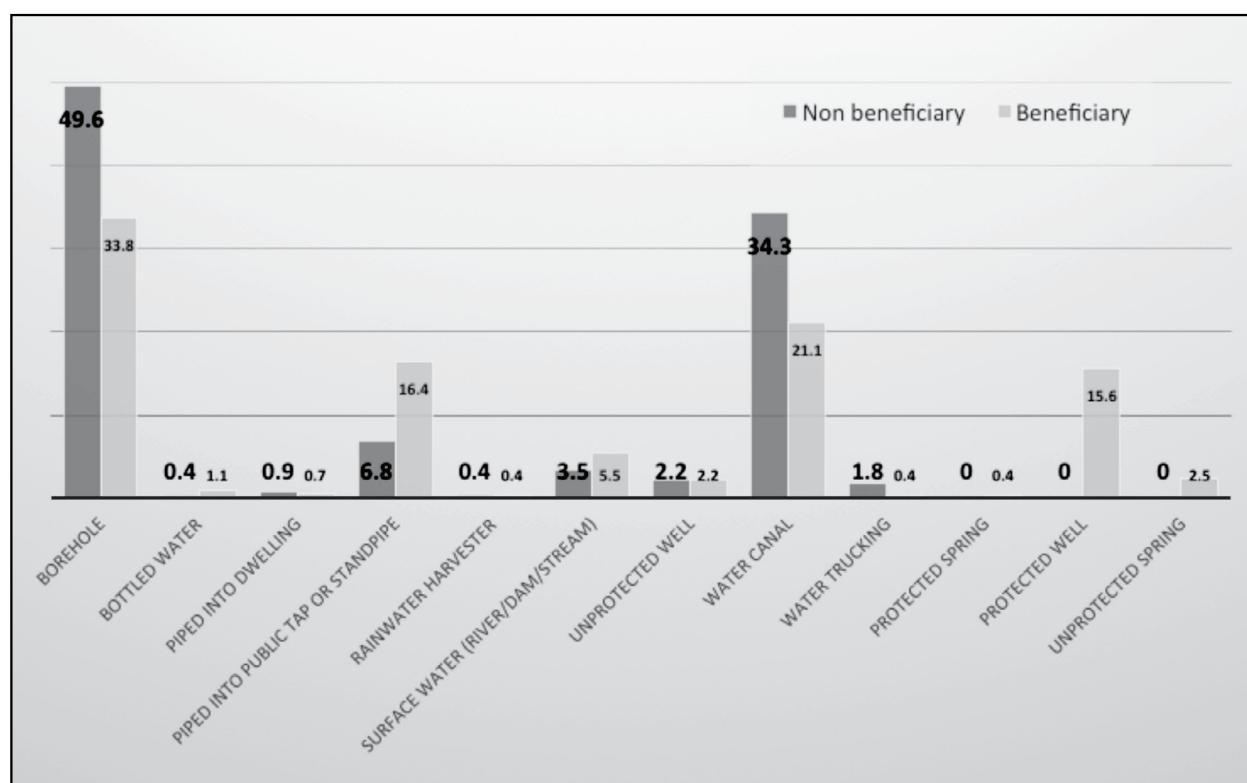
1.5.3 Water, Health and Diseases

The study established that both beneficiary and non-beneficiary households used safe and unsafe water sources. The study considered safe water sources to include borehole, bottled water, piped water into dwelling, public tap, rainwater harvester, water trucking, protected spring and protected well. Unsafe water sources were surface water from a river or dam, unprotected well, water canal and unprotected spring.

Main source of drinking water

The main source of drinking water for beneficiary households was borehole (34.3%) while important sources were standing pipe of public tap (16.4%), protected well (15.6%) and water canal (21.1%). The main source of drinking water for non-beneficiary households was also borehole (49.6%) followed by water canal (34.3%). On aggregate a higher percentage of beneficiary households (68.8%) used safer water sources than non-beneficiary households (59.9%). The exposure to unsafe water sources was lower for beneficiary households (31.7%) than non-beneficiary households (40%). However both beneficiary and non-beneficiary households used water canal as the second most common source of water. The focus group results indicated that water from the canal was not safe for human consumption. In essence while both beneficiary and non-beneficiary households have access to safe water sources they continue to access water from unsafe source. The major reason for this are distance and all year round availability of safe water sources.

Figure 4.12: Main source of drinking water



Source: survey data

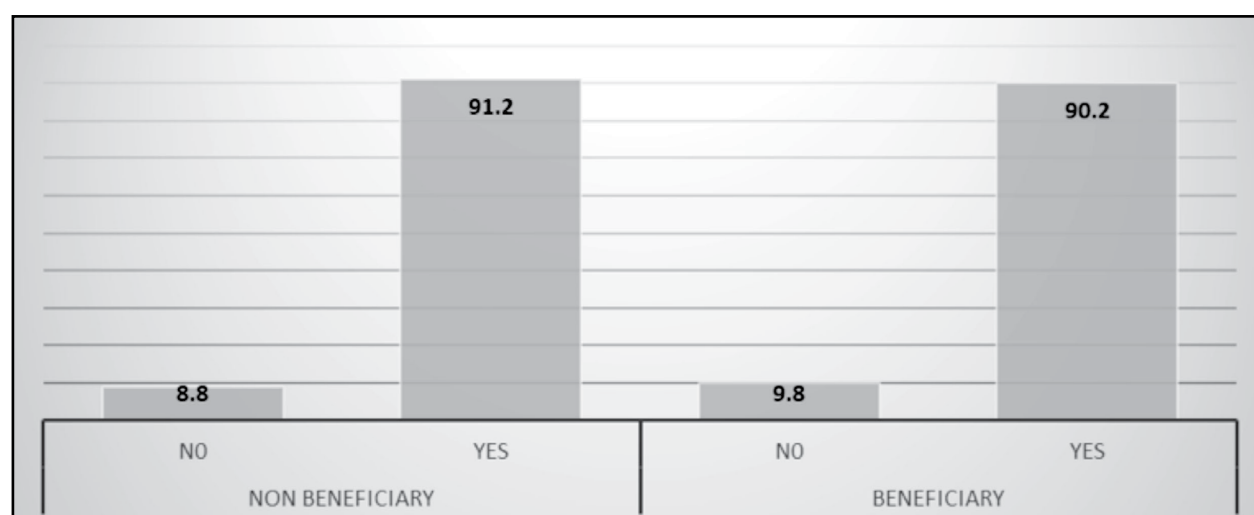
The distance to main water source for non-beneficiaries is 1.7 km and 1 km for beneficiaries.

Table 4.21: Distance to main water source

Beneficiary status	Distance	Mean (km)
Non beneficiary	Distance to main water source	1.7
Beneficiary status	Distance to main water source	1

Source: survey data

Figure 4.13: Water availability Throughout the Year



Source: survey data

Source of Drinking Water by Benefits

The row results showed that under most benefits, households sourced water from across all the possible water sources, indicating no specific association of a benefit and water source(s). Hence while investment reduces exposure to unsafe water, beneficiaries still continue to use unsafe sources due to distance and year round availability issues. This was confirmed by the striking finding that water canal was a significant source of water for households under most benefits – ready market for small produce (22.6%) ready market for small projects (27%), and renting irrigated land (31%). Considering households using water canal, the column results showed that beneficiary households renting irrigation, resettled farm land, ready markets constituted higher bulky of the population of households drinking water from the canal of 56.6%, 33.6% and ready markets 29.2% respectively– indicating a high level of vulnerability of beneficiary households although these were still lower than the proportion for non-beneficiary households which was 62.8%. Non-beneficiary households are also more exposed to surface water and unprotected spring, while beneficiary households for resettled land ready market for produce are more exposed to unprotected wells. The high level of exposure to unsafe drinking water demands that households treat their water before drinking in order to prevent occurrence of water borne diseases such as cholera, bilharzia, dysentery and malaria.

Table 4.22: Source of Drinking Water by Benefits

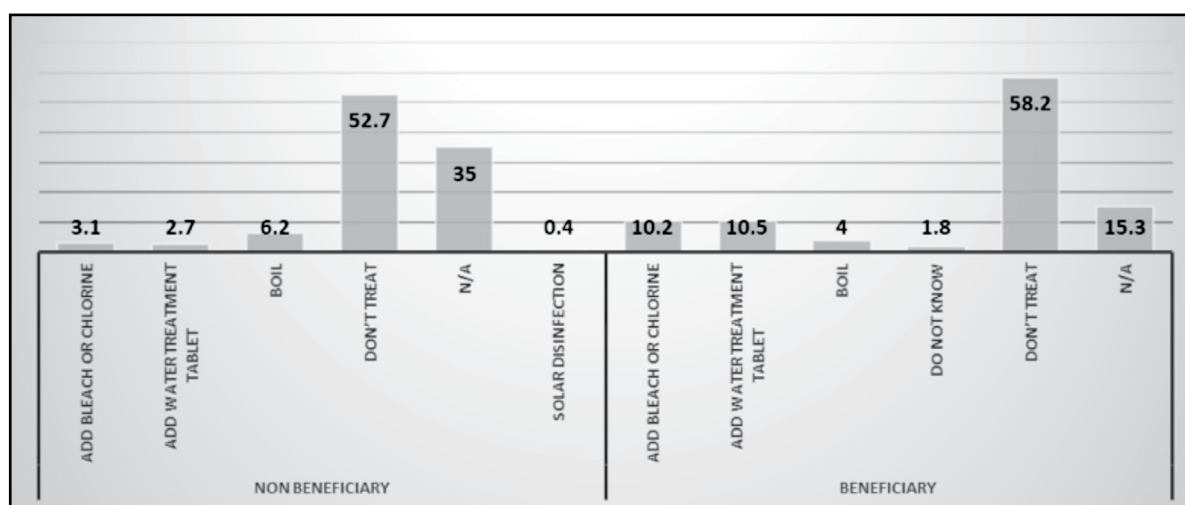
Benefits	Surface water			Unprotected spring			Unprotected well			Water canal		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	23	7.3%	100.0%	7	2.2%	100.0%	5	1.6%	45.5%	71	22.4%	62.8%
Mill contract	0	0.0%	0.0%	0	0.0%	0.0%	1	3.1%	9.1%	5	15.6%	4.4%
Farm permanent	1	20.0%	4.3%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Farm contract	4	10.0%	17.4%	1	2.5%	14.3%	0	0.0%	0.0%	7	17.5%	6.2%
School fees	9	17.3%	39.1%	1	1.9%	14.3%	1	1.9%	9.1%	5	9.6%	4.4%
Ready market for agricultural produce	4	2.7%	17.4%	0	0.0%	0.0%	6	4.1%	54.5%	33	22.6%	29.2%
Ready market small projects	0	0.0%	0.0%	0	0.0%	0.0%	3	3.6%	27.3%	23	27.4%	20.4%
Renting irrigated land	4	1.9%	17.4%	2	1.0%	28.6%	3	1.4%	27.3%	64	30.6%	56.6%
Owning irrigated land	1	8.3%	4.3%	3	25.0%	42.9%	2	16.7%	18.2%	0	0.0%	0.0%
Resettled farmland	0	0.0%	0.0%	0	0.0%	0.0%	6	3.4%	54.5%	38	21.2%	33.6%

Source: Survey data

Water Treatment by Beneficiary Status

The results show that there was still a high level of both beneficiary (58.2%) and non-beneficiary (52.7%) households that did not treat their water before drinking in spite of the high level of exposure to unsafe drinking water. This was a worrisome finding given that water canal was the second most common water source for a significant proportion of both beneficiary and non-beneficiary households. However this lack of treatment of water before drinking did not manifest in high diseases occurrence which also did not differ much between beneficiary and non-beneficiary households.

Figure 4.14: Water Treatment by Beneficiary Status



Source: survey data

Disease Frequency by Beneficiary Status

The diseases which affected the area were mainly malaria (20% for non-beneficiary and 23% for beneficiary households) and dysentery (14% for non-beneficiary and 4% for beneficiary households). The cases of dysentery were high for non-beneficiaries due to the higher exposure to unsafe water sources including the water canal. The results show that disease occurrence was generally low for both beneficiaries and non-beneficiaries. This was not expected where there is high exposure to unsafe water sources with significantly high percentage of households not treating their water before drinking. However, this was consistent with the finding that even those with access to safe water continued to use unsafe water sources for issues of distance to and all year round availability of water from the safe source. Also Tongaat Hullet implemented mosquito spraying programmes mosquitoes and surrounding communities also had access to 2 main hospitals. The study cross tabulated water source and diseases to establish any association of disease occurrence and the type of water source.

Table 4.23: Disease Frequency by Beneficiary Status

Beneficiary status	Disease Occur?	Disease and Frequency (%)			
		Malaria	Cholera	Bilharzia	Dysentery
Non beneficiary	No	80	100	97	86
	Yes	20	0	4	14
Beneficiary	No	77	100	97	96
	Yes	23	0	3	4

Source: survey data

Table 4.24: Water Source by Disease Frequency

Water source	Diseases											
	Malaria			Cholera			Bilharzia			Dysentery		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Borehole	36	60.0%	33.0%	0	0.0%	0.0%	8	13.3%	50.0%	21	35.0%	50.0%
Bottled water	2	100.0%	1.8%	0	0.0%	0.0%	0	0.0%	0.0%	1	50.0%	2.4%
Piped into dwelling	1	100.0%	0.9%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Piped into public tap or standpipe	13	81.2%	11.9%	0	0.0%	0.0%	3	18.8%	18.8%	7	43.8%	16.7%
Protected well	17	100.0%	15.6%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Surface water	5	100.0%	4.6%	0	0.0%	0.0%	3	60.0%	18.8%	0	0.0%	0.0%
Unprotected spring	1	100.0%	0.9%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Unprotected well	3	100.0%	2.8%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Water canal	30	81.1%	27.5%	2	5.4%	100.0%	1	2.7%	6.2%	12	32.4%	28.6%
Water trucking	1	50.0%	0.9%	0	0.0%	0.0%	1	50.0%	6.2%	1	50.0%	2.4%

Source: Survey data

1.5.4 Food Availability and Food Security

The study used food availability and food consumption score (FCS) indicators to measure the food security of beneficiary and non-beneficiary households. The food availability used a 12 month reference period to identify the months when the household experienced food shortages. The FCS measures the dietary diversity taking into account all the food groups consumed by the household and respective weights based on a 7 day reference period.

The row results show that 67% of beneficiaries had enough food for the family needs compared to 35% for non-beneficiaries. In the same token, the column results indicated that 77.4% of those that had some months of deficit were non-beneficiaries compared to 32.6% of them who were beneficiaries. The results suggests that beneficiaries of the investment are better off than non-beneficiaries. The study cross tabulated individual benefits with food availability to established whether all benefits drive food availability.

Table 4.25: Food Availability and Food Security

	In the past 12 months, were there days in which you did not have enough food to meet your family's needs?								
	No			Yes			Total		
	Count	Row	Column	Count	Row	Column			
No beneficiaries	112 _a	35.3%	47.5%	205 _b	64.7%	77.4%	317	100.0%	63.3%
Beneficiaries	124 _a	67.4%	52.5%	60 _b	22.6%	32.6%	184	100.0%	36.7%

Source: Survey Data

Table 4.26: Benefits and Food Availability

Benefits	In the past 12 months, were there days in which you did not have enough food to meet your family's needs?						
	Yes			No			Total
	Count	Row	Col	Count	Row	Col	
No benefits	112	35.3%	47.5%	205	64.7%	77.4%	317
Mill contract	11	34.4%	4.2%	21	65.6%	9.1%	32
Farm permanently	2	40.0%	.8%	3	60.0%	1.3%	5
Farm contract	11	27.5%	4.2%	29	72.5%	12.6%	40
School fees	26	50.0%	10.0%	26	50.0%	11.3%	52
Ready market for agricultural produce	49	33.6%	18.8%	97	66.4%	42.0%	146
Ready market for produce from small projects	34	40.5%	13.1%	50	59.5%	21.6%	84
Renting irrigated land	151	72.2%	58.1%	58	27.8%	25.1%	209
Owning irrigated land	5	41.7%	1.9%	7	58.3%	3.0%	12
Resettled farmland	55	30.7%	21.2%	124	69.3%	53.7%	179

Source: Survey Data

Benefits, Food Availability and Sex of Household Head

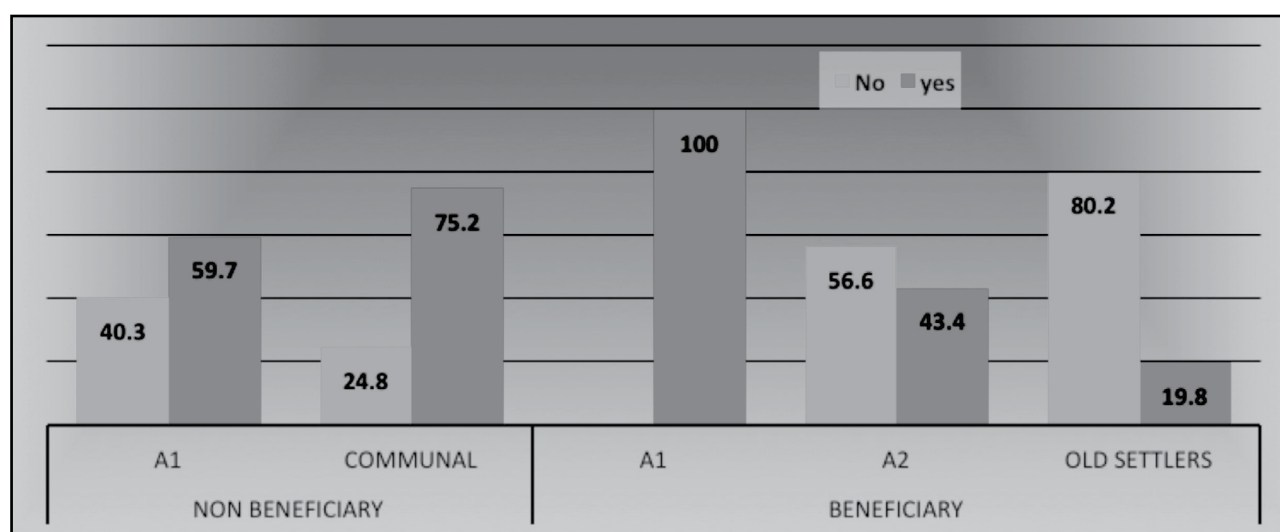
In both male and female headed households, there are more beneficiary households that did not have months of deficit are more than non-beneficiaries households. The improvement in food availability is more in female headed households where there is bigger difference between the percentages of beneficiary and non-beneficiary.

