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Nordic Consulting Group

Increasing Resilience in Energy and Agriculture Systems and Entrepreneurship (INCREASE)

Final Report

Sida

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December 2022

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Sida Decentralised Evaluation 2023:20 Sida

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Abbreviations and Acronyms

7NDP	Seventh National Development Plan
8NDP	Eighth National Development Plan
AEZ	Agro-ecological zones
BCE	Biodigester Construction Enterprises
CDF	Constituency Development Fund
CRA	Climate Risk Assessment
COP	Conference of the Parties
CS	Climate Smart
CSA	Climate Smart Agriculture
DDD	Doing Development Differently
DCFD	Dutch Fund for Climate and Development
DRC	Democratic Republic of Congo
E4A	Energy for Agriculture
EQ	Evaluation Questions
ESLIP	Enhanced Smallholder Livestock Investment Programme
FGD	Focus Group Discussion
GESI	Gender and Social Inclusion
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GNA	Good Nature Seeds
HRBA	Human Rights-Based Approach
HH	Household
IAP	Innovation Against Poverty
IFPRI	International Food Policy Research Institute
INCREASE	Increasing Climate Resilience in Energy & Agricultural Systems and Entrepreneurship
ISFM	Integrated Soil Fertility Management
KDWA	Katete District Women's Association
KII	Key Informant Interviews
LDWA	Lundazi District Women's Association
LFA	Logical Framework Approach
LSP	Local Service Provider
MCC	Milk Collection Centres
M&E	Monitoring and Evaluation
MGEE	Ministry of Green Economy and Environment
MoU	Memorandum of Understanding
MSD	Market-System Development
MSME	Micro, Small and Medium Enterprises

MTE	Mid-Term Evaluation
MTR	Mid-Term Review
NEP	National Energy Policy
OYE	Opportunity for Youth Employment
RALS	Rural Agricultural Livelihoods Survey
RBF	Results-Based-Finance
SDC	Swiss Development Cooperation
SDG	Sustainable Development Goals
Sida	Swedish International Development Cooperation Agency
SILMS	Sustainable Integrated Land Management Solutions
SME	Small and Medium Enterprises
SNAP	Second National Agricultural Policy
SNV	Stichting SNV Netherlands Development Organisation
ToC	Theory of Change
ToR	Terms of Reference
USADF	US African Development Foundation
VC	Value Chain
WEAI	Women's Empowerment in Agriculture Index
ZARI	Zambia Agricultural Research Institute
ZCCN	Zambia Climate Change Network
ZMW	Zambian Kwacha

Executive Summary

The **Increasing Climate Resilience in Energy & Agricultural Systems and Entrepreneurship (INCREASE) project** (in the following: INCREASE) in Zambia has as its **overall goal**: "Increased social, economic and environmental resilience and equity in agricultural and energy systems". It focuses on an integrated approach to entrepreneurship, agriculture, energy, climate change and the environment with a strong focus on reaching youth and women. The goal of INCREASE is to be achieved through **three outcomes**: 1) Increased income, food and energy security for men, women, and youth farmers; 2) Increased business/value chain performance through climate smart investments in agriculture, water, and renewable energy; 3) Improved performance of the enabling environment for developing and scaling of markets for CSA, water and renewable energy practices (including Opportunities for Youth Employment (OYE)). INCREASE is a merge of two previous SNV projects in Zambia namely the Energy for Agriculture (E4A) that promoted and implemented biodigester technology and the Sustainable Integrated Land Management Solutions (SILMS) which focused on CSA. INCREASE is focused on three value chains (cotton, dairy and horticulture) and implemented in five different provinces in Zambia (Eastern, Southern, Lusaka, Central and North Western Provinces).

The **Swedish International Development Cooperation Agency (Sida)** is supporting INCREASE with **SEK 78 million** in the period from **1 January 2020 to 31 December 2022 (a no-cost extension to 31 December 2023 has been agreed)**. This assignment constitutes a Mid-Term Evaluation (MTE) launched with the intention to inform progress towards results and lessons learned since the beginning of the project. The evaluation period covers the entire project period. The **MTE methodology** is based on comprehensive document review, a three-weeks field mission in Zambia to all project provinces with more than 400 stakeholders consulted through interviews and focus group discussions as well as an outcome harvesting workshop. Moreover, the MTE has adhered strongly to a theory-based and **utilisation-focused approach**, including close and frequent interaction and dialogue with the intended users of the MTE (the Swedish Embassy and SNV project staff) during the evaluation process, as well as use of a flexible evaluation design and data collection protocols to cover both intended and unintended results.