Table 4.27: Benefits, Food Availability and Sex of Household Head

Gender	Beneficiary Status	In the past 12 months, were there days in which you did not have enough food to meet your family's needs?					
		No			Yes		
		Count	Row	Col	Count	Row	Col
Male	Non-beneficiary	95 _a	40.4%	52.2%	140 _b	59.6%	77.3%
	Beneficiary	87 _a	68.0%	47.8%	41 _b	32.0%	22.7%
Female	Non-beneficiary	17 _a	20.7%	31.5%	65 _b	79.3%	77.4%
	Beneficiary	37 _a	66.1%	68.5%	19 _b	33.9%	22.6%

Source: Survey Data

Figure 4.15: Food availability in the Past Twelve Months: Jan – Dec 2016



Source: Survey data

Food Consumption Score by Beneficiary Status

The row results show that more non-beneficiaries had poor (27.4%) to borderline (29%) food consumption score compared to 4.3% and 16.8% for beneficiaries. The column results show of those with acceptable FSC beneficiary households represent 51.2% of the population compared to 48.8% for non-beneficiaries. This is influenced by the high margins farmers get from sugarcane production. The study concluded that the Tongaat Hullet investment project improved the food security of the surrounding community.

Table 4.28: Food Consumption Score by Beneficiary Status

	<= 28.00			28.01 - 42.00			42.01+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	87	27.40%	91.60%	92	29.00%	74.80%	138	43.50%	48.80%
Bene	8	4.30%	8.40%	31	16.80%	25.20%	145	78.80%	51.20%

Source: Survey data

Table 4.29: Food consumption score by benefits

Beneficiary status	FCS_cate								
	<= 28.00			28.01 - 42.00			42.01+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	87	27.4%	91.6%	92	29.0%	74.8%	138	43.5%	48.8%
Mill contract	6	18.8%	6.3%	5	15.6%	4.1%	21	65.6%	7.4%
Farm permanent	2	40.0%	2.1%	1	20.0%	.8%	2	40.0%	.7%
Farm contract	5	12.5%	5.3%	15	37.5%	12.2%	20	50.0%	7.1%
School fees	11	21.2%	11.6%	20	38.5%	16.3%	21	40.4%	7.4%
Ready market agric produce	4	2.7%	4.2%	22	15.1%	17.9%	120	82.2%	42.4%

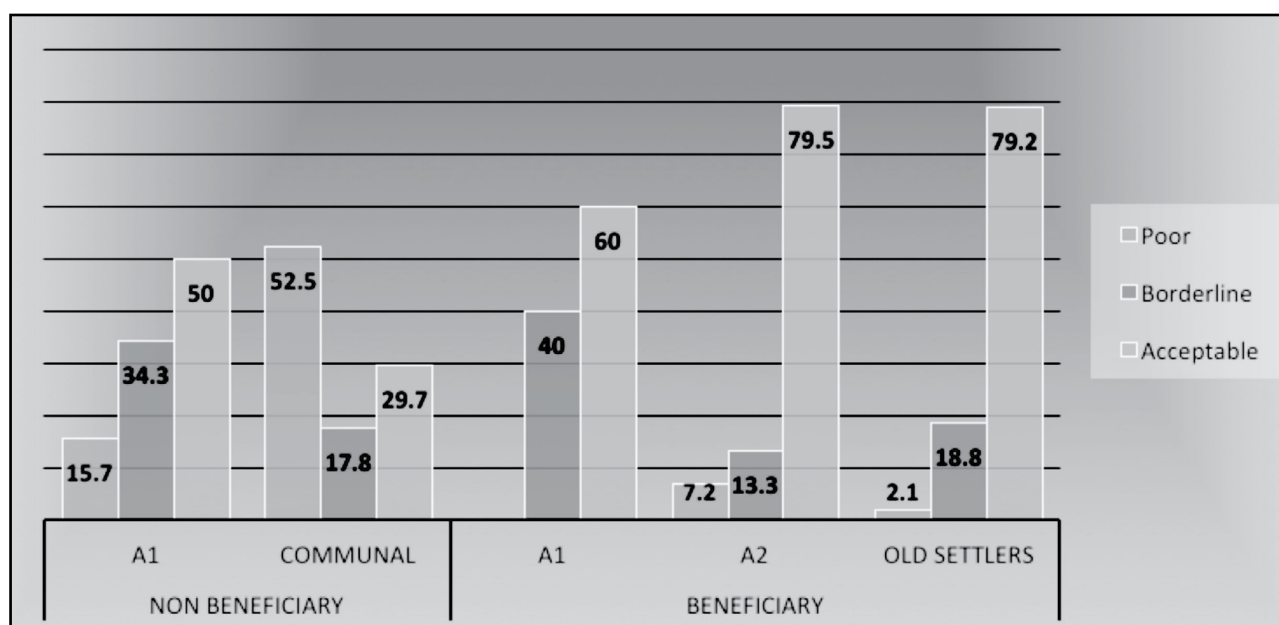
Beneficiary status	FCS_cate								
	<= 28.00			28.01 - 42.00			42.01+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Ready market small projects	2	2.4%	2.1%	8	9.5%	6.5%	74	88.1%	26.1%
Renting irrigated land	76	36.4%	80.0%	53	25.4%	43.1%	80	38.3%	28.3%
Owning irrigated land	2	16.7%	2.1%	2	16.7%	1.6%	8	66.7%	2.8%
Resettled farmland	8	4.5%	8.4%	29	16.2%	23.6%	142	79.3%	50.2%

Source: Survey data

Food consumption score

The food consumption score shows that the majority of non-beneficiaries (A1:15.7% poor, 34% borderline, 50%, Communal: 53% poor, 18% borderline, 30% acceptable) have poor to borderline diets. Whilst for beneficiaries for all sectors the majority have acceptable diets.

Figure 4.16: Food consumption score



Source: survey data

Dry Land ownership in relation to food security status

For non-beneficiaries, the Analysis of Variance shows that there is a significant relationship (0.001) between the area of the dryland owned and the number of food groups consumed. To note is that those with poor diets have 2.7Ha, borderline diets have 4.4 Ha and those with acceptable diets an average of 5Ha. The analysis of variance shows that the area has no significant relationship with the number of food groups consumed.

Table 4.30: Dry Land ownership in relation to food security status

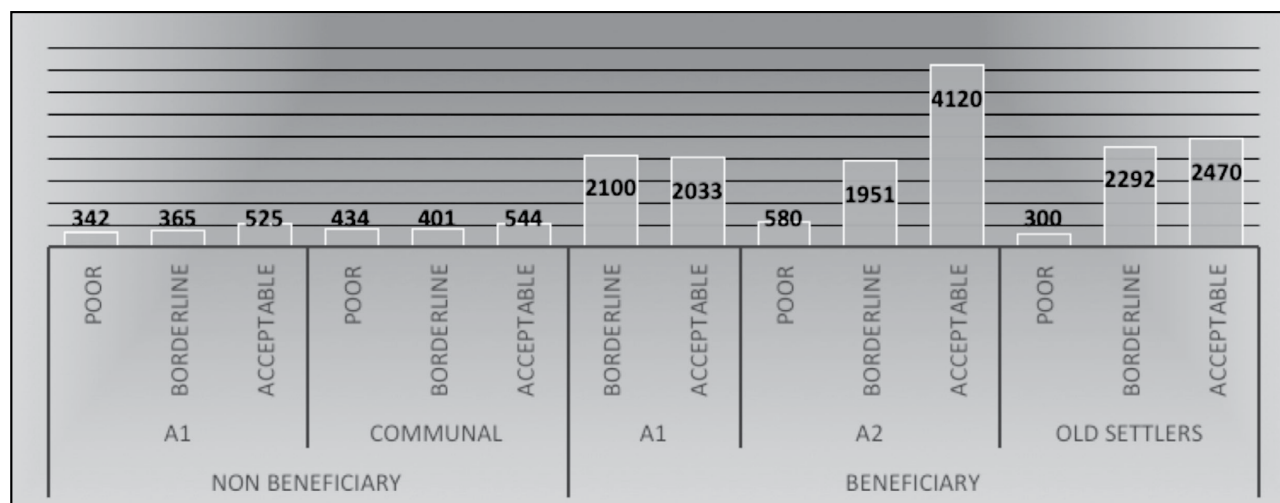
Beneficiary status	Food consumption score	Dryland after
Non beneficiary	<= 28.00	2.7
	28.01 - 42.00	4.4
	42.01+	5.0
	Total	4.2

Beneficiary	<= 28.00	1.5
	28.01 - 42.00	1.1
	42.01+	3.3
	Total	2.9

Source: Survey data

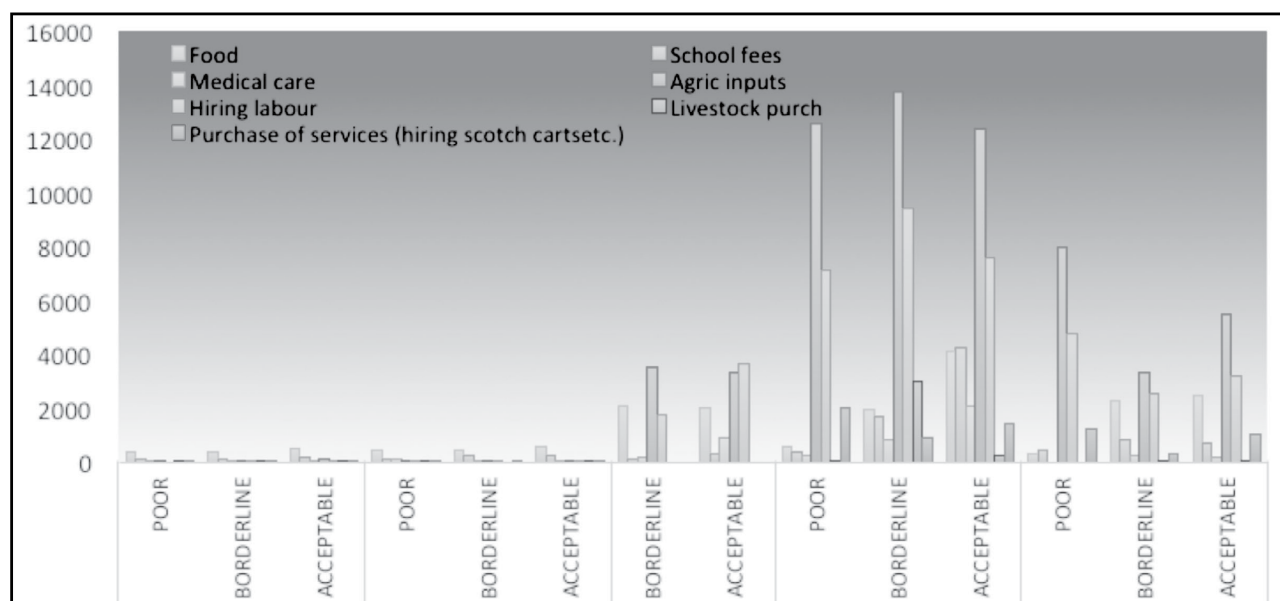
Expenditure by Food Consumption Score in US\$. The expenditure patterns for non-beneficiaries are generally lower than that of beneficiaries this has an impact on the types of foods that are consumed by the household. Households for non-beneficiaries who have a poor diet generally spend less than US\$1000 per year for each expenditure item. Expenditure increases as we move towards the beneficiaries with the bulk of the money being used for the procurement of agricultural inputs, the highest being from A2 farmers, US\$14000, purchase of services and food. Livestock purchases are generally lower across all groups, with the bulk of the purchase coming for the A2 sector.

Figure 4.17: Expenditure by Food Consumption Score US\$



Source: Survey data

Figure 4.18: Expenditure on Food by food consumption score US\$



Source: survey data

Total cereal output/requirement

For non-beneficiaries, all households interviewed had cereal stocks adequate for less than three months¹. Whilst for beneficiaries old settlers had stocks adequate for three months and A2 farmers had stocks adequate for seven months.

Table 4.31: Total cereal output/requirement

Beneficiary status	Sector	Cereal Required (kgs)	Cereal produce (Kgs)	Months
Non beneficiary	A1	724	2417	3
	Communal	754	330	0.5
Beneficiary	A1	1 012		0
	A2	651	4368	7
	Old settlers	889	2978	3

Source: Survey data

Cereal output and food consumption score

Non beneficiary households with poor food consumption for have low output of 152Kgs as shown by the table above, however for beneficiaries households with a low food consumption score have an output of 450Kgs. The analysis of variance for non-beneficiary households shows that there is a significant relationship at 0.002 between cereal output and the Food that is consumed by the household. For beneficiary households the analysis of variance shows that there is no significant relationship between the food consumed and the output. To note is that all households with acceptable consumption have a high cereal output.

Table 4.32: Cereal output and food consumption score

Beneficiary status	Food Consumption Score	Output (KGs)
Non beneficiary	<= 28.00	152
	28.01 - 42.00	862
	42.01+	1 240
	Total	874
Beneficiary	<= 28.00	450
	28.01 - 42.00	625
	42.01+	5 002
	Total	1 465

Source: Survey data

¹ To calculate cereal requirement, the requirement of 110kgs/person/year was used

2. THE CASE OF CHISUMBANJE ETHANOL PROJECT

2.1 THE VALUE CHAIN ANALYSIS

2.1.1 Green Fuels Investment Model and the Value Chain Structure

The Chisumbanje Ethanol Project (Green Fuels) is a public-private partnership established in 2009 under a joint venture model formed between ARDA, and Green Fuels. The project is a strategic investment utilizing both Chisumbanje and Middle Sabi Estates premised upon the development of marginal land to generate benefits such as energy security, efficient irrigation schemes, productive utilization of land, smallholder out-grower schemes, job creation, electric power generation and the stimulation of upstream and downstream industries.

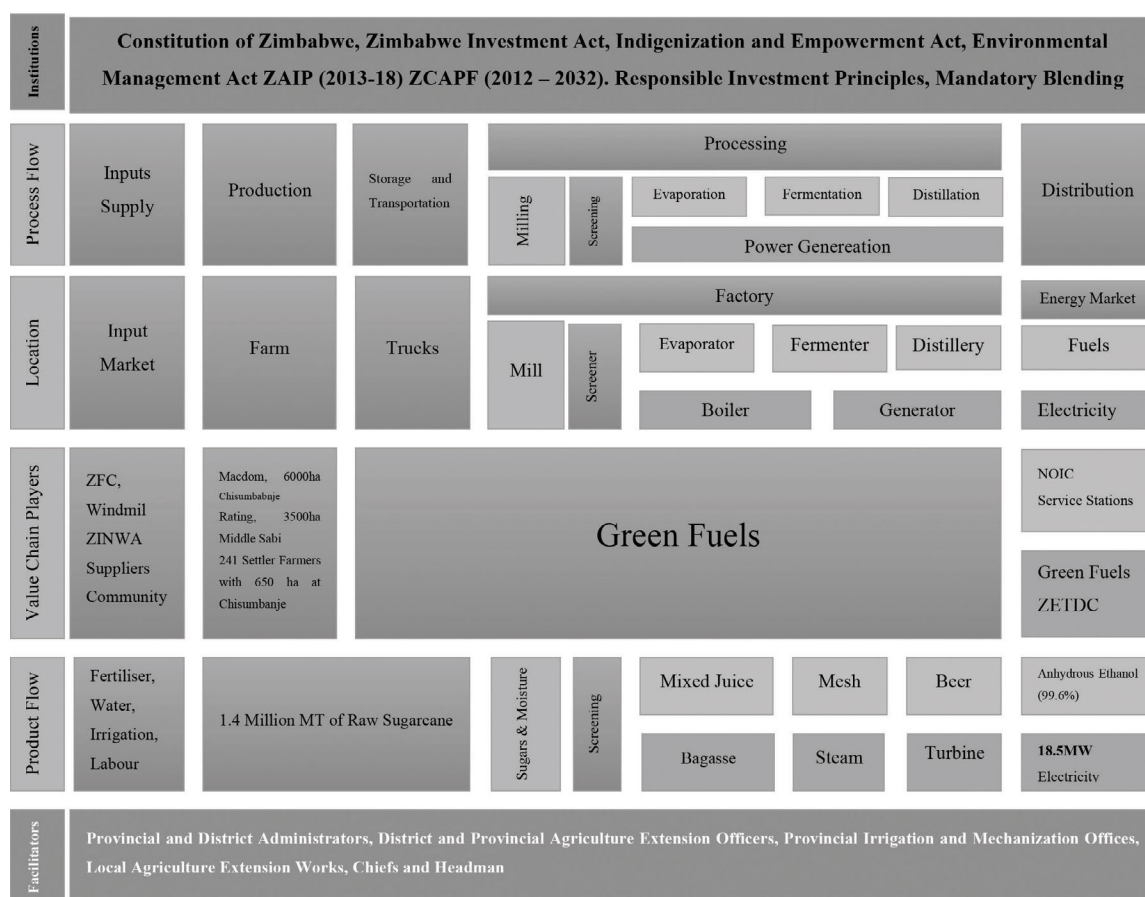
The Chisumbanje Ethanol Project investment includes Ethanol Plant at Chisumbanje supported by core estates at Chisumbanje and Middle Sabi.

Table 5.1: Operations of the Chisumbanje Ethanol Project

Sugarcane production	The project has 6 000 ha of sugarcane at Chisumbanje with plans to develop up to 40 000 ha and 33 500 ha at Middle Sabi Estates with plans to develop 6 000 ha of an out-grower scheme of medium-scale farms under an A2 resettlement model. The two core estates are producing in excess 1.4 million MT of sugarcane per annum.
Ethanol Production	The ethanol plant is located at Chisumbanje.
Electricity Generation	The project produces 18 MW of electricity per annum. This used on the estate and surplus put on the grid.

Figure 6.1 shows the value chain structure of the Tongaat Hullet Zimbabwe investment. It shows the players and facilitators and their roles; processes and product flows, and their location; and key institutions that promotes and guide large-scale agriculture investments.

Figure 5.1 the Chisumbanje Sugarcane Value Chain Structure



2.1.2 Investment Value Chain Coordination Mechanism

2.1.2.1 Local Investment Coordination Committee

The study established that a now defunct committee that comprised the Provincial Administrators' Office and local leadership coordinated the establishment and implementation of the Chisumbanje Ethanol Project.

2.1.2.2 Cores Estates under Private Equity Partnerships

Green Fuels owns both Macdom Investments and Rating Investments which are producing sugarcane from 6 000 ha of Core Estate at Chisumbanje and 3 500 ha of Core Estate at Middle Sabi respectively. Green Fuel processes the sugarcane produced from the two estates into ethanol at Chisumbanje.

2.1.2.3 Out grower Scheme

The 6 000 ha of sugarcane at Chisumbanje includes 650 ha of out grower farmers comprising 116 small-scale farmers (400 ha) and 125 War Veterans (250 ha). Landholding ranges between 4 – 6 hectares. The out grower farmers have a MoU with Macdom. The company developed land, established an irrigated sugarcane crop, maintains the crop, land and related works and buys sugarcane from settler at US\$4/T assuming an average yield of 150 MT/ha.

The out growers indicated that they have fully reimbursed Macdom for all capital expenditure including development of land and sugarcane crop as well as all associated maintenance. They feel that their land holdings are small and that the price they are getting is too low for viability. The study established that when the out growers tried to farm on their own, they achieved an average yield of 65T/ha after which experience they decided to continue with the current arrangement where Macdom does everything.

There are no out growers at Middle Sabi although there are plans to develop 6 000 ha of A2 out grower model. All in all out growers' supply 7% of the throughput to the mill by area, with the balance being supplied by the core estates. There may be merit in insuring that the development of the 40 000 ha include a substantial amount of out growers.

2.1.2.4 Government Policy – Mandatory Blending and Negotiated Ethanol Price

In 2014 the Government of Zimbabwe legislated for mandatory blend of fuel. This move led to the development of the ethanol market and enabled a complete value chain. Government also negotiates with the investor on the price of ethanol. However, there is no government intervention in the pricing of sugar cane from the field.

2.2 DEVELOPMENT PROGRAMMES

2.2.1 Irrigation Development for Households

Macdom Investments developed 0.5 ha of irrigation each (476 ha) for 952 communal farmers from 10 villages – Tazwa 1 and 2, Guwarekipi, Madhwayi 1, 2 and 3, Mazembe, Vhutuza, Chinyamukwakwa, Muyondozi and Ndojeni. The company agreed with the community to have their farming land incorporated into the core estate and in return the company will develop irrigation on at least 10% of that land for re-allocation to the farmers where they would grow what they want with Macdom providing free water and agronomic services. The study however established that no inputs were provided in the previous year's two seasons but the company was planning to resume provision of inputs to farmers with irrigation plots and buying all of what the farmers are producing.

While the company key informants indicated that the irrigating farmers were producing 3 crops per year and achieving maize and sugar beans yields of 4T/0.5 ha and 1T/0.5ha respectively against 0.3T/ha for dryland maize, the statistical results from households showed otherwise. The study established that there remain a number of households that are yet to receive their allocation of 0.5 ha of irrigation plots. There were disgruntlements that the irrigation plots were too small for families and that they were plots women. The men are not working on the irrigation plots nor using the dryland, which they said, was too far from their homestead.

The study established however, through key informants that a 0.5 ha irrigation plot was adequate to occupy the family throughout the year. The crops of focus should include tomatoes, leafy vegetables, sugar beans onions, butternuts, maize. In order to be viable the scheme should be run as a consolidated unit with proper market linkages. The argument being that even bigger 1.5 ha can still be unviable if not linked markets.

2.2.2 Dryland Reallocation

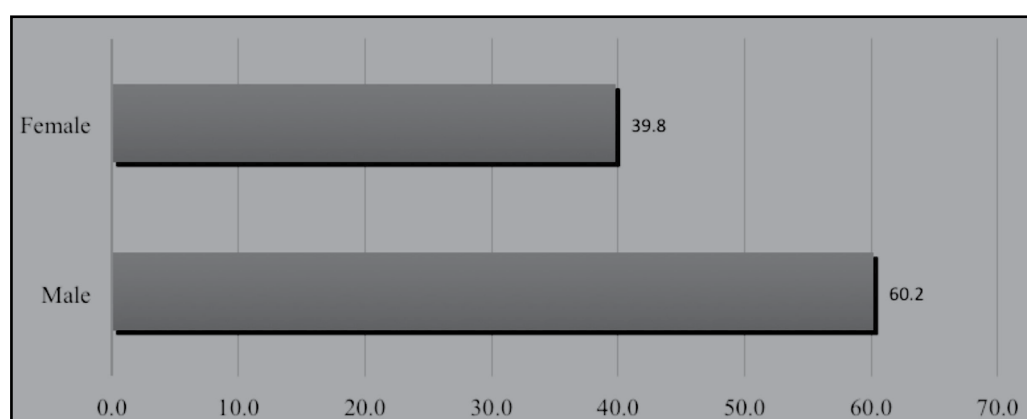
The study established that the displaced dryland areas were re-allocated 12 km from homesteads. Distance to the field is a challenge to households who reported that very little production was happening these dryland farms.

2.2.3 Community Programs

Green Fuels has a Community Programmes Officer. Programmes under implementation include rehabilitation of schools (7) affected by storm, building toilets in schools, drilling boreholes, broiler project for women, sawing factory for women, local employment, apprenticeships programmes, livestock watering points, free nurseries of local trees, drip irrigation and child feeding program for St Peters hospital and a technology center for internet and computer skills training. The company is also providing a ready market for agricultural products from the community and giving free sugarcane leaves for livestock feed.

2.3 HOUSEHOLD DEMOGRAPHICS

Figure 5.2: Gender of Sample Survey

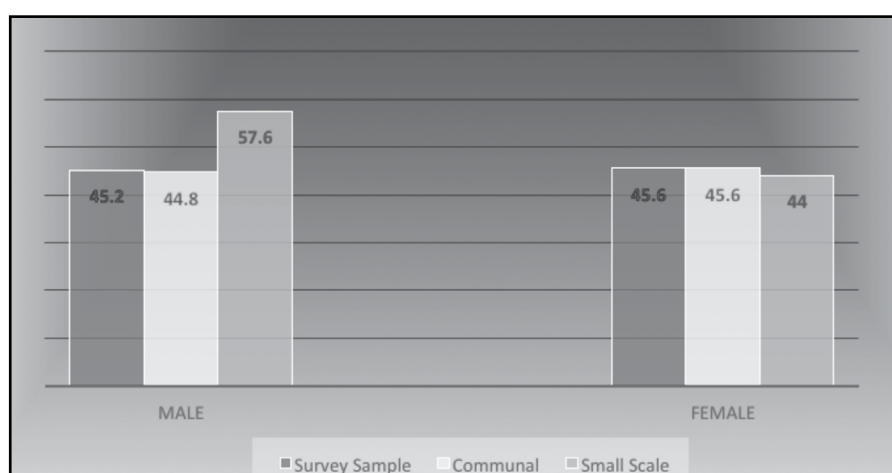


Source: Survey data

Age of respondents

The survey data shows that the sample had 60.2% male and 39.8% females.

Figure 5.3: Distribution of Age of Household Head



Source: Survey data

Average Household Head Age (Years) by Beneficiary Status

The average household head age was 45 years for both males and females. The sampled households had an average household size of 6 people.

Table 5.2: Average Household Head Age (Years) by Beneficiary Status

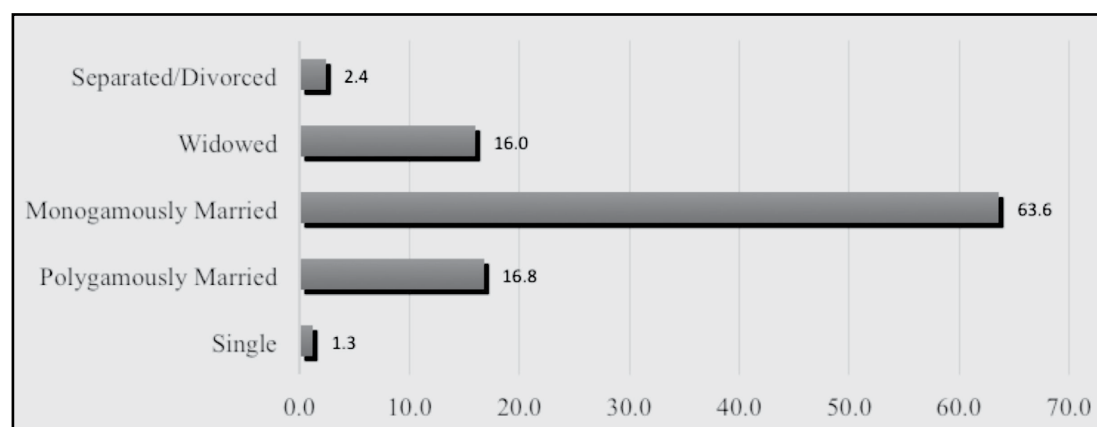
	Male	Female
Beneficiaries	43.54	45.33
Non Beneficiaries	46.62	45.71

Source: Survey Data

Marital Status of respondents

The results show that 64% of the marriages were monogamous, 17% were polygamous and 16% widowed and 2.4% separated.

Figure 5.4: Household Head Marital status

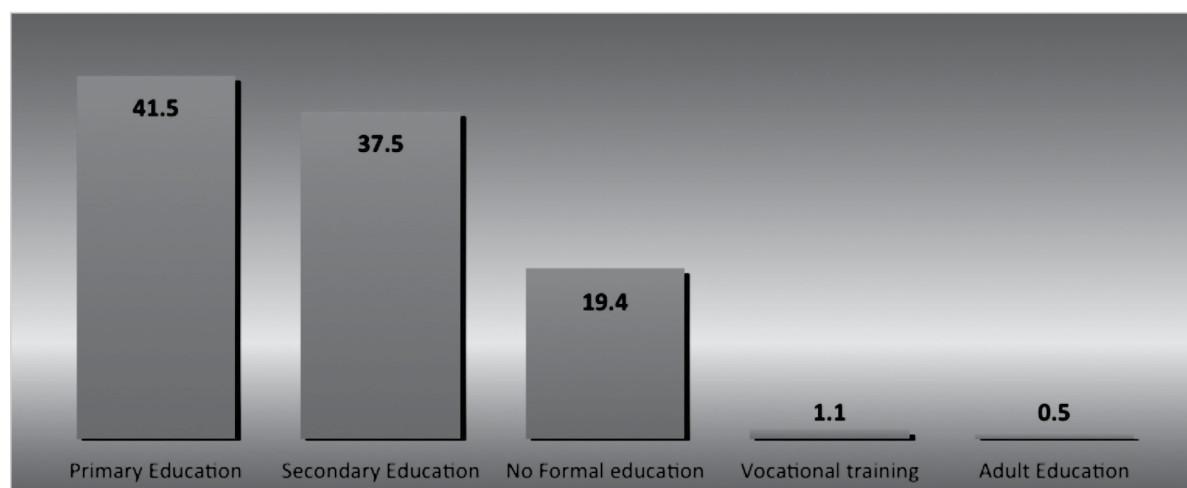


Source: Survey data

Respondent's level of education

The results show that 42% of household heads attained primary education, 38% secondary school and 19% had no formal education.

Figure 5.5: Distribution of respondents' Level of Education



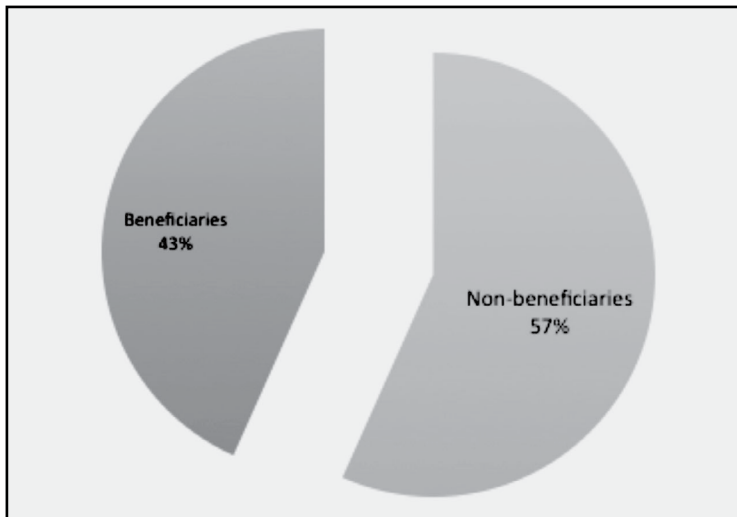
Source: Survey data

2.4 INVESTMENT BENEFITS ANALYSIS

Proportion of Beneficiary and Non-beneficiary Households

The results showed that the investment benefited a higher proportion of male-headed households (46.6%) than female-headed households (38.2%). The Chi-square confirmed that there difference in the proportions was statistically significance at 5% level of significance. The Green Fuels model thus did not achieve gender equitable as it benefited a higher proportion of male than female headed households.

Figure 5.6: Proportion of Beneficiary and Non-beneficiary Households

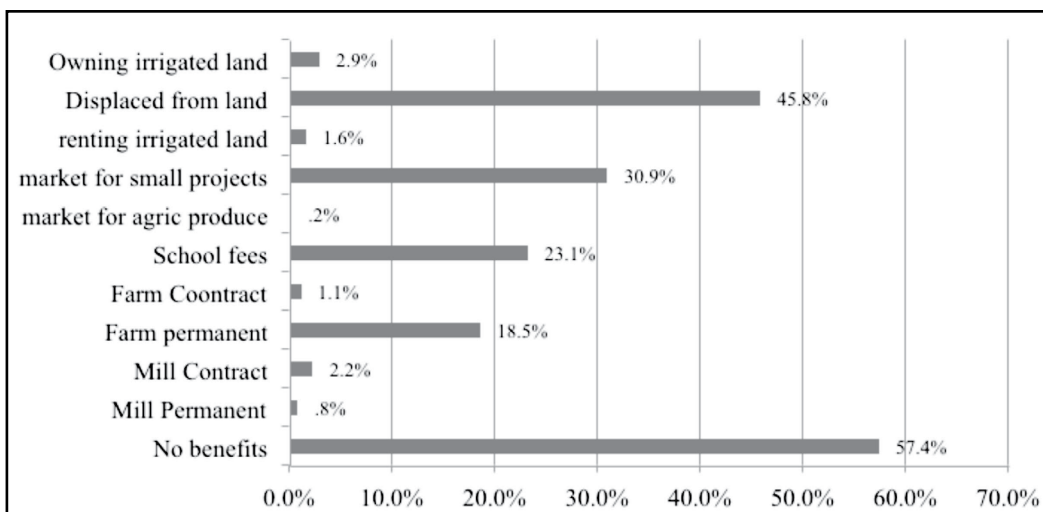


Source: survey data

Type of Investment Project benefits

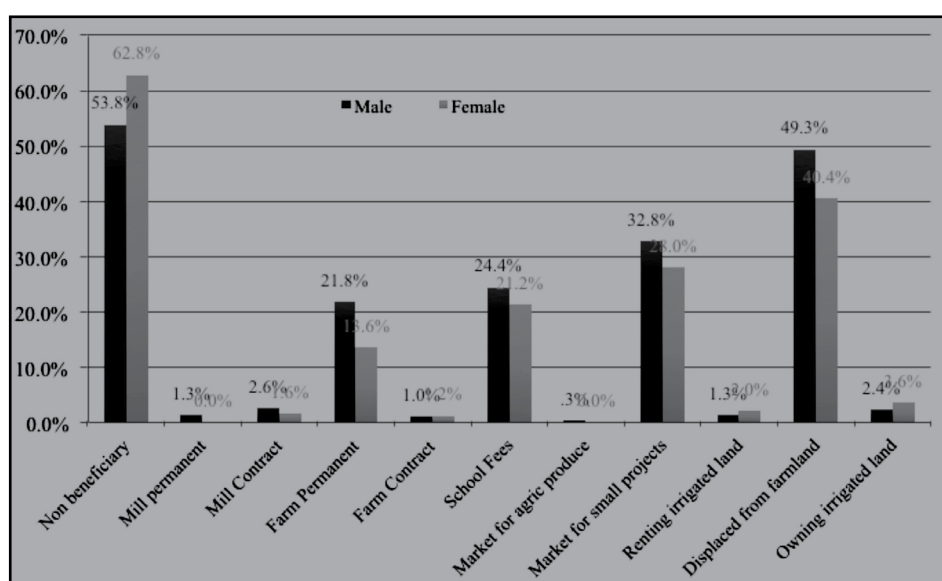
The major benefits identified were displaced from farmland (45.8%) and ready market for small projects (30.9%), school fees (23.1%) and farm permanent (18.5%). Only 0.2% indicated market for agriculture produce, 2.9% owning irrigated land and less than 3% permanent and contract at the sugarcane mill. Key informants highlighted that when the project started there was a boom of economic activity at Checheche growth point, which saw a number of banks establish commercial presence at the growth point. 2.3% of the respondents indicated that they benefited from the project through access to near banking services.