Key Findings

Project design and relevance

It was a wise and forward-looking decision to merge the SILMS and E4A projects into one single project (INCREASE) to enhance focus on the agriculture-energy-water nexus with a view to address critical livelihood aspects for smallholder farmers and enhance their climate resilience through **a more coherent and holistic approach**. Overall, the project is also well aligned to key development **policies and plans of the Zambian Government**. However, the planned 3-year timeframe has been much too

short considering the wide geographical scope of the project as well as the introduction of new and innovative CSA practices and technologies.

While the INCREASE claims to apply a **Market-System Development (MSD)** approach, the MTE found little evidence that this is actually what has been implemented. Research and studies of markets and value chains have been conducted to a great extent but use of learning from these studies has been less convincing. Likewise, to fully ensure that **targets groups' needs and priorities** are taken into account in the design, there is a need to further specify the target group. Smallholder farmers contain many nuances such as gender, age, ethnicity, languages etc. that need to be considered to fully understand their needs. While the dairy value chain has proven well-suited for demonstrating the full potential of the INCREASE model – combining CSA with energy - this has so far been less evident in the horticulture value chain and in particularly in the cotton value chain.

In its design, the INCREASE model is focussed on increasing resilience for smallholder farmers with regards to climate change and the project includes **elements that speak to both adaptation and mitigation**. However, overall, the design reflects **an agriculture facing climate-aware approach** and not a human-environment facing approach. Those stakeholders that might have brought environmental concerns into the project design with a stronger weight (environment departments, indigenous and traditional and other elder knowledge) did not have a voice in designing the approach. This shortfall is not so much seen in the planned agriculture treatments as in not making a stronger effort to avoid cumulative harm to natural and through that to future human systems.

Results and implementation

In general, the farmers are satisfied with the **training** provided and many have quickly adopted some of the techniques related to management and preparation of soil for cultivation, in particularly land preparation and early planting. **Cotton farmers** have experienced a substantial increase in yield by implementing these techniques demonstrating the production potentials of the cotton value chain. **Dairy farmers** have also increased milk production by providing the cattle with enhanced fodder, including from lucaena and now farmers are able to also produce milk during the dry season. In **horticulture**, there are good potentials for diversifying production and increasing yields if techniques are adopted.

The vast majority of the farmers targeted for training belong to the **cotton value chain.** While some cotton farmers have only been able to implement the full INCREASE model recently, in other places famers are still waiting to do so due to late delivery of seedlings. This has given the project very limited time to demonstrate its full potential. Even the 3-year period has been an insufficient timeframe to see the true benefits of the tree planting, and the delays in provision of seedlings have further put the demonstration of the INCREASE model under pressure. Training in the **dairy value chain** has been conducted through the Milk Collection Centres (MCCs) which play an essential role in the dairy value chain and agribusinesses. The MCCs have however been affected by serious governance and management constraints which have impacted negatively on the selection of farmers for training as well as on the farmer's interest and trust in these cooperatives. The implementation of training in the **horticulture**

value chain in North Western Province have been affected by the need for adjustment of the original outgrower model towards a lead farmers approach with demonstration plots in the communities, thus training was only initiated this year and has not been as practical as initially intended.

While training activities are now picking up, across the three value chains the training of farmers has been delayed mainly for the following reasons: i) agreements with partners took longer than expected; ii) COVID-19 restrictions challenged the implementation of physical training; iii) delays in procurement processes; iv) the sensitisation of farmers and selecting them for the training took longer than expected (not least under COVID-19); and v) seasonal constraints make it more difficult to catch up with delays (in particular in the cotton value chain). **Training manuals** in all three value chains are rather comprehensive and technically sound, although not fully thorough with regards to environmental considerations. The manuals, however, have little focus on facilitation and implementing partners are not offered any guidance on how to ensure full participation, non-discrimination, focus on empowerment and a learning centred approach.