Figure 5.7: Distribution of Type of Investment Project benefits



Source: Survey data (multiple response)

Figure 5.8: Frequency Distribution of Households Benefits by Gender



Source: survey data (multiple response)

Benefits by Age Category

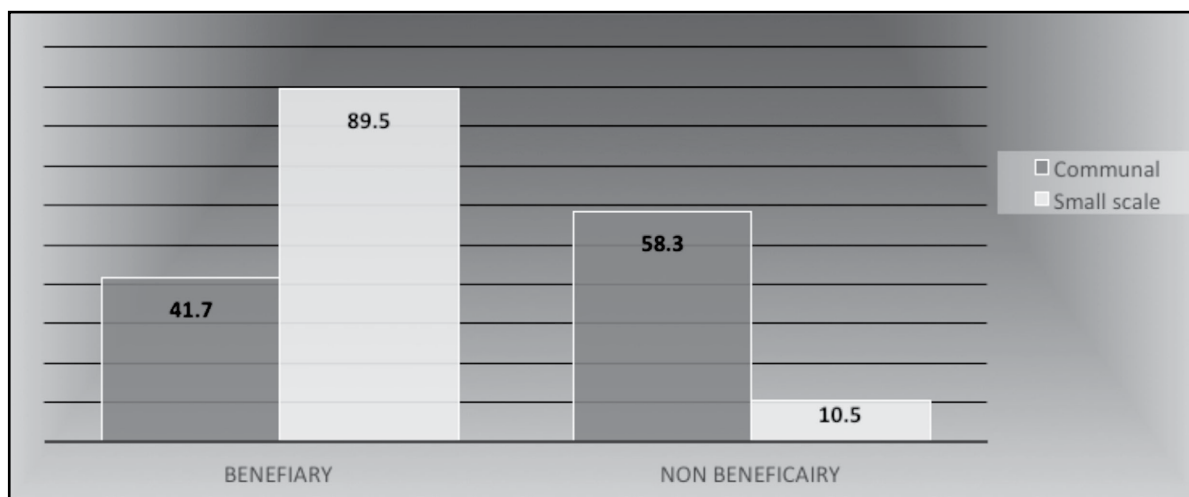
The row results show that all benefits are concentrated for the 35-64 age group. There is need for future programming to also cater for youths and the elderly. The age group largely affected by displacement is the 35-64 age group.

Table 5.3: Benefits by Age Category

Benefits	< 35			35 - 64			65+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	82	22.70%	50.60%	229	63.30%	59.50%	51	14.10%	60.70%
Mill permanent	2	40.00%	1.20%	2	40.00%	0.50%	1	20.00%	1.20%
Mill contract	4	28.60%	2.50%	10	71.40%	2.60%	0	0.00%	0.00%
Farm permanent	29	24.80%	17.90%	71	60.70%	18.40%	17	14.50%	20.20%
Farm contract	0	0.00%	0.00%	5	71.40%	1.30%	2	28.60%	2.40%
School fees	34	23.30%	21.00%	88	60.30%	22.90%	24	16.40%	28.60%
Ready market for agric produce	0	0.00%	0.00%	1	100.00%	0.30%	0	0.00%	0.00%
Ready market for produce from small projects	47	24.10%	29.00%	123	63.10%	31.90%	25	12.80%	29.80%
Renting irrigated land	5	50.00%	3.10%	4	40.00%	1.00%	1	10.00%	1.20%
Displaced from land	94	32.50%	58.00%	170	58.80%	44.20%	25	8.70%	29.80%
Owning irrigated land	9	50.00%	5.60%	9	50.00%	2.30%	0	0.00%	0.00%

Source: Survey data

Figure 5.9: Benefits Status by Sector



Source: Survey data

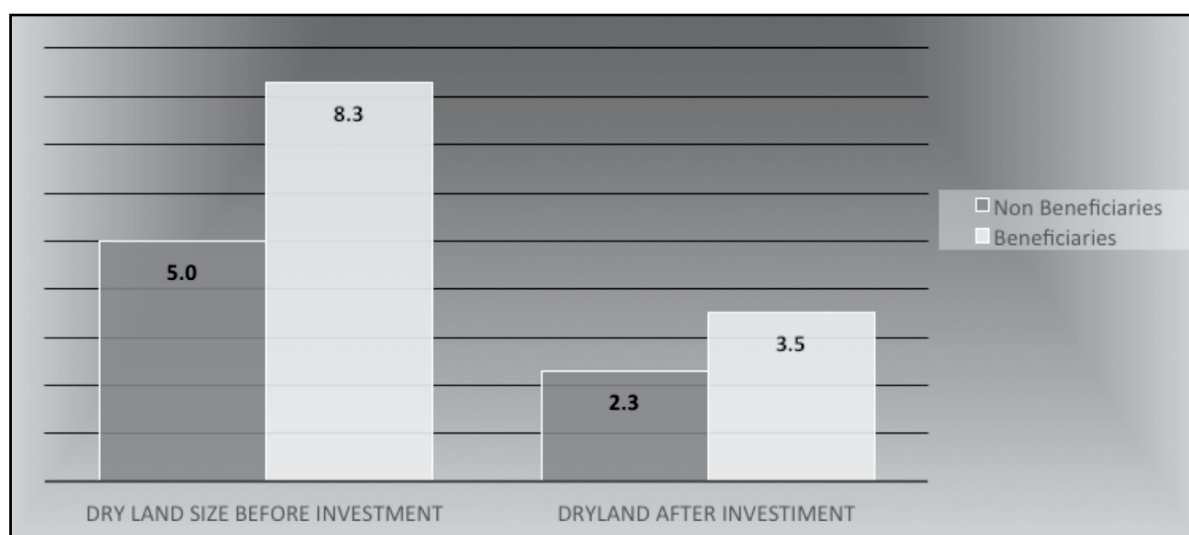
2.5 BENEFITS IMPACT ANALYSIS

2.5.1 Land Ownership

Dryland Land Holding before and after the project

The average dryland holding for beneficiaries before and after the investment project reduced from 8.3 ha to 1.3 ha, while that for non-beneficiaries decrease from 5 ha to 3.5 ha. The analysis of variance showed a significant difference between dryland owned by beneficiaries and non-beneficiaries before and after the investment project. Hence the investment reduced dryland ownership by incorporating dryland into core estates.

Figure 5.10: Dryland Land holding before and after the project



Source: survey data

Dryland Size Ownership by Beneficiary Status

The raw results show that non-beneficiaries have more dryland as 44.2% have less than 2 ha compared to 69.6% of beneficiaries with less than 2 ha. The column results show that more (54.5%) of households owning equal or less than 2 ha of dryland are beneficiaries compared to 45.5%) for non-beneficiaries. This trend is reversed high dryland ownership 2.0 – 4.9 ha, 5.0 – 9.9 ha and 10 ha+. A high proportion of non-beneficiaries

generally own more dryland than beneficiaries under these area categories with non-beneficiary households representing 71.7% of households owning 2 – 4.9 ha, 68% owning dryland of 5 – 9 ha and 67% owning dryland of more than 10 ha. This result is explained by the fact that most beneficiaries had their dryland incorporated into the core estate.

Table 5.4: Dryland Size Ownership by Beneficiary Status

	< 2.0			2.0 - 4.9			5.0 - 9.9			10.0+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	160	44.2%	45.5%	152	42.0%	71.7%	40	11.0%	67.8%	10	2.8%	66.7%
Beneficiary	192	69.6%	54.5%	60	21.7%	28.3%	19	6.9%	32.2%	5	1.8%	33.3%

Source: survey data

Dry Land Rented in and Out (Global)

The results show that beneficiaries rented in an average of 2.4 ha and rented out an average of 1.6 ha. The beneficiaries indicated that they were allocated pieces of land 10 km away from their homesteads; this explains why they are renting in land from non-beneficiaries.

Table 5.5: Dry Land Rented in and Out (Global)

	Dry Land Rented in (Ha)	Dry Land Rented Out (Ha)
Beneficiaries	2.4	1.6
Non Beneficiaries	1.7	2.9

Source: Survey data

Irrigated Land ownership by Beneficiary Status

Beneficiary households own more irrigated land than non-beneficiary households. The column results show that non-beneficiaries represent more (63%) households owning equal or less than 0.1 ha irrigated plots as compared to 37% for beneficiaries. This trend reverses as irrigation area increases with beneficiaries representing more households under each size of irrigated land. Eighty six percent (86%) of households that own between 0.2 – 0.5 ha of irrigated plots are beneficiaries. Beneficiaries also represent 71.4% and 100% of households that own 0.6 – 3.0 ha and 3.1 – 6.0 ha respectively. The investment project thus increased ownership of irrigated land among beneficiaries.

This result is explained by the fact that the investor allocated 0.5 ha irrigation plots to some households that had had their dryland area incorporated into the core estate. The study established that some households were still waiting for their allocation of 0.5 ha irrigation plots. The study also established that the schemes were being under-utilised. The allocated households considered 0.5 ha to be too small to sustain a household. The plots were considered to be for women. But contrary to these households views on 0.5 ha irrigation plots, key informant advised that 0.5 ha irrigation plot was enough to fully occupy and sustain a household. What was needed was proper organisation of the farmers and linking them to markets so that they can do intensive farming which will occupy them throughout the season. It was noted that such organisation was not possible after the disbanding of a committee which was chaired by the rural district council chief executive officer. In order to facilitate development Government involvement is key, there is need that the committee which was chaired by the Council CEO to direct community projects be reinstated so as to guide development because the irrigation schemes are currently underutilised.

Table 5.6: Irrigated Land ownership by Beneficiary Status

Beneficiary status	HA											
	<=0 .1			0.2 - 0.5			.6 - 3.0			3.1 - 6.0		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	347	95.90%	63.00%	10	2.80%	14.50%	4	1.10%	28.60%	0	0.00%	0.00%
Beneficiary	204	73.90%	37.00%	59	21.40%	85.50%	10	3.60%	71.40%	3	1.10%	100.00%

Source: survey data

Irrigation Land Beneficiary and Non Irrigation Land Beneficiary

The results show that the investment increased the size of irrigated land owned. Irrigated land for beneficiaries increased from 0 ha to 0.57 ha while it remained at 0.02 ha for non- beneficiaries. The main issue that arose from the Focus Group Discussions was that of farmer preference between dryland and irrigated land. Farmers indicated a higher preference for dryland rather than irrigated land. The argued that they do not afford to purchase inputs required for irrigation. While accepting that in the initial stages the investor would provide inputs they indicated that due to the economic hardships the investor had since stopped and did not provide inputs in the previous two season. Issues of water allocation were also raised, the farmers indicated that the water was not enough to service all the plots in the scheme. Access to irrigation services was a major benefit to project beneficiaries considering that Chisumbanje, unlike all other areas of Chipinge which are lie in natural region 1, is in natural farming regions 5 with low agriculture potential. However the community is not viewing that as a benefit because they are no longer growing cotton which used to be their main source of income.

Table 5.7: Irrigation Land Beneficiary and Non Irrigation Land Beneficiary

Beneficiary status	Irrigation Land Before (HA)	Irrigation Land After (HA)
Beneficiary of irrigation land	0.00	0.57
Non Beneficiary of Irrigation Land	0.02	0.02

Source: Survey data

Irrigated land owned by Age category

Beneficiary households have more irrigation after the investment as compared to non-beneficiary households. Beneficiaries aged 15-34 own an average of 0.03 Ha, 35-64 own 0.3Ha and 65+ own an average of 0.5 ha of irrigated plots. The smallholder farmers during the Focus Group Discussions indicated that they prefer dryland farming than using the irrigated plots as they require more inputs (fertiliser). The farmers are no longer getting input packs from the company. To also note is that there were weak extension systems in the Chinyamukwakwa area as farmers do not have a cropping calendar and the irrigation scheme is not well managed, with each farmer growing what they want with no market linkages.

Table 5.8: Irrigated land owned by Age category

Beneficiary status	Age	Irrigation (Ha)	
		Before	After
Non-beneficiary	15-34	0	.012
	35 - 64	0	.011
	65+	0	0
Beneficiary	15-34	0	0.1
	35 - 64	0.1	0.3
	65+	0	0.5

Source: Survey data

2.5.2 Production and Productivity

The investment has settler sugarcane production on the core estate. **Macdom** is doing everything and paying the farmers for raw cane produced at 120 t/ha. The settlers producing on their own were once able to produce 65 t/ha against.

The project reduced production of cotton by households whose land was incorporated into the core estate. As cotton has always been a traditional crop for the Chisumbanje area, the households are still engaged in cotton production under contract arrangements with Cottco on rented-in dryland. The investment enabled the introduction of maize and sugar beans production on irrigation plots where beneficiary households are growing what they want. The yields for maize, cotton and sugar beans remain below the respective crops' potential yields - not less than 5 t/ha for maize under irrigation and 2 t/ha up to for sugar beans and cotton.

The results show that beneficiary households of a ready market for agriculture produce had the highest average maize yield. There was no improvement in average maize yields for those renting irrigation, while there was a decrease in average yields for those owning irrigation. Hence access to irrigation did not impact positively to average maize productivity as would have been expected as the project did not follow with input support on the irrigation support. The investment however, impacted positively on maize productivity through ready market for produce suggesting a better paying market that enabled the farmers to access inputs.

The cotton average yields for non-beneficiaries (0.5 t/ha) was the same as the one for beneficiaries renting irrigated land (0.5 t/ha). The average yield for beneficiary households of permanent and contract employment at mill (0.3 and 0.3 t/ha) and farm (0.3 and 0.2 t/ha), and displaced from dryland (0.3 t/ha) and owning irrigated land (0.2 t/ha) are lower than non-beneficiary households. Most benefits from the investment thus impacted negatively on the average cotton productivity in Chisumbanje area in spite of the contract arrangements by cottco.

Sugar beans productivity increased from 0.2 t/ha for the non-beneficiaries to 1.6 t/ha for the displaced who were allocated 0.5 ha irrigation plots. There was no ready market for sugar beans. The investment impacted positively on the average sugar beans production through irrigation.

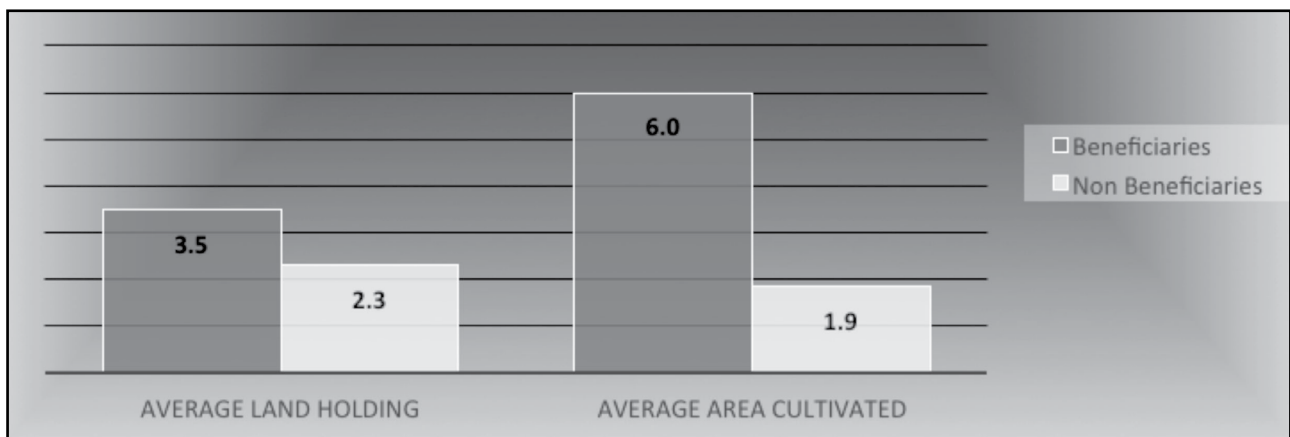
The study concluded that crop productivity between beneficiary status and among beneficiary households differ across different enterprise and benefits enjoyed by households. There is limited knowledge and skills transfer for both non-project crops (sugarcane) and non-project crops (sugar beans cotton and maize).

Table 5.9: Production and Productivity

Benefits	Maize	Sugar beans	Cotton
Non beneficiary	0.3	0.2	0.5
Mill permanent	0.1	0.0	0.3
Mill contract	0.0	0.0	0.2
Farm permanent	0.2	0.0	0.3
Farm contract	0.6	0.0	0.2
School fees	0.1	0.8	0.4
Ready market for agric produce	0.7	0.0	0.0
Ready market for produce from small projects	0.1	0.2	0.2
Renting irrigated land	0.3	0.0	0.5
Displaced from land	0.2	1.6	0.3
Owning irrigated land	0.1	0.0	0.2

Source: Survey data

Figure 5.11: Land holding against cultivated

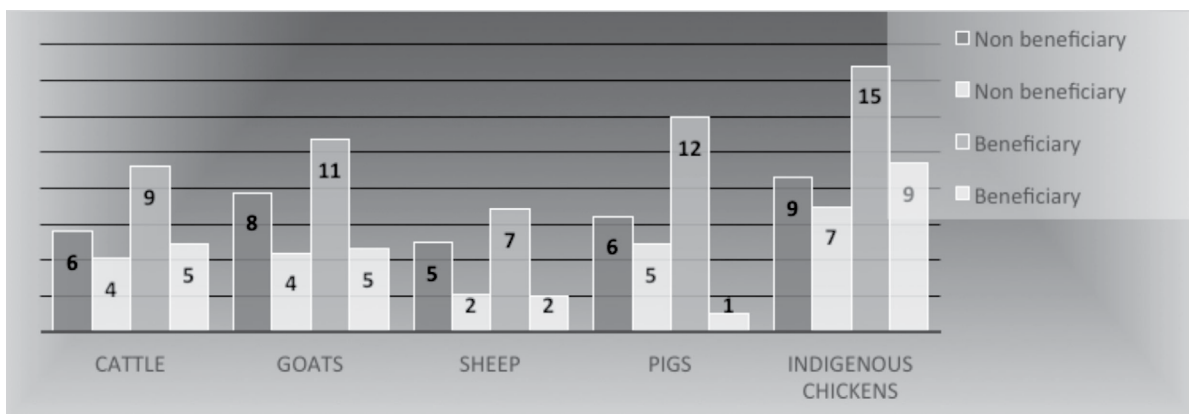


Source: Survey

Livestock Ownership

There was a reduction in the numbers of cattle owned by both beneficiary and non-beneficiary households. Beneficiary households own slightly more cattle than non-beneficiaries. The greatest decrease was experienced in pig production for beneficiaries from owning an average of 12 pigs to 1 pig.

Figure 5.12: Livestock Ownership



Source: Survey data

2.5.3 Income and Expenditure

Beneficiary Status by Income Category

The row results show that 98.2% of beneficiary households compared to 99.2% of non-beneficiary households are in the income category of less than US\$3 000. This suggests a limited (1%) positive income effect by the investment project. The column results show a clearer impact assessment of the investment project within the income categories and reflects a more positive impact of the investment on incomes. The results show that at a lower expending level of less or equal to US\$3 000, there is a larger proportion of non-beneficiary households (57.0%) than beneficiary households (43.0%). However, at a higher spending category of US\$3 001 to US\$6 000 there is a larger proportion of beneficiary households (62.5%) than non-beneficiary households (37.5%). Hence more beneficiary households have expenditure levels which are higher than non-beneficiary households. The study cross-tabulated expenditure category and benefits to understand which benefits drive the increase in expenditure among beneficiaries.

Table 5.10: Beneficiary Status by Income Category

Beneficiary status	<= 3000.00			3001.00 - 6000.00		
	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	359	99.20%	57.00%	3	0.80%	37.50%
Beneficiary	271	98.20%	43.00%	5	1.80%	62.50%

Source: Survey data

Expenditure by Benefits

The row results show the investment marginally drove income and expenditure as all benefits except market for agriculture produce had between 85 -100% of their households spending less than US\$3 000 compared to 99.2% for non-beneficiary households. There were marginal negative income effects on beneficiary households employed permanent and contract at mill all with 100% and displaced from land with 99.3%, while there were marginal positive income effects on beneficiary households employed permanent and contract at farm (98.3% and 85.7% respectively), ready market for small projects (99.0%), renting irrigated land (90.0%) and owning irrigated land (94.4%) which had lower percentage than non-beneficiaries (99.2%).

The column results confirm that different benefits have different impacts on income and expenditure. Within the less than US\$3 000 income category, all benefits had lower proportions of beneficiary households than non-beneficiary households (57.6%). However, the proportion of beneficiary households of displaced land (46.1%) and ready market for small projects (31%) were the highest among all benefits within the below US\$3 000 category. Hence they can be said to be the benefits that most negatively impacted on income. The trend displayed for the income category of US\$3 001 – 6 000 shows that non-beneficiaries still dominate the high income expenditure over all benefits. The non-beneficiary households (37.5%) have the largest proportion of households than all beneficiary households – employed at mill contract and permanent (all 0%), farm permanent, ready market for small projects, displaced from land (all 25.0%), and employment at farm contract, ready market for agriculture produce, renting and owning irrigated land (all 12.5%).

This result is explained by the fact that at the time of the study both mill and farm employees were in arrears. The farmers selling their sugarcane were receiving US\$4/T of raw cane. Also productivity was low on irrigation schemes. The study concluded that all benefits including employment at mill or farm, ready market for small projects, renting irrigation and owning irrigation marginally translated to increased expenditure and income as the proportions of non-beneficiary households spending below US\$3000 and between US\$3 001 – 6 000 income categories are well above the proportions of beneficiary households for all benefits from the investment.

Table 5.11: Expenditure by Benefits

Benefits	<= 3000.00			3001.00 - 6000.00		
	Count	Row N %	Column N %	Count	Row N %	Column N %
Non benefit	359	99.20%	57.60%	3	0.80%	37.50%
Mill permanent	5	100.00%	0.80%	0	0.00%	0.00%
Mill contract	14	100.00%	2.20%	0	0.00%	0.00%
Farm permanent	115	98.30%	18.50%	2	1.70%	25.00%
Farm contract	6	85.70%	1.00%	1	14.30%	12.50%
School fees	143	97.90%	23.00%	3	2.10%	37.50%
Ready market for agriculture produce	0	0.00%	0.00%	1	100.00%	12.50%

Benefits	<= 3000.00			3001.00 - 6000.00		
	Count	Row N %	Column N %	Count	Row N %	Column N %
Ready market for small projects	193	99.00%	31.00%	2	1.00%	25.00%
Renting irrigated land	9	90.00%	1.40%	1	10.00%	12.50%
Displaced from land	287	99.30%	46.10%	2	0.70%	25.00%
Owning irrigated land	17	94.40%	2.70%	1	5.60%	12.50%

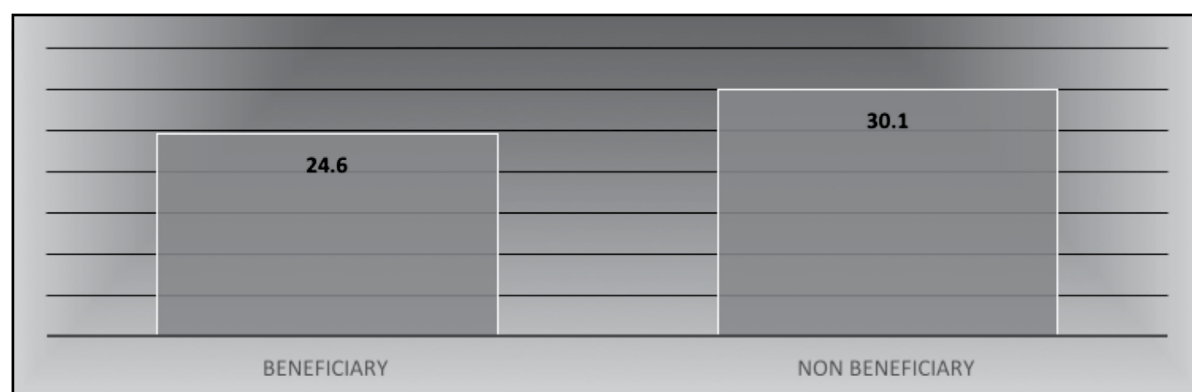
Source: Survey data

2.5.4 Access to Education

The study used the ability of households to send to school all their children of school going age among beneficiary and non-beneficiary households to assess the impact of large-scale investment on education.

Households with children not attending school

Twenty-five percent (25%) of beneficiary households had children who were not attending school compared to 30% for non-beneficiary households. The results show that beneficiaries are now able to send their children to school than non-beneficiaries. The common reasons for not attending school were no money.



Source: Survey data

Table 5.12: Male household members not attending primary school

	Male household members not attending primary school											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	120	33.1%	57.4%	146	40.3%	61.3%	64	17.7%	49.6%	21	5.8%	52.5%
Mill permanent	1	20.0%	.5%	3	60.0%	1.3%	1	20.0%	.8%	0	0.0%	0.0%
Mill contract	7	50.0%	3.3%	5	35.7%	2.1%	1	7.1%	.8%	1	7.1%	2.5%
Farm permanent	32	27.4%	15.3%	36	30.8%	15.1%	34	29.1%	26.4%	10	8.5%	25.0%
Farm contract	2	28.6%	1.0%	1	14.3%	.4%	3	42.9%	2.3%	1	14.3%	2.5%
School fees	50	34.2%	23.9%	48	32.9%	20.2%	33	22.6%	25.6%	12	8.2%	30.0%
Ready market agriculture produce	1	100.0%	.5%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%

	Male household members not attending primary school											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Ready market small projects	73	37.4%	34.9%	76	39.0%	31.9%	33	16.9%	25.6%	10	5.1%	25.0%
Renting irrigated land	3	30.0%	1.4%	4	40.0%	1.7%	2	20.0%	1.6%	1	10.0%	2.5%
Displaced from land	89	30.8%	42.6%	113	39.1%	47.5%	62	21.5%	48.1%	20	6.9%	50.0%
Owning irrigated land	5	27.8%	2.4%	9	50.0%	3.8%	3	16.7%	2.3%	1	5.6%	2.5%

Source: survey data

Female household members not attending primary school

The results are the same for the male child above. The row results show that there still are more than 63 – 83% of households with female child of school going age who are not going to school. The benefits have not translated to improved access to education for the girl child.

Table 5.13: Female household members not attending primary school

Benefits	Female children not going to school											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	117	32.3%	56.8%	134	37.0%	55.8%	74	20.4%	58.3%	27	7.5%	60.0%
Mill permanent	2	40.0%	1.0%	3	60.0%	1.3%	0	0.0%	0.0%	0	0.0%	0.0%
Mill contract	3	21.4%	1.5%	7	50.0%	2.9%	4	28.6%	3.1%	0	0.0%	0.0%
Farm permanent	35	29.9%	17.0%	42	35.9%	17.5%	28	23.9%	22.0%	10	8.5%	22.2%
Farm contract	2	28.6%	1.0%	2	28.6%	.8%	3	42.9%	2.4%	0	0.0%	0.0%
School fees	54	37.0%	26.2%	54	37.0%	22.5%	25	17.1%	19.7%	11	7.5%	24.4%
Ready market agric produce	0	0.0%	0.0%	0	0.0%	0.0%	1	100.0%	.8%	0	0.0%	0.0%
Ready market small projects	60	30.8%	29.1%	78	40.0%	32.5%	38	19.5%	29.9%	14	7.2%	31.1%
Renting irrigated land	2	20.0%	1.0%	4	40.0%	1.7%	3	30.0%	2.4%	1	10.0%	2.2%
Displaced from land	87	30.1%	42.2%	111	38.4%	46.3%	63	21.8%	49.6%	24	8.3%	53.3%
Owning irrigated land	3	16.7%	1.5%	8	44.4%	3.3%	7	38.9%	5.5%	0	0.0%	0.0%

Source: Survey data

Table 5.14: Male members not attending secondary school

Benefits	Male members not attending secondary school											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	280	77.3%	56.3%	67	18.5%	60.9%	12	3.3%	60.0%	2	.6%	100.0%
Mill permanent	3	60.0%	.6%	1	20.0%	.9%	1	20.0%	5.0%	0	0.0%	0.0%
Mill contract	13	92.9%	2.6%	1	7.1%	.9%	0	0.0%	0.0%	0	0.0%	0.0%
Farm permanent	93	79.5%	18.7%	21	17.9%	19.1%	2	1.7%	10.0%	1	.9%	50.0%
Farm contract	4	57.1%	.8%	2	28.6%	1.8%	1	14.3%	5.0%	0	0.0%	0.0%
School fees	111	76.0%	22.3%	28	19.2%	25.5%	6	4.1%	30.0%	0	0.0%	0.0%
Ready market agric produce	1	100.0%	.2%	0	0.0%	0.0%	0	0.0%	0.0%	0	0.0%	0.0%
Ready market small projects	149	76.4%	30.0%	36	18.5%	32.7%	9	4.6%	45.0%	0	0.0%	0.0%
Renting irrigated land	7	70.0%	1.4%	2	20.0%	1.8%	1	10.0%	5.0%	0	0.0%	0.0%
Displaced from land	225	77.9%	45.3%	50	17.3%	45.5%	12	4.2%	60.0%	1	.3%	50.0%
Owning irrigated land	16	88.9%	3.2%	1	5.6%	.9%	0	0.0%	0.0%	1	5.6%	50.0%

Source: survey data

Female members not attending secondary school

The results are the same for the male child of secondary school going age. The benefits enable more households to send all their female children to secondary school. The column results show that renting irrigated land, displaced from land and ready market for small projects have the higher proportions of households under those that are not sending 1, 2 and 3 female children to school. The study concluded that not all investment project benefits will improve access to education. There are other cultural views on female and male children as well as the level of education.

Table 5.15: Female members not attending secondary school

Benefits	Female members not attending secondary school											
	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non bene	257	71.0%	54.4%	84	23.2%	64.6%	18	5.0%	69.2%	1	.3%	100.0%
Mill permanent	4	80.0%	.8%	1	20.0%	.8%	0	0.0%	0.0%	0	0.0%	0.0%
Mill contract	12	85.7%	2.5%	2	14.3%	1.5%	0	0.0%	0.0%	0	0.0%	0.0%
Farm permanent	98	83.8%	20.8%	16	13.7%	12.3%	3	2.6%	11.5%	0	0.0%	0.0%
Farm contract	6	85.7%	1.3%	1	14.3%	.8%	0	0.0%	0.0%	0	0.0%	0.0%
School fees	111	76.0%	23.5%	31	21.2%	23.8%	4	2.7%	15.4%	0	0.0%	0.0%
Ready market agric produce	0	0.0%	0.0%	1	100.0%	.8%	0	0.0%	0.0%	0	0.0%	0.0%
Ready market small projects	134	68.7%	28.4%	48	24.6%	36.9%	10	5.1%	38.5%	1	.5%	100.0%

Female members not attending secondary school												
Benefits	0			1			2			3		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Renting irrigated land	7	70.0%	1.5%	2	20.0%	1.5%	1	10.0%	3.8%	0	0.0%	0.0%
Displaced from land	224	77.5%	47.5%	49	17.0%	37.7%	15	5.2%	57.7%	1	.3%	100.0%
Owning irrigated land	12	66.7%	2.5%	6	33.3%	4.6%	0	0.0%	0.0%	0	0.0%	0.0%

Source: survey data

Table 5.16: Average distance to school

	Primary School	Secondary School
Beneficiary	2.6	2.2
Non-Beneficiary	1.8	2.9

Source: Survey data

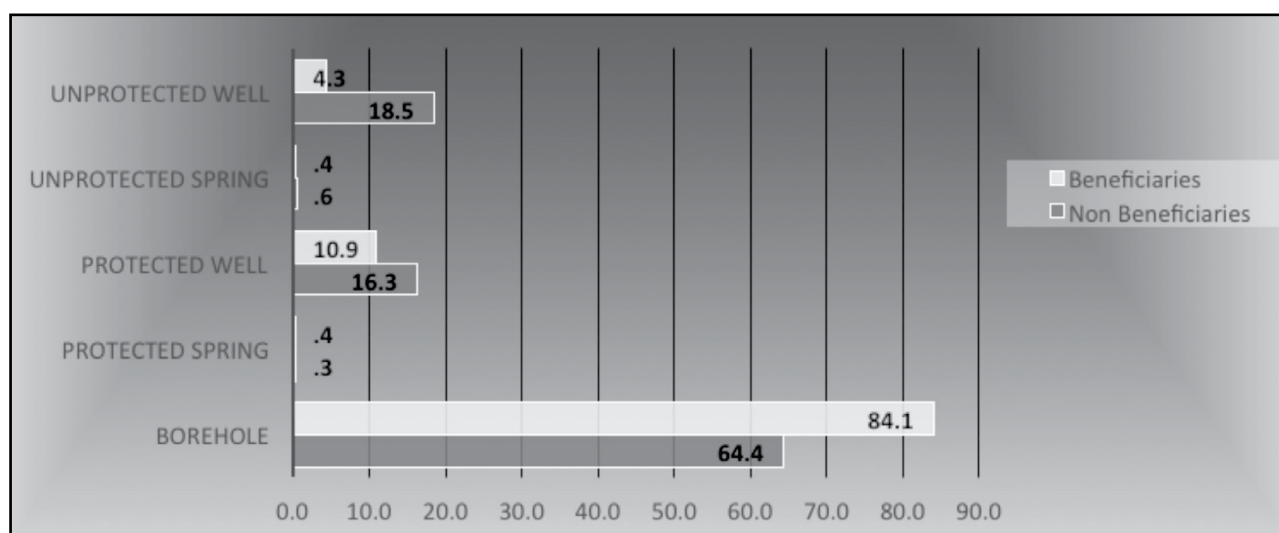
2.5.5 Water, Health and Disease

The study established that beneficiary and non-beneficiary households used safe and unsafe water sources. The safe water sources included borehole, protected well and protected spring, while the unsafe water sources included unprotected well and unprotected spring.

Water Sources by Beneficiary Status

The results showed that the borehole was the most common source for both non-beneficiary (64.4%) and beneficiary (84.1%) households. However, there was still 18.5% and 4.3% of non-beneficiary and beneficiary households respectively that used water from unprotected well. On the overall, exposure to unsafe water was high among the non-beneficiary households (19.1%) compared to beneficiary households (4.7%).