When it concerns Small and Medium Enterprises (**SMEs) and women-led enterprises**, some progress has been achieved. Women-led enterprises have been trained in business management and some of these have completed the first draft of their business plan with the remaining enterprises being on different stages of the process. There are indications that the project is contributing to **youth employment and empowerment**. Savings in the **saving groups** have considerably increased and there are indications of in particularly empowerment of females. However, linkage to financial institutions is still a major concern.

In terms of **advocacy,** SNV has supported the **Zambia Climate Change Network (ZCCN)** to coordinate CSO advocacy for inclusion of climate resilient farming techniques and representing farmers' position in national policy processes. These dialogues with government authorities on climate change have contributed to improvements of the enabling environment especially for **youth**.

With regards to **renewable energy,** the initial approach for **biodigester** installation, implementation/use, registration and follow-up/quality control was not effective. Critical shortcomings in the planning and implementation process have led to a number of biodigesters not being properly installed/used or being dysfunctional. However, changes to this approach are now being implemented to address these shortcomings in the remaining project period. Farmers are in general well aware of the INCREASE model and the role that also **bio-slurry** can play here as cheaper and organic fertiliser in the future, however still very few farmers are using this practice now, mainly due to uncertainty on how to dose the bio-slurry correctly. So far, INCREASE has not managed to establish a strong linkage between the macro (policy) and micro (farmer) level in support of market and incentive development for biogas and biodigesters. While solar panels represent an attractive solution for irrigation, cooling and drying facilities from an environmental perspective, it was not prioritised during the first part of the project period to introduce financial models to support more farmers getting access to solar driven technologies. This may be seen as a missed opportunity as a solar

stream of the renewable energy component is only starting to take off very late in the project.

In terms of **market access and development** for the agriculture products, the three value chains are facing different situations and challenges. In the case of **cotton**, ginning companies are the only permitted by law in Zambia (the Cotton Act) to run outgrower schemes to provide inputs to farmers and buy the cotton that the farmers produce. This runs the risk for developing of monopolies. A large proportion of farmers expressed dissatisfaction that outgrower companies arbitrarily determine the input costs which are deducted from the sales proceeds as well as from the selling price of the cotton. In the **dairy value chain,** large milk off-takers regularly collect milk from the MCCs/dairy cooperatives and pay them on a monthly basis. However, due to an increased milk production during rainy season, off-takers often have their tankers full by the time they reach MCCs located further from Lusaka thereby disrupting these farmers' milk marketing endeavours. In addition to this, smallholder dairy farmers experience low and highly volatile prices. Most milk from MCCs is of lower grade hence attracting lower prices due to in most cases lower levels of hygiene. While linkages to markets play an important role in the development of smallholder **horticulture**, there is an inherent risk that short-term production increases among better-off smallholding farmers supported through INCREASE may squeeze out poorer smallholders from the local open markets, in particular outside the larger cities, as long as alternative market opportunities are not provided.

The **women-led enterprises** serve as an inspiration of female leadership to other community-based groups, organisations and associations. The women groups have developed business plans and trained representatives from these groups has trained fellow female farmers to ensure knowledge sharing. The project proposal clearly expresses an intention to mainstream gender into the project, however, organisational decisions have not been convincing in this regard and has not responded to recommendations along the way. While targets of 30% women participation are largely being achieved, except for the lead farmers, the training offered by INCREASE partners is not taking gender considerations sufficiently into account and barrier to women's active participation are not sufficiently addressed by the project. Guidelines on how gender and youth considerations are ensured and specific suggestions for facilitating the training sessions to ensure non-discrimination and full participation of all farmers are also absent. Lack of access to land and ownership of land is a key barrier for women's empowerment and there were cases reported where women had been removed from land after preparing for cultivation or even starting to produce crops.

Project management and efficiency

In terms of **human resources**, INCREASE was seriously challenged by management issues and a number of vacant staff positions during the first years of implementation. At the same time, there have been continuous delays with SNV **procurement**. Implementing partners in all areas have struggled to comply with agreed deadlines and be accountable to the farmers due to the delays. Significant improvements have however been noticed within these areas during the past six months.