Figure 5.14: Water Sources by Beneficiary Status



Source: Survey data

Distance to Major Water Source by Sex and Beneficiary Status

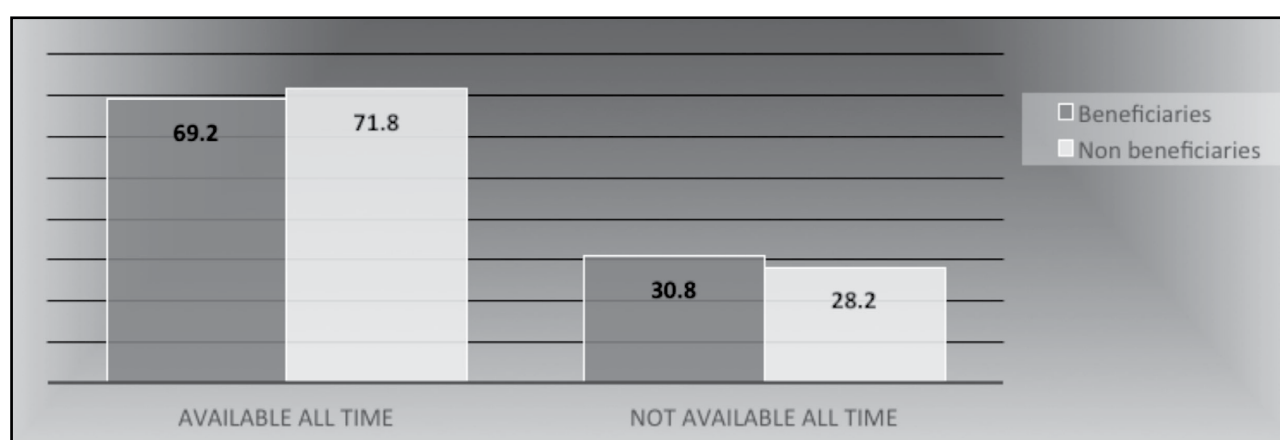
The results show that water sources for beneficiaries are further than for non-beneficiaries. The average distance for beneficiaries ranged from 1.2 to 1.5 km as compared to 0.8 km for non-beneficiaries. The investment increased distance to water source as a result of displacement from dryland farming area.

Table 5.17: Distance to Major Water Source by Sex and Beneficiary Status

Beneficiary status	Sex of Household Head	
	Male	Female
Beneficiary	1.5	1.3
Non Beneficiary	0.8	0.8

Source: Survey data

Figure 5.15: Water Availability all the Time



Source: Survey data

Water treatment methods

The most prevalent water treatment methods for beneficiaries are straining through cloth (30%), letting the water stand and settle (49%) and boiling (16%). Fifty three percent (53.3%) of the non-beneficiaries indicated that they do not treat their water before drinking and 18% indicated that they boil their water before drinking. Only 0.4% of beneficiaries do not treat their drinking water compared to 53.3% for the non-beneficiaries

Figure 5.16: Water treatment methods

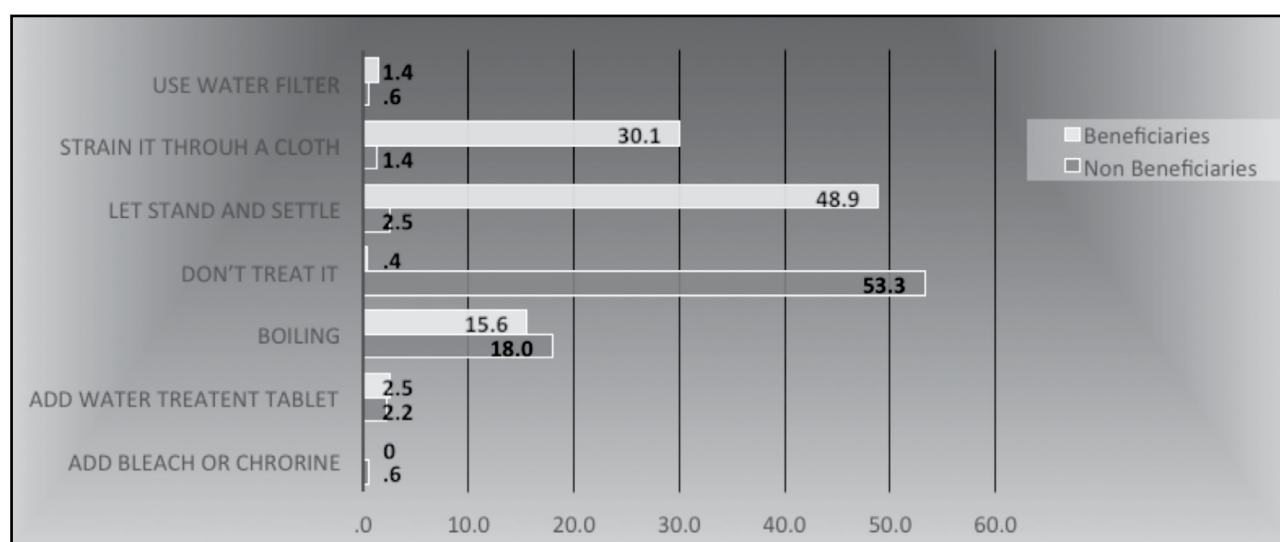
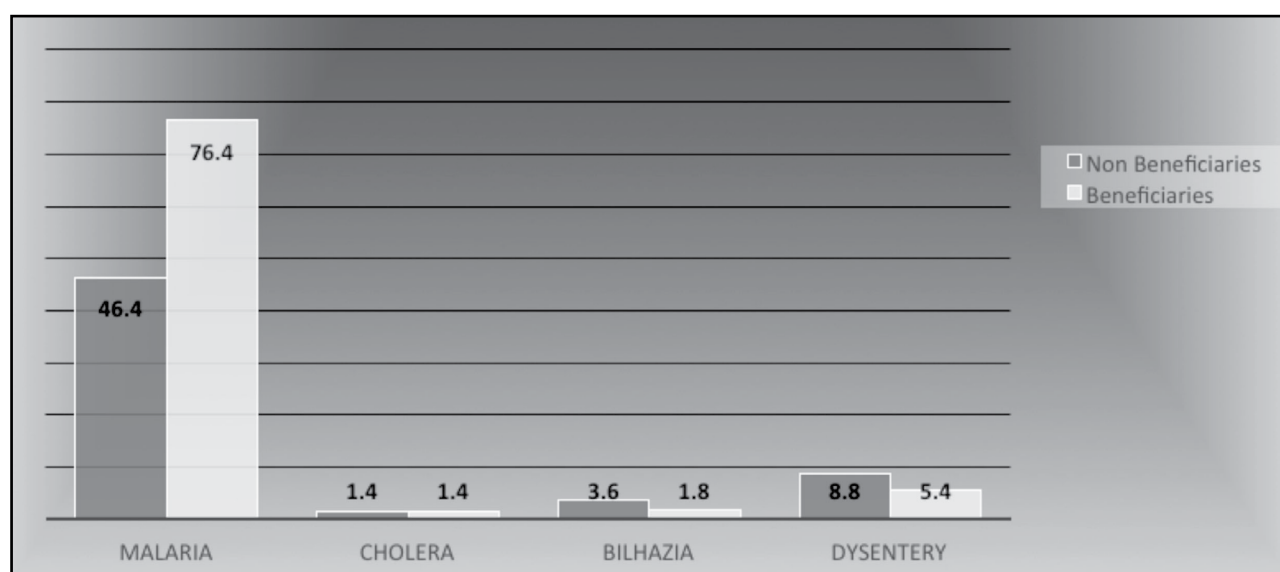


Figure 5.17: Disease Prevalence by Beneficiary Status



Source: survey data

Disease prevalence by water source

The row results showed that malaria, bilharzia and dysentery are found from all water sources for both beneficiary and non-beneficiary households but are most common in borehole including cholera. The results thus showed that the borehole was the most common source of diseases among beneficiary and anon-beneficiary households. This is an unexpected result. There is need to further investigate issues of depth of the boreholes, location, direct and distance from latrines and the impact of the *danda water* on ground water.

The column results showed that under each source of water, malaria followed by dysentery had a high proportion of households and this proportion was higher for beneficiaries than non-beneficiaries as a result of exposure to *danda water*. Hence the study concluded that the investment increased malaria prevalence. There was no change for cholera bilharzia.

Table 5.18: Disease prevalence by water source

Beneficiary status	Disease	Borehole			Protected well			Unprotected well		
		Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	Malaria	104	61.90%	91.20%	23	13.70%	85.20%	41	24.40%	97.60%
	cholera	3	60.00%	2.60%	1	20.00%	3.70%	0	0.00%	0.00%
	Bilharzia	8	61.50%	7.00%	3	23.10%	11.10%	2	15.40%	4.80%
	Dysentery	18	56.20%	15.80%	6	18.80%	22.20%	8	25.00%	19.00%
Beneficiary	Malaria	181	85.80%	98.90%	19	9.00%	90.50%	10	4.70%	100.00%
	cholera	4	100.00%	2.20%	0	0.00%	0.00%	0	0.00%	0.00%
	Bilharzia	2	40.00%	1.10%	2	40.00%	9.50%	1	20.00%	10.00%
	Dysentery	12	80.00%	6.60%	1	6.70%	4.80%	2	13.30%	20.00%

Source: survey data

2.5.6 Food Self-sufficiency and Food Security

The food self-sufficiency of households can be measured by availability of food from own production. The study explored if households had months in which they experienced food shortages during the year.

The row result show that there are more (86.4%) beneficiary households who experienced food shortages than (85.4%) non-beneficiary households. This implies a marginal negative effect of 1% by the investment on food security. The study cross tabulated the individual benefits and food availability to establish whether it was all benefits that caused food shortages.

Beneficiary Status	Did the household experience food shortages during the year?					
	Yes			No		
	Count	Row	Column	Count	Row	Column
Non-beneficiary	309	85.4%	56.8%	53	14.6%	58.9%
Beneficiary	235	86.4%	43.2%	37	13.6%	41.1%

Source: Survey Data

Food Availability and Benefits

The row results show that permanent employment at the mill and contract at the farm had a positive effect on food availability as these had 60.0% and 71.4% households who suffered food shortage compared to non-beneficiaries with 85.4%. All the other benefits – contract employment at the mill (92.2%), permanent employment at farm (88.9%), ready market for small projects, renting irrigation (100%), displaced from farmland (90.3%) and owning irrigated land (88.9%) had more households that experienced food shortages than non-beneficiaries (85.4%).

Table 5.19: Food Availability and Benefits

Benefits	In the past 12 months, were there days in which you did not have enough food to meet your family's needs?						Total
	Yes			No			
	Count	Row	Col	Count	Row	Col	
Non Beneficiary	309	85.4%	57.3%	53	14.6%	59.6%	362
Mill Permanent	3	60.0%	.6%	2	40.0%	2.2%	5
Mill Contract	13	92.9%	2.4%	1	7.1%	1.1%	14
Farm Permanently	104	88.9%	19.3%	13	11.1%	14.6%	117
Farm Contract	5	71.4%	.9%	2	28.6%	2.2%	7
School Fees	121	84.6%	22.4%	22	15.4%	24.7%	143
Ready Market For Agric Produce	1	100.0%	.2%	0	0.0%	0.0%	1
Ready Market For Produce From Small Projects	175	89.7%	32.5%	20	10.3%	22.5%	195
Renting Irrigated Land	10	100.0%	1.9%	0	0.0%	0.0%	10
Displaced From Land	260	90.3%	48.2%	28	9.7%	31.5%	288
Owning Irrigated Land	16	88.9%	3.0%	2	11.1%	2.2%	18
	539			89			628

Source: Survey Data

Table 5.20: Food Availability by Benefit by Gender

Sex HH	Benefits	In the past 12 months, were there days in which you did not have enough food to meet your family's needs?						Total
		Yes			No			
		count	Row	Col	count	Row	Col	
Male	Non Bene	174	84.9%	54.4%	31	15.1%	52.5%	205
	Mill Permanent	3	60.0%	.9%	2	40.0%	3.4%	5
	Mill Contract	9	90.0%	2.8%	1	10.0%	1.7%	10
	Farm Permanently	72	86.7%	22.5%	11	13.3%	18.6%	83
	Farm Contract	2	50.0%	.6%	2	50.0%	3.4%	4
	School Fees	75	82.4%	23.4%	16	17.6%	27.1%	91
	Ready Market For Agric Produce	1	100.0%	.3%	0	0.0%	0.0%	1
	Ready Market For Produce From Small Projects	110	88.0%	34.4%	15	12.0%	25.4%	125
	Renting Irrigated Land	5	100.0%	1.6%	0	0.0%	0.0%	5
	Displaced From Land	164	87.7%	51.3%	23	12.3%	39.0%	187
	Owning Irrigated land	8	88.9%	2.5%	1	11.1%	1.7%	9
Female	Non Bene	135	86.0%	61.6%	22	14.0%	73.3%	157
	Mill Contract	4	100.0%	1.8%	0	0.0%	0.0%	4
	Farm Permanently	32	94.1%	14.6%	2	6.7%	5.9%	34
	Farm Contract	3	100.0%	1.4%	0	0.0%	0.0%	3
	School Fees	46	88.5%	21.0%	6	11.5%	20.0%	52
	Ready Market For Produce From Small Projects	65	92.9%	29.7%	5	7.1%	16.7%	70
	Renting Irrigated Land	5	100.0%	2.3%	0	0.0%	0.0%	5
	Displaced From Land	96	95.0%	43.8%	5	5.0%	16.7%	101
	Owning Irrigated Land	8	88.9%	3.7%	1	11.1%	3.3%	9

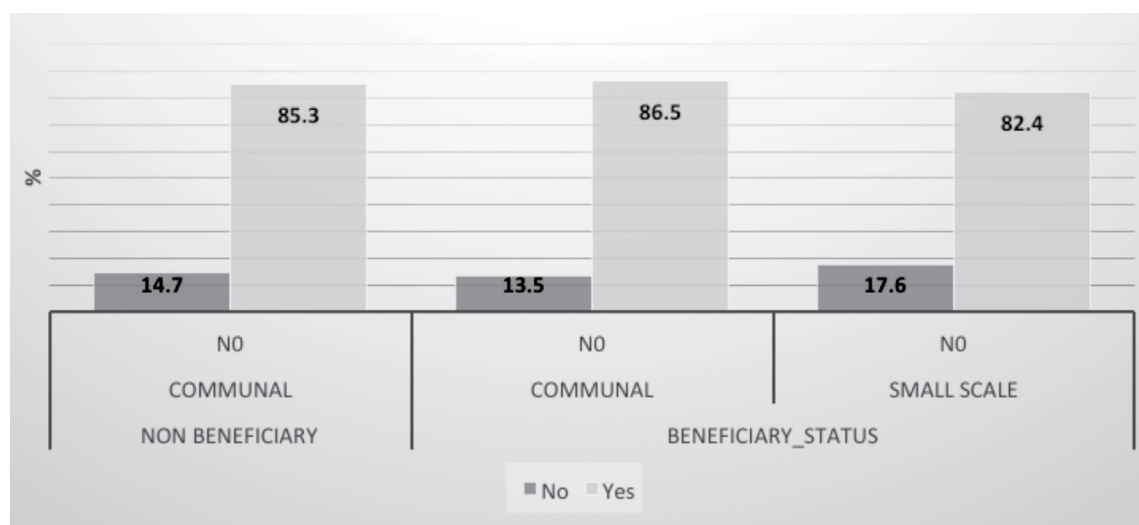
Source: Survey Data

Food Availability by Sector

The results show that 85% of the non-beneficiaries in the communal sector experienced cases of food shortages between January and December 2016. For non-beneficiaries the results show that more than 80% of households in all sectors for beneficiaries experienced cases of food shortages. This results suggests the project did not improve the food security of households.

The study also computed the FCS a proxy indicator of current food security. FCS is a composite score based on dietary frequency, food frequency and relative nutrition importance of different food groups. A FCS of 28 is unacceptable, that from 28 to– 42 is borderline and that above 42 is acceptable.

Figure 5.18: Food Availability by Sector



Source: Survey data

Table 5.21: Food Consumption Score by Beneficiary Status

	FCS					
	<= 28.00		28.01 - 42.00		42.01+	
	Row	Col	Row	Col	Row	Col
Non-beneficiary	183		117		62	
	50.6%	58.1%	32.3%	53.7%	17.1%	59.0%
beneficiary	132		101		43	
	47.8%	41.9%	36.6%	46.3%	15.6%	41.0%

Source: Survey Data

Food Consumption Score by benefits

The row results show that more households with ready markets for small projects, displaced from land and contract employment at the mill had an unacceptable FCS than non-beneficiaries. The key benefits that drive food security are permanent employment at the mill, permanent and contract employment at the farm, and renting irrigation. These have more borderline and acceptable FCS. Owning irrigation had 50% with unacceptable and 50% with borderline (27.8%) and acceptable (22.2%) FCS. This was similar to non-beneficiaries households. This implies low productivity on irrigation schemes.

The column results show that the most food insecure benefits are non-beneficiary households (58.8%), households displaced from farmland (52.4%) and households with ready market for small projects. These had the highest proportion of households with poor FCS. This result is explained by a positive relationship that was established between crop output and dryland size. The displaced households have less dryland as their allocated dryland is 10 – 12 km from their homesteads. As a result they produce less output and hence are food insecure. Food insecurity for households with irrigation schemes is explained by low productivity on irrigation schemes. The investor used to supply inputs but has stopped. The schemes are not being fully utilised as they are perceived to be small and allocated to women. The irrigation plots grow different products and are far from markets in Mutare, Chiredzi and Masvingo. There is need for more intervention on the irrigation plots and link them with markets. The displaced households needs to be reallocated dryland closer to homesteads. The study cross tabulated benefits and FCS layered by gender to explore the gender dimension of the FCS and food security.

Table 5.22: Food Consumption Score by benefits

Benefits	<= 28.00			28.01 - 42.00			42.01+		
	Count	Row N %	Column N %	Count	Row N %	Column N %	Count	Row N %	Column N %
Non beneficiary	183	50.60%	58.80%	117	32.30%	54.40%	62	17.10%	59.00%
Beneficiary	132	47.80%	41.90%	101	36.60%	46.30%	43	15.60%	
Mill permanent	0	0.00%	0.00%	4	80.00%	1.90%	1	20.00%	1.00%
Mill contract	9	64.30%	2.90%	1	7.10%	0.50%	4	28.60%	3.80%
Farm permanent	49	41.90%	15.80%	55	47.00%	25.60%	13	11.10%	12.40%
Farm contract	0	0.00%	0.00%	6	85.70%	2.80%	1	14.30%	1.00%
School fees	71	48.60%	22.80%	51	34.90%	23.70%	24	16.40%	22.90%
Ready market for agric produce	0	0.00%	0.00%	1	100.00%	0.50%	0	0.00%	0.00%
Ready market for small projects	121	62.10%	38.90%	56	28.70%	26.00%	18	9.20%	17.10%
Renting irrigated land	1	10.00%	0.30%	7	70.00%	3.30%	2	20.00%	1.90%
Displaced from land	163	56.40%	52.40%	86	29.80%	40.00%	40	13.80%	38.10%
Owning irrigated land	9	50.00%	2.90%	5	27.80%	2.30%	4	22.20%	3.80%

Source: Survey data

Food Consumption Score by Gender

The results showed that female headed households were negatively affected. The majority of the benefits had higher percentage of beneficiary households in the poor FCS – employed at mill contract (75.%%), farm permanent (52.9%), school fees (52.8%), ready market for small projects (70.0%), displaced from land (59.4%) and owning irrigation (66.5%) - than their non-beneficiary counterparts with 51.6%. Female-headed households under farm contract (0%) and renting irrigation (20.0%) had better FCS than non-beneficiary households. For male headed households, mill contract had 60.0%, ready market for produce from small projects 57.6% and displaced from farmland 54.8% of beneficiary households with poor FCS compared to non-beneficiary households with 49.8%.

Table 5.23: Food Consumption Score by Gender

Sex of Household Head	Benefits	FCS									Total
		<= 28.00			28.01 - 42.00			42.01+			
		Count	Row	Column	Count	Row	Column	Count	Row	Column	
Male	Non beneficiary	102	49.8%	57.3%	67	32.7%	48.9%	36	17.6%	54.5%	205
	Mill permanent	0	0.0%	0.0%	4	2.9%	80.0%	1	20.0%	1.5%	5
	Mill contract	6	60.0%	3.4%	0	0.0%	0.0%	4	6.1%	40.0%	10
	Farm permanently	31	37.3%	17.4%	40	48.2%	29.2%	12	14.5%	18.2%	83
	Farm contract	0	0.0%	0.0%	3	75.0%	2.2%	1	25.0%	1.5%	4
	school fees	43	46.2%	24.2%	37	39.8%	27.0%	13	14.0%	19.7%	93
	Ready market for agric produce	0	0.0%	0.0%	1	100.0%	.7%	0	0.0%	0.0%	1
	Ready market for produce from small projects	72	57.6%	40.4%	38	30.4%	27.7%	15	12.0%	22.7%	125
	Renting irrigated land	0	0.0%	0.0%	4	80.0%	2.9%	1	20.0%	1.5%	5
	Displaced from land	103	54.8%	57.9%	60	31.9%	43.8%	25	13.3%	37.9%	188
	Owning irrigated land	3	33.3%	1.7%	3	33.3%	2.2%	3	33.3%	4.5%	9
		178			137			66			381
Female	Non beneficiary	81	51.6%	60.9%	50	31.8%	64.1%	26	16.6%	66.7%	157
	Mill contract	3	75.0%	2.3%	1	25.0%	1.3%	0	0.0%	0.0%	4
	Farm permanently	18	52.9%	13.5%	15	44.1%	19.2%	1	2.9%	2.6%	34
	Farm contract	0	0.0%	0.0%	3	100.0%	3.8%	0	0.0%	0.0%	3
	School fees	28	52.8%	21.1%	14	26.4%	17.9%	11	20.8%	28.2%	53
	Ready market for produce from small projects	49	70.0%	36.8%	18	25.7%	23.1%	3	4.3%	7.7%	70
	Renting irrigated land	1	20.0%	.8%	3	60.0%	3.8%	1	20.0%	2.6%	5
	Displaced from land	60	59.4%	45.1%	26	25.7%	33.3%	15	14.9%	38.5%	101
	Owning irrigated land	6	66.7%	4.5%	2	22.2%	2.6%	1	11.1%	2.6%	9
		133			78			39			250

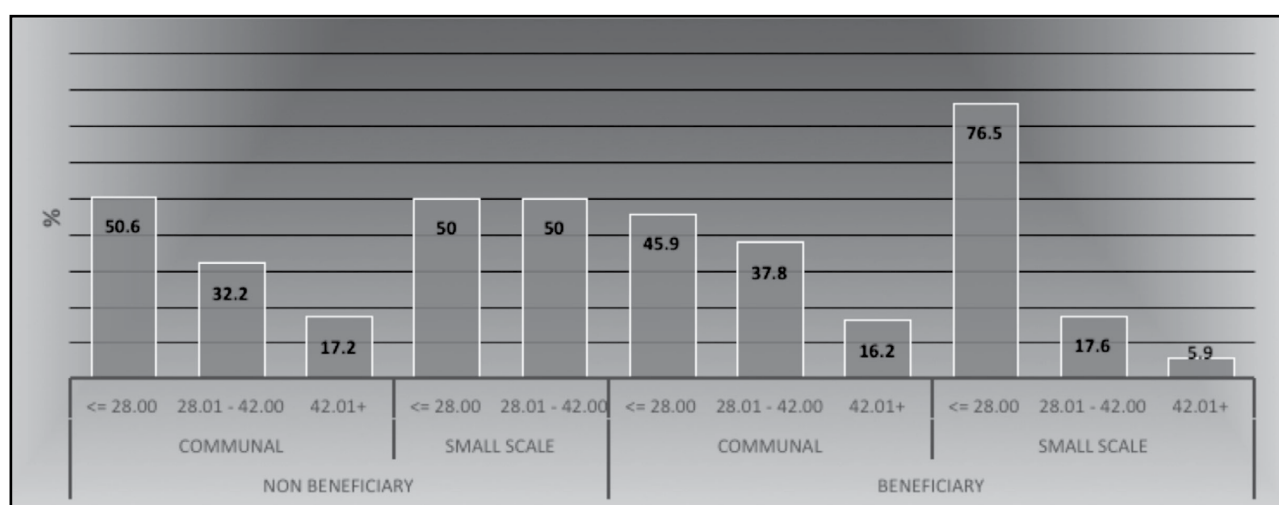
Source: Survey Data

Food Consumption Score by Sector

The results show that FSC for communal beneficiary and non-beneficiary households remained the same. Fifty one percent (51%) of communal non-beneficiary households had a poor food consumption score compared to 46% for beneficiary communal households. The acceptable FSC was 17.2% and 17.6% for non-beneficiary and beneficiary households respectively. This confirms the limited impact of the project on food security.

The results show a mixed impact of the project in the small-scale sector. Poor food consumption score increased from 50% in non-beneficiary households to 76.5% in beneficiary households. However, while the borderline consumption score remained at 17%, there was an improvement in the acceptable consumption score from 0% in the non-beneficiary to 5.9% in the beneficiary households.

Figure 5.19: Food Consumption Score by Sector



Source: Survey data

Table 5.24: Cereals output by food consumption score

Beneficiary status	Sector	FCS	Cereal output (Kgs)
Non beneficiary	Communal	≤ 28.00	605
		28.01 - 42.00	859
		42.01+	1 925
Beneficiary	Communal	≤ 28.00	243
		28.01 - 42.00	506
		42.01+	312
	Small Scale	≤ 28.00	460

Source: Survey data

Food Balance Sheet (Deficit/Surplus) and Food Consumption Score

The results show that under non-beneficiary communal households with food deficits are also food insecure, and that under beneficiary communal households with food deficit are not necessarily food insecure as measured by the FSC. However non-beneficiary and beneficiary small scale households have similar trends, where a food deficit does not mean food insecurity. This is an expected results as small scale farmers are more commercial oriented in their farming activities. They produce high value crops and rely on the market for food.

Table 5.25: Food Balance Sheet (Deficit/Surplus) and Food Consumption Score

Beneficiary status	Sector	FCS	Requirement		Output (Kg)	Deficit/ Surplus (Kg)	Consumption months (Kg)
			monthly	annual			
Non beneficiary	Communal	<= 28.00	66	795	605	(190)	9
		28.01 - 42.00	70	841	859	18	12
		42.01+	65	777	1925	1148	30
		Total	67	807	824	18	12
	Small Scale	<= 28.00	46	550		(550)	0
		28.01 - 42.00	110	1320		(1320)	0
		Total	78	935		(935)	0
Beneficiary	Communal	<= 28.00	64	772	243	(529)	4
		28.01 - 42.00	69	831	506	(325)	7
		42.01+	76	909	312	(597)	4
		Total	68	816	395	(421)	6
	Small Scale	<= 28.00	81	973	460	(513)	6
		28.01 - 42.00	61	733		(733)	0
		42.01+	92	1100		(1100)	0
		Total	78	938	460	(478)	6

Source: Survey data

Table 5.26: Food Balance Sheet and Age of Household Head

Beneficiary Status	Sector	Age	Output	Requirement		Deficit/ surplus	Consumption months
				Monthly	Annual		
Non beneficiary	Communal	15-34	988	58	692	295	17
		35 - 64	830	70	839	(9)	12
		65+	674	71	848	(174)	10
		Total	824	67	807	18	12
	Small Scale	35 - 64	0	78	935	(935)	0
		Total	0	78	935	(935)	0
Beneficiary Status	Communal	15-34	560	57	686	(126)	10
		35 - 64	281	72	859	(578)	4
		65+	1000	79	950	50	13
		Total	395	68	816	(421)	6
	Small Scale	15-34	460	60	715	(255)	8
		35 - 64	0	82	981	(981)	0
		65+	0	76	917	(917)	0
		Total	460	78	938	(478)	6

Source: Survey data

Table 5.27: Dryland Holding and Food Consumption Score

Beneficiary status	FCS	Dryland after (Ha)
Non beneficiary	<= 28.00	2
	28.01 - 42.00	3
	42.01+	3
Beneficiary	<= 28.00	1
	28.01 - 42.00	1
	42.01+	3

Source: Survey data

Irrigated Land owned by Food consumption Score

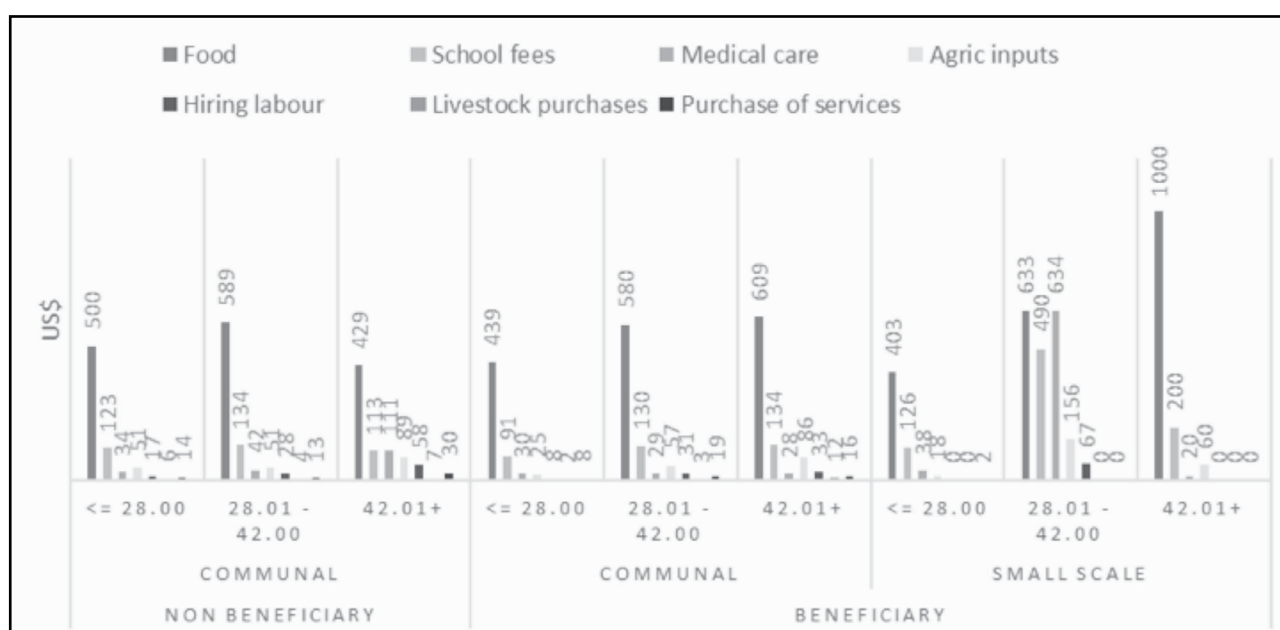
The results show that non-beneficiary households have limited access to irrigation, with only an average of 0.02 ha owned by households with borderline diets. The results also show that beneficiaries households have irrigation ranging between 0.2 – 0.5 ha. However, there is no clear relationship between irrigation ownership and food consumption score. This could mean varying productivity levels. Some households with irrigation were producing sugarcane for the project while others especially those allocated 0.5 ha on displacement from dryland were producing other crops such as sugar beans. As to whether the household would be food secure depends on the prices for the sugarcane and availability of profitable markets for the other crops to allow household to purchase adequate food on the market.

Table 5.28: Irrigated Land owned by Food consumption Score

Beneficiary status	FCS	Irrigation Owned After Investment
Non beneficiary	<= 28.00	0
	28.01 - 42.00	0.02
	42.01+	0.0
Beneficiary	<= 28.00	0.2
	28.01 - 42.00	0.2
	42.01+	0.5

Source: Survey data

Figure 5.20: Expenditure patterns by Food Consumption Score



Source: Survey data

4. CONCLUSION AND RECOMMENDATIONS

4.1 THE IMPACT OF LARGE SCALE INVESTMENT AND LESSONS LEARNT

The impact of large-scale agriculture investments on land ownership, productivity, income, access to education and health, and food security of rural communities is a double edged sword whose net effect can be a zero sum game. Further, it can be negative or positive depending on the investment model and how the investment is implemented in the circumstances of both the business, the communities and the investment supply chain facilitation or coordination mechanism.

The impact of large-scale investments thus differ within and between communities depending on the performance of the business and government influence. Positive impact is minimal and there is emotional conflict where implementation fails to deliver the right mix of outputs in adequate levels to influence standards of living and livelihoods, or fails to take into account local institutions, norms and values or fails to deliver promises to communities.

Indicators	Conclusions	Key Observations and Lessons Learnt from Case Study	
		Tongaat Hullet	Chisumbanje
Land Ownership	<p>Large scale investments either resettle communities on new land or dispossess them of their land. One investment can deliver both benefits.</p> <p>Land ownership before and after investments is different – beneficiaries own less dryland and more irrigated land than non-beneficiaries after the investment.</p> <p>Large scale investment increase access to out grower irrigation, irrigation for own production or both.</p> <p><i>The impact on ownership can greatly be influenced by government strategic direction and involvement in the whole investment process.</i></p>	<p>The investment resettled 813 out grower – Old Resettlement, A1 and A2 farmers – on 16 000 ha. This is 35.6% of the total area under sugarcane.</p> <p><i>The close cooperation between government and investor increased communities' ownership of both dryland and irrigated land.</i></p>	<p>The investment allocated 415 small-scale farmers 650 ha within the 9 500 ha core estate.</p> <p>The investment disposed some communities of dryland farming and re-allocated alternative dryland farms 10 – 12km away from their home steads.</p> <p>The investment allocated 0.5 irrigation plots to beneficiaries</p> <p><i>Limited government involvement left communities at the goodwill of investor's corporate responsibility which may explain why some of the investor's promises are yet to be delivered.</i></p>
		<p>The proportion of out grower land is too low compared to the core estate. Yet there is a high demand for land evidenced by renting of irrigation schemes. The investors need to seriously consider more inclusive models as investments expand operations.</p>	

Indicators	Conclusions	Key Observations and Lessons Learnt from Case Study	
		Tongaat Hullet	Chisumbanje
Agricultural Productivity	<p>LSC investments support surrounding farming communities with all, some or none of the following – input, salaries and wages and farmer capacity and skills development. The productivity of communities before and after the investment is different depending on crop and benefits delivered by the investment.</p> <p>The impact will depend on the adequacy and completeness of the package – increased access to irrigation, input support, payment of salaries and wages and farmer capacity and skills development.</p>	<p>Sugarcane yields vary across sector and benefits below the yield potential of 120 MT/ha although investor provides inputs and market. <i>This questions the adequacy of the input support, threatens viability and fans the unending negotiations on DoP.</i></p> <p>A2 farmers produce 78MT/Ha while old settlers produce 38MT/Ha. The yields are high for the employed compared to the resettled and ready markets.</p> <p>Maize and sugar beans yields improved for all benefits, but they are high for the resettled and ready markets.</p> <p><i>Knowledge and skills transfer for sugarcane production is high for the employed. The employed are less productive for non-project crops.</i></p>	<p>The investor manages out growers' sugarcane plots and pay them US\$4/T based on a 120 MT/ha. The settler farmers own their own did 65MT/ha. <i>There is no capacity building in the case of investor leaving farmers on their own.</i></p> <p>Renting irrigation did not impact on maize yield, while displaced, owning irrigation and employed on farm permanent actually decreased maize yields below non-beneficiaries.</p> <p>All types of benefits have lower cotton yields than non-beneficiaries due to low inputs.</p> <p>Sugar beans yields improved for displaced. These got 0.5 ha irrigation plots. There was no input support for own production on the irrigation plots and while salaries and wages were in arrears.</p> <p><i>The performance of project is necessary. Investors will cut community linkages to save investment. Hence capacity building is key to enable farmers to become self-financing – move from contract production to marketing contract.</i></p>
		<p><i>Large scale investment need to avail a complete package in order to drive productivity beyond non-beneficiaries. This include irrigation, input support, and farmers' skills and capacity development. Government needs to come in to complement investor efforts while ensuring completeness of packages. Investor can minimise cost by training government employees than having own staff.</i></p>	