The **M&E system** has only to a limited extent been useful for assessing project progress and the data collected does not provide much insight into actual results

achieved. In addition, the process of implementing a new M&E software has been cumbersome and is yet to be fully operational. Learning procedures and knowledge exchange has been limited in INCREASE and most activities have been implemented in silos. Roles and responsibilities of different stakeholders are not always streamlined and **communicated** to farmers. This confuses lead farmers, extension officers and follower farmers in terms of what they can expect from the project and when.

Sustainability issues

While most **partners** understand and agree that the INCREASE model has great potential, the limited consultations in the design phase have compromised their engagement. Little has been done in the project to facilitate and encourage partners will engage with each other and thereby enhance synergies and development of relationships that could help to further develop and sustain the supported interventions. Likewise, limited coordination and proactive exchange of experiences have taken place with external actors.

The INCREASE approach to farming may be seen as a very positive, and less harmful, move towards **environmental sustainability**, although it is still causing harm. Thus, more is needed. For instance, **water** is a huge challenge particularly in Southern and Eastern Provinces, and this aspect has not been sufficiently addressed by the project. Therefore, while the promoted **CSA practices** are certainly improvements, there will still be a likely net draw on watersheds which in the face of climate, increasing demand for agricultural production, etc. will in fact reduce the sustainability and constrain the adaptive capacity of humans and the environment. From an **institutional** perspective, the project has only to a limited extent focussed on engaging environmental authorities in planning, assessment and monitoring of actions with potentially damaging consequences for the environment.

Conclusions

Conclusion 1 (Relevance): *The relevance of INCREASE is high and the INCREASE model has demonstrated its potential for further uptake and scaling through its innovative and flexible approach and strong adherence to climate resilience for smallholder farmers. It is a flagship project in Zambia which serves as inspiration for the government, other partners in the country and internally in SNV. However, the ambitions of the project have been too high given of its scope and timeframe.*

Conclusion 2 (Design): *INCREASE has been developed and designed with insufficient participation and involvement of partners and target groups and it does not build on proper value chain and market systems analysis. Instead, the design process has been guided mainly by SNV's previous working experience with E4A and SILMS including the choice of partners and value chains. This has resulted in shortcomings and weaknesses in the design which affects the potential outcomes and sustainability of the supported interventions.*

Conclusion 3 (Efficiency): *While INCREASE has faced critical implementation challenges in the past, the project has been on an upward trajectory over the past six months. Change in management and fill-in of vacant positions have been key determining factors for this turnaround.*

Conclusion 4 (Effectiveness): *The progress made so far indicates that results are likely to fall short of expectations. While training targets are likely to be achieved, a strong focus on delivering quantitative targets in the remaining project period runs the risk that critical qualitative aspects may become neglected with potentially negative consequences for sustaining the supported interventions after project completion*.

Conclusion 5 (Effectiveness): *The approach for training farmers has been adopted over time, however access to reliable and attractive markets remains a key challenge and the project still has not managed to demonstrate how engagement with commercial farmers and market actors will trickle down to also benefit poorer and more vulnerable smallholders.*

Conclusions 6 (Coherence): *INCREASE intended to develop more holistic energy-agriculture-water nexus interventions and integrate strategic partnerships, in practice, it has been a challenge to ensure internal and external coherence in the implementation process. Recent improvements are however noted.*

Conclusion 7 (Gender/HRBA): *INCREASE has focused on women's empowerment and has been successful in developing the foundation for further economic empowerment through targeted support to women-led enterprises. However, there are important gaps in the project's mainstreaming of gender and youth which is conducted systematically, neither in project activities nor in M&E.*

Conclusion 8 (Sustainability – environment): *INCREASE is addressing important environmental issues and includes both a climate adaptation and a climate mitigation perspective. However, it is not addressing the human-natural resource nexus from a strategic perspective and has missed opportunities for wider introduction of solutions to water shortage. Potentials for further uptake of renewable energy solutions for productive use are only being promoted late in the process.*