Indicators	Conclusions	Key Observations and Lessons Learnt from Case Study	
		Tongaat Hullet	Chisumbanje
Household Income	<p>The income levels of beneficiaries and non-beneficiaries measured by expenditure are different.</p> <p>Large scale investments can either improve or eliminate on-farm income generating capacity of communities. Large scale investments increase non-farm income generating opportunities (employment and provides markets for off farm projects) but these may not necessarily translate to higher incomes.</p> <p><i>The impact depends on productivity, whether produce markets are profitable, whether the investment is doing well and paying salaries and wages.</i></p>	<p>Higher % of beneficiaries have higher expenditure than non-beneficiaries.</p> <p>The employed, renting and owning irrigation high % of households with expenditure below US\$3 000 putting in question the levels of salaries and wages, and input support.</p> <p>Those with ready markets are better than non-beneficiaries implying profitability of DoP – 23:77. @ US\$600 – US\$57.75/T</p>	<p>Higher % of beneficiaries have higher expenditure than non-beneficiaries.</p> <p>But all benefits have huge % of households with expenditure below US\$3 000. The displaced beneficiaries lost income sources have the highest proportion under expenditure below US\$3 000. The employed are owed salaries and wages. There is no input support. Those owning or renting irrigation are less productive.</p> <p>Limited capacity of farmers to negotiate price of US\$4/T after repaying for developments and establishment of cane.</p>
		<p><i>To drive income, the investment should enhance higher productivity, ensure profitable prices, up-to-date salaries and wages for both on and off-farm income generating activities of communities. Intervention of government at both the lower and upper end of the value chain may be necessary to ensure productivity and profitability.</i></p>	
Education, Water and Health	<p>Distance to education, water and health are different. The outputs delivered by large scale investments in health, education and water are evident but the translation of these outputs into positive outcome and impact such as increased access is mixed depending on household circumstances and choices.</p>	<p>Built 2 hospitals, clinics and have a mosquitos spraying programs.</p> <p>All benefits have large % households with malaria. Borehole major source of malaria, bilharzia and dysentery followed by canal, which is the major source of cholera. There remain high % using unsafe sources. Yet a large % still do not treat drinking water.</p>	<p>Drilled 7 boreholes. <i>Borehole large % of each disease and malaria the most prevalent disease under each source.</i></p> <p>Waste management from mill resulting in stagnant water (danda water) in communities providing good breeding ground for mosquitos. <i>Investor not compliant with EMA Act in taking migratory measures of some of its negative impact.</i></p>
		<p><i>While households have the ultimate responsibility for their health relating to water borne diseases through their choice of sources and how the water is treated before drinking. There seems to be no safe source of drinking water. There is need to train households but also to investigate the quality of borehole water.</i></p>	

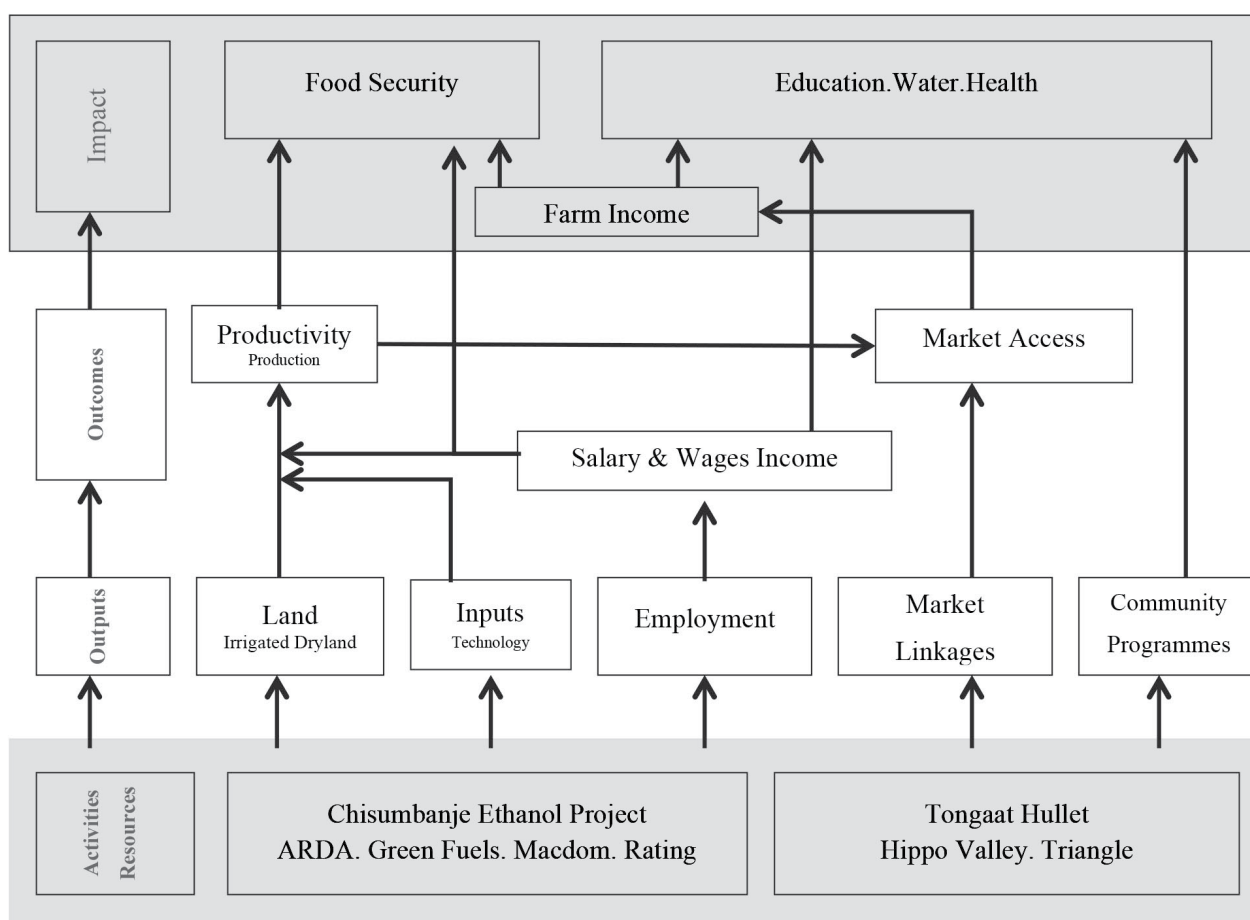
Indicators	Conclusions	Key Observations and Lessons Learnt from Case Study	
		Tongaat Hullet	Chisumbanje
Food Security	<p>The food security of beneficiary and non-beneficiary households are different.</p> <p>Large scale investment can improve the food security status of a household depending on benefit and its effect on productivity – ability to produce own food – and salaries and wages and farm income – ability to acquire food on the market.</p>	<p>Beneficiaries have a high FCS than non-beneficiaries. The group benefiting most is the resettled farmers.</p> <p>All benefits have higher % of households with borderline and acceptable FCS.</p> <p><i>There still is something that can be done to bring the rest to the acceptable FCS – improve input support and skills development.</i></p>	<p>Beneficiaries have a poor FCS than non-beneficiaries. The most affected are the households whose dryland farming land was incorporated into the core estate.</p> <p>Benefits such as employed at mill contract, displaced from land, owning irrigation and ready markets for small projects still have high % of households with poor FCS.</p> <p><i>This confirms impact of low productivity, non-payment of salaries and wages and low prices.</i></p>
		<p><i>Some benefits of large scale investments by themselves will not necessarily translate to food security for all households within the same and across communities. This confirms the need for a complete package to positively impact communities and also that different households and communities have different capacities and will be affected differently. Bridging this gap requires government involvement in training and capacity building in collaboration with or to complement the investor as well as improve farmers' capacity to negotiate better prices.</i></p>	

5. THE IMPACT LOGIC OF LARGE SCALE INVESTMENT

5.1 Logical Framework for Large Scale Investments

Figure 7.1 shows the logical framework for large-scale agriculture investment. The Figure depicts how Green Fuels and Tongaat Hullet Zimbabwe impact on productivity, food security, income and access to social service by surrounding rural communities.

Figure 6.1: The Impact Logic of Large Scale Investments



Large scale investments deliver benefits or outputs that address the problems of surrounding communities or that influence each stage of the value chains for surrounding communities. These benefits include dryland farming area and irrigated land, farming inputs, permanent or contract employment on the farm or mill, market linkages and deliverables from community programs. Depending on the portfolio or mix of the benefits, the adequacy of each of them, how they are collectively delivered and how they are used by the communities, the benefits may cause negative or positive effects on productivity and income that in turn may cause a positive or negative impact on the standards of living of farming households in the surrounding communities, directly or indirectly, actively or passively in terms of food security and access to education, water and health. Sustaining the Vertical Impact Logic.

There is a clear national level large-scale agriculture investments supply chain coordination institutional infrastructure. The study concludes that to achieve a systemic local level coordination institutional infrastructure for the large scale agriculture investment supply chain will sustain a positive vertical impact logic by minimizing

conflict between communities and large scale investments, ensuring compliance to minimize negative impacts as well as ensuring delivery of relevant benefits to surrounding communities to maximize positive impacts.

Further, the study concluded that there are two perspectives to sustaining the positive vertical logic – the **benefits portfolio portfolio**, and the **nature and adequacy of benefits perspectives**. The portfolio perspective of the vertical logic suggests that an investment cannot deliver a single output and hope to have an impact on communities without delivering outputs that improve the capacity of the communities to utilize the later effectively. An investment that delivers say irrigated land only may not necessarily guarantee productivity improvements unless it combines that with input support, irrigation management, production extension support services and market linkages. The outputs interact and guarantee a positive vertical impact logic. Yet, the nature and adequacy perspective of each of these outputs is still equally important.

The nature and adequacy perspective suggests that there is need to sufficiently invest in each deliverable to ensure that no output become a limiting factor in the delivery process. An investment that delivers inputs may not guarantee productivity improvements unless the input package is complete. In the same interpretation, salaries and wages may not guarantee better income and food security, if they are below the cost of living, or worse still if they are not received in due course. The nature and perspective also suggests that market access support should go beyond the investment's own value chain to include other value chains that support livelihoods of surrounding communities. The prices involved in any market access support system determine the direction of the vertical logic. If prices are not profitable, the vertical logic will have a negative impact on food security and standards of living of the surrounding communities. Farmers' organization and capacity to lobby for good prices is no replacement for the important role of the government in influencing off-take prices of raw and or valued-added products. This is more so where there are legislative impediments such as the Sugar Act which only recognizes one sugar association. There is need for a level playing field for prices negotiations. The study notes that the performance of the business model becomes very critical in this instance to sustaining a positive vertical impact on productivity, income, food security and access to social services. Where a business is financially struggling, the first to suffer are the linkages with surrounding communities including loss of employment.

4.2 Role of Government in Sustaining a Positive Impact by Large Scale Investments

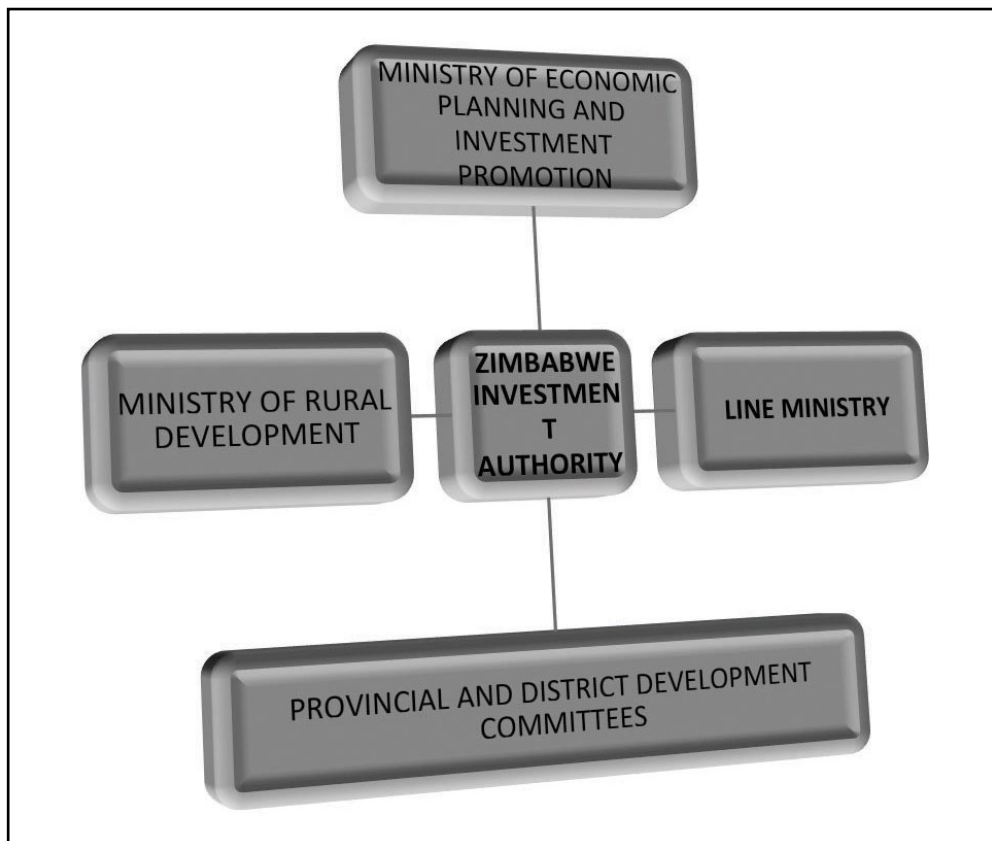
The study established that investors in large scale agriculture projects are not any different from any other investors – they are business in their approach and seek to maximize their businesses' bottom line – profit. They may not necessarily invest in the best structured investor-community linkages that will continue to drain resources from their business where they can get away with non-compliance or they simple invest there barest minimum in order to minimize costs. In some cases, they may boost in the glory of the quantum of investments in the community without due consideration of whether investment portfolio mix is relevant to problems of the communities or if each of such investments is enough to make positive impact as they may only want to be seen as doing something about the communities in which they are located.

The study concluded that local level coordination institutional infrastructure and value chain facilitation type of government interventions – policies, laws and standards, and technical and support services – may be necessary as an important component of sustenance of the vertical logic required to guarantee a positive impact of large scale investments on the surrounding communities. Hence collaboration between government and the investor is key. At the activity and resources levels, government intervention influences the **identification** of the investment, and the level of corporate social responsibility of the investment and its **design** in terms of the planned outputs to be delivered to surrounding communities and the delivery mechanisms.

At the outputs level, government monitors **implementation** of investment plans enforcing compliance and fulfillment of promises. Government thus influences the mix of outputs – land, value chain support arrangements, employment and corporate social responsibility programs – as well as the nature and adequacy of each of

the outputs. These are the portfolio, and nature and adequacy perspectives of the vertical logic. Depending on options available, government can influence whether the large scale investment will displace or resettle communities on dryland or irrigated farming land or both, and what will be the level of fair compensation for the affected communities or households.

4.3 RECOMMENDATIONS



This study therefore recommends that there is need for;

Government to establish an investment coordination mechanism at provincial and district levels. This mechanism can be led by Ministry of Rural Development and Promotion and Preservation of National Culture and Heritage with Ministry of Macro-Economic Planning and Investment Promotion as the Secretariat through provincial offices.

Intensified government involvement to ensure (i) compliance; (ii) responsible investment; and (iii) minimise negative and maximise positive impacts.

Chisumbanje	<ul style="list-style-type: none"> • Influence location of core estate to avoid dispossession or ensure better relocation. • Ensure promises of irrigation development are delivered to the remaining households. • Ministry of Energy and Power Development legislated for mandatory blending and negotiates price of ethanol with investor. • Influence review of pricing of out grower cane where farmers have completed repayments of developments done by the company. • Enforce spraying programs – EMA • Ensure sufficient input packs • Enforce rehabilitation of road infrastructure • Provide extension, market linkages support and capacity building of irrigations schemes in order to dully utilize schemes and expand from sugar beans to horticulture and establish strong market linkages
Tongaat Hullet	<ul style="list-style-type: none"> • Government policy resulted in the resettlement of households under the A1, A2 and Old Resettlement models. • The Ministry of Industry and Commerce announces the Division of Proceed. • Develop farmers' capacity to negotiate sugar prices • Review of Sugar Production Control Act – only recognizes one association the ZSA • Ensure adequate input packages for farmers • Provide support to out growers to improve the yield of sugarcane

There is need for more collaboration between government and investor to achieve more inclusive models that respond to the demand for land by increasing out-grower contribution.

Model	Core Estate:Outgrower	Recommended collaboration
Chisumbanje	Core estate 9 500 ha Out grower 650 ha (7%)	<u>Implement of plans</u> Development of 40 000 ha at Chisumbanje to include out growers Development of 6 000 ha A2 out grower scheme at Middle Sabi
Tongaat Hullet	Core estate 29 000 ha Out grower 16 00 ha (46%)	<u>Implement of vision</u> Increase out growers to 37 000 ha (59%) using land at Tokwe Mukosi

The government should explore how it can ride on incentives such as special deductions to partner investor in financing irrigation development and promote a more inclusive model. Community share trusts need to be tailor made to specific investments so that they are the source of funding for irrigation development projects.

1. Socio cultural issues to be considered as men not utilising 0.5 ha irrigation plots.
2. Review of the Sugar Act which only recognises on sugar association.
3. Community development programmes should be designed in such a way that they also benefit the youths and elderly.
4. Extension and specialist services support including training in irrigation management, market linkages and awareness campaigns on safe drinking water.
5. Further research required to ascertain the quality water, viability of sugarcane in terms of area, yields and pricing, and explore scope of profitable market linkages for irrigation in Chisumbanje to enable them do horticulture.

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