Recommendations

Several of concrete, ***operational recommendations*** are provided in the report to support the implementation process up to the end-2023. Overall, it is recommended that the project will focus on **consolidating** what is already being implemented or in process and **not start up new activities before the project will be completed by the end of 2023**. This should include focus on **documenting/showcasing** good and successful practices, including between different actors/levels in the value chains and adoption of CSA for further scaling. Both SNV and Sida will be responsible to ensure follow-up and action planning given recommendations provided. In addition to the operational recommendations, the following ***strategic recommendations*** (looking beyond the time of project completion in 2023) are provided:

Strategic Recommendation 1: Overall, the INCREASE model has demonstrated good forward-looking potentials and Sida/SNV should positively consider **developing and supporting a continuation/follow-up phase,** although with the need to **rethink and refocus the project design and set-up**. This should include: i) **a stronger and more explicit climate "profile"**, with a stronger view to **scaling** opportunities and attracting complementary climate funding, ii) **a more inclusive design process**; iii) a more **narrow geographical scope** and **a more realistic timeframe;** and iv) **stronger coherence and synergies** to other (Sida) support interventions.

Strategic Recommendation 2: Stronger adherence to a **programmatic approach** (compared to the current project-driven approach) based on iterative learning, to strengthen management and decision-making and allow for a more holistic implementation. This should include: i) **a much stronger focus on knowledge management** and a process for better integrating monitoring and learning with action and decision-making; ii) **a more agile project organisation** and encourage **a working culture that supports risk taking** and **learning from failures** including **competitive salaries** and aiming at **longer contracts** for staff members to mitigate high staff turnover; iii) a more **operational results framework and an associated Theory of Change (ToC);** iv) **strategic communication and outreach** by further defining target groups and communication channels depending on the target group; v) **identifying and developing partnerships and synergies** with other programmes and projects.

Strategic Recommendation 3: **Access to markets and finance** are critical aspects for success of INCREASE interventions and should be more comprehensively assessed previous to entering into a follow-up phase, including: i) assessment of **market dynamics and capacities**, including **the role of local markets** and **price setting;** ii) Pioneer a different and **market-based approach for introducing and selling of biodigesters**; iii) explore opportunities for **further expanding the business diversity of some of the stronger enterprises** to also include other renewable energy businesses; iv) Further explore the **market potentials for bio-slurry fertiliser**; v) further explore the possibilities for **attracting climate financing** as well as making use of other **innovative financing instruments** such as loans and guarantees, etc.; and vi) further explore opportunities for linking up smallholders to **digital market platforms** which have been boosted during COVID-19.

Strategic Recommendation 4: More strategic addressing of the **human-natural resource nexus** from an environmental sustainability perspective, including: i) consider use of a **broader landscape approach** with **a longer-term perspective**; ii) better **connection between applied research and indigenous knowledge** as a basis for decision-making; ii) "Break down" of the INCREASE model to **climate and landscape specific "packages"**; iv) innovative and in-expensive solutions to **water shortage;** v) more strategic **use of renewable energy sources for productive use**; vi) more **direct involvement of environmental authorities**, in the planning and implementation process.

Strategic Recommendation 5: In order to address **gender equality and social inclusion** more strategically, it is recommended to: i) e**ngage either a gender focal point or a local partner** specialised in **social inclusion** already in the project design phase and when developing the results framework; ii) **mainstream gender throughout the results framework** and make explicit reference to gender, youth, potentially other vulnerable groups (if targeted) in impact, outcomes and outputs; iii) **Integrate gender and vulnerability** considerations into all aspects of the project decisions, priorities, strategies, activities etc.; iv) ensure that **all SNV staff and implementing partners are fully aware of SNV's GESI policy**, and capable of implementing it in practice (development of tools, checklist and guidelines to support implementation); and v) further explore opportunities for engaging in **women's access to and ownership of land,** potentially in partnership with other CSO partners.

1 Introduction

Swedish support to SNV Netherlands Development Organisation (SNV) is part of the operationalisation of the Swedish Cooperation Strategy for Zambia for the period 2018 to 2022. The contribution falls under the strategy area on environment, climate, renewable energy and sustainable, inclusive economic development and livelihood. SNV is a long-term partner of the Swedish Embassy in Zambia that works for increasing people's income and access to basic services in agriculture, energy, water, sanitation and hygiene.

The Increasing Climate Resilience in Energy & Agricultural Systems and Entrepreneurship (INCREASE) project (in the following: INCREASE) in Zambia has as its overall goal: "Increased social, economic and environmental resilience and equity in agricultural and energy systems". INCREASE focuses on an integrated approach to entrepreneurship, agriculture, energy, climate change and the environment with a strong focus on reaching youth and women. The goal of INCREASE is to be achieved through three outcomes:

1. Increased income, food and energy security for men, women, and youth farmers;
2. Increased business/value chain performance through climate smart investments in agriculture, water and renewable energy;
3. Improved performance of the enabling environment for developing and scaling of markets for CSA, water and renewable energy practices (including opportunities for youth employment).

The three outcome areas focus on different stakeholder groups namely: i) smallholder farmers; ii) agribusinesses, Small and Medium Enterprises (SMEs) and Biodigester Construction Enterprises (BCEs); and iii) institutions e.g., government institutions, associations, cooperatives etc. Outcome 3 includes a focus on Opportunity for Youth Employment (OYE) which is a separate project and at the same time a component under INCREASE funded jointly by Sida and Swiss Development Cooperation (SDC).[1]

The Swedish International Development Cooperation Agency (Sida) agreed to support INCREASE with MSEK 78 in the period from 1 January 2020 to 31 December 2022 initially but due to implementation delays it has been decided to make a no-cost

[1] The OYE is also implemented in Zimbabwe but that is not part of the INCREASE and therefore not considered in this Mid-Term Evaluation.

extension to 31 December 2023. Although, the project is more than half-way through implementation, this assignment constitutes a Mid-Term Evaluation (MTE) launched with the intention to inform progress towards results and lessons learned since the beginning of the project.

1.1 OVERALL PURPOSE, OBJECTIVE AND SCOPE OF THE EVALUATION

The evaluation period covers the entire project period from January 2020 to December 2022. The overall objective of the MTE is to:

- Assess progress made towards the achievement of the project objectives and outcomes as specified in the project documents and the monitoring and evaluation (M&E) framework.
- Identify early signs of project success or failure with the goal of introducing the necessary changes to be made in order to set the project on-track to achieve its intended results.
- Assess the need to modify the overall project management and implementation strategy in supporting the achievement of the desired project results.

Thus, the MTE will assess progress towards intended goals, successes, challenges and the potential need to further adapt management and implementation strategies in order to achieve results. It is important to note that the timeframe has been heavily influenced by the COVID-19 period including periods of lockdowns etc. so this will need to be duly taken into consideration.

Since the OYE project was recently evaluated (2022), this MTE will not include an in-depth evaluation of OYE but mainly focus on OYE's integration with INCREASE.

1.2 THE INCREASE PROJECT

INCREASE is a merge of two previous SNV projects in Zambia namely the Energy for Agriculture (E4A) (2015-2019) and the Sustainable Integrated Land Management Solutions (SILMS). E4A promoted the biodigester technology as an environment-friendly technology based on the decomposition of organic materials. The biodigesters provide gas for household cooking and lightning, reduces the dependency of firewood while at the same time producing bio-slurry for productive use. The project trained BCEs to construct biodigesters and the intention was to create a high enough demand to sustain the BCEs. E4A was implemented all over Zambia except in the North Western Province and with the strongest presence in Southern Province among dairy farmers.[2] The SILMS project aimed to enhance the income of smallholder farmers through the sustainable adoption of Integrated Soil Fertility Management (ISFM),

[2] SNV (2021), Household biodigester market development in Zambia, lessons learnt from the energy for agriculture project

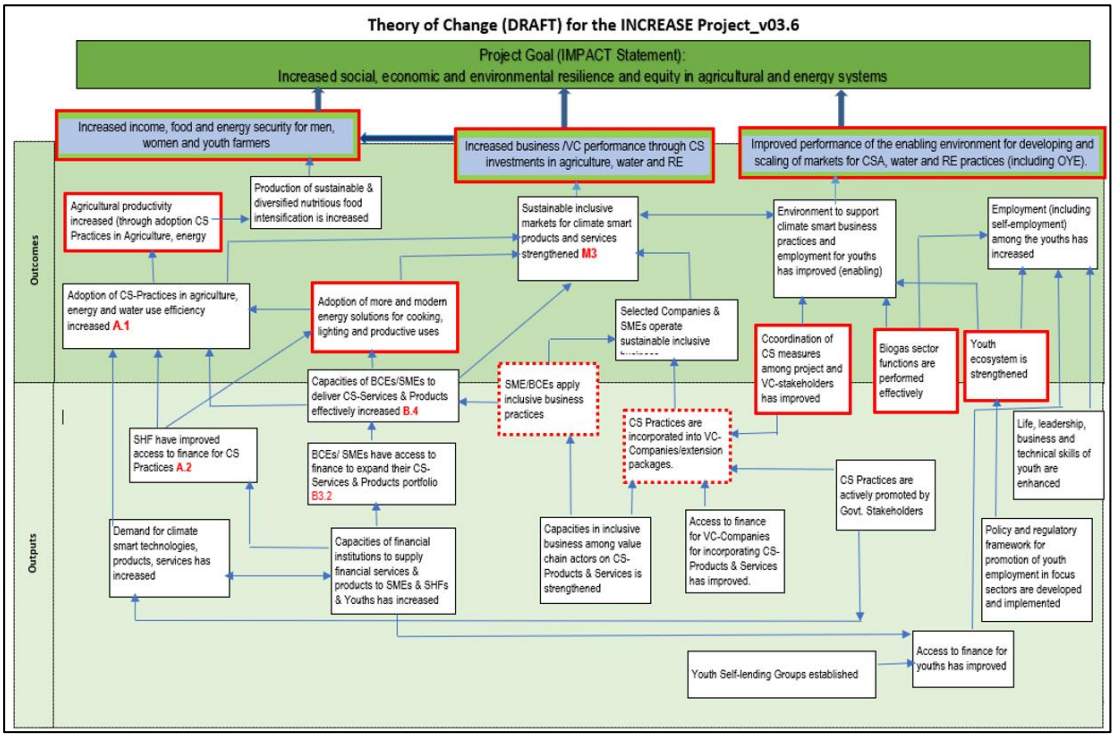
agroforestry practices and deforestation-free supply chains. In order to achieve this, the project promoted market-based incentives for these climate-smart (CS) practices, including access to inputs, extension services, markets and financial products. The project promoted climate-smart agriculture (CSA) in Eastern Province.

The SNV intervention has focused on three value chains: cotton, dairy and horticulture. SNV was engaged in horticulture and cotton in the SILMS project and promoted biodigesters in the dairy sector in the E4A and this prior experience of SNV in these value chains seem to have been most crucial for the selection.

INCREASE is implemented in five different provinces in Zambia (Eastern, Southern, Lusaka, Central and North Western Provinces). While some of these provinces were selected to continue, ongoing project activities in North Western Province were introduced due to opportunities for horticulture near the border with the Democratic Republic of Congo (DRC) and the mining sector.

INCREASE focuses on an integrated approach to entrepreneurship, agriculture, energy, climate change and the environment with a strong focus on reaching youth and women. The INCREASE Theory of Change (ToC) has developed over the years and was first visualised in the annual report from 2021 (see Figure 1).[3] The three components are reflected in the grey boxes in the top of the Figure. See also Annex 6 for further explanation of assumptions based on the MTE's document review.

Figure 1: INCREASE ToC



[3] SNV (2021), INCREASE, Annual Report 2021.

Component 1 focuses on smallholder farmers in the three value chains. While no horticulture farmers had been trained during 2021, due to a need to adjust the model from a focus on commercial farmers towards lead farmers and demonstration plots in the communities, progress has been achieved during 2022.

In the cotton value chain, trained farmers include both lead farmers and "follower" farmers. One of the strategies applied by the project is a training of trainers approach where lead farmers are to further train other farmers and keep demonstration farms for practice examples towards other farmers. The training approach however varies from one value chain to another and e.g. in horticulture the service provider Impuls Africa is currently in charge of the training sessions where the role of lead farmers is mainly to showcase the demonstration plots.

The approach in dairy is also slightly different and here Milk Collection Centres (MCCs) play a leading role in terms of selecting farmers for training and hosting demo plots. MCCs represent a cornerstone in milk marketing infrastructure and play an essential role in the dairy value chain and agribusinesses (Component 2).[4] SMEs, BCEs and cooperatives also play a key role in Component 2 as well as a targeted gender approach to support women-led enterprises.

Component 3 is co-financed with SDC and is a targeted intervention towards youth and women. Implementation is done by 10 Local Service Providers (LSPs) where Sida funds five[5] and SDC funds the other five.

1.3 STRUCTURE OF THE EVALUATION REPORT

After this brief introduction and background, Chapter 2 explains the methodology and approach applied. Chapter 3 to 6 present the findings of the MTE: Chapter 3 focuses on the relevance of INCREASE, while Chapter 4 focuses on the effectiveness of the project. This Chapter is structured around an overall assessment of progress towards targets in the three components in 4.1. Then, achievements within thematic areas of importance are analysed: renewable energy in 4.2, markets for agricultural products in 4.3, and lastly gender equality and women's empowerment in 4.4. In Chapter 5, the efficiency is analysed focusing on project management, human resources, procurement, communication and M&E and learning. Chapter 6 focusses on trajectories towards sustainability. Based on the analysis of relevance, effectiveness, efficiency, coherence and sustainability, conclusions are drawn in Chapter 7 which lead to recommendations at a strategic level (medium to long-term) as well as at an operational (short-term) level.

[4] SNV (2021), INCREASE Market System Analysis Report.
[5] NutriAid (Sinazongwe), Onmark (Lusaka and Monze), Kudu Consulting (Monze and Chipata), Creative Thinkers (Lusaka West), Stratmore (Chisamba, Mpima, Kapiri, Mukonchi, Kabwe). Currently, the collaboration with Kudu Consulting is being reviewed to assess whether it will be continued or not.

2 Methodology and Approach

Presented below are the specific approaches, methods and analyses that have been applied for this MTE.

2.1 APPROACH – KEY ELEMENTS

The overall approach to data collection and analysis has been based on a mixed-methods approach, combining existing data with qualitative methods (see further detailing of the specific methods below). The approach has included the following key elements:

Use of a theory-based approach: Given the complexity and nature of this MTE, a theory-based approach has been applied. A core element in this approach has been the INCREASE ToC (Figure 1 above) together with the results framework for the project. These illustrate and explain how the different components (including OYE) and intervention areas, introduced and supported by the project, jointly are expected to lead to changes.

Focus on contribution: In order to assess achievements of results, the MTE team has focused on the *contribution* of INCREASE to obtain an improved understanding of what difference the project is making as well as an increased understanding of *how* and *why* observed results are occurring (or not). As it is noted that some elements of the project are still at an early stage of implementation, the focus has here been on assessing the *process* and *trends/trajectories* towards results. This way, the intention has been to understand *progress* towards results in a systematic manner, following the chain of interventions and intermediate level results along the change process.

Utilisation-focused approach and intended users: The MTE team has strongly adhered to the commitment to utilisation-focused evaluations in Sida's Evaluation Handbook, including an emphasis on intended users and intended use, process use and how to 'disseminate' lessons to different categories of end users. This has included frequent interaction and dialogue with the intended users of the MTE (the Swedish Embassy and SNV project staff) during the evaluation process, as well as use of a flexible evaluation design and data collection protocols. In addition, some of the selected methods for data collection have been designed to create space for reflection, discussion and learning between and across different key stakeholder groups e.g. outcome harvesting (see below).

Evaluation Matrix as a guiding framework: Based on the nine Evaluation Questions ((EQs), see Table 1) included in the Terms of Reference (ToR), an Evaluation Matrix was developed (Annex 2) and has provided the guiding framework for the MTE. Overall, the MTE conforms to OECD/DAC's Quality Standards for Development Evaluation and make use of Sida's OECD/DAC Glossary of Key Terms in Evaluation.

The MTE team has widened the scope for judgement of some of the EQs to more explicitly include an environmental and natural resource dimension and address key aspects of the nexus between human and natural systems, in line with the Footprint Evaluations thinking.[6]

Table 1: Evaluation questions

Evaluation questions
Relevance
To what extent has INCREASE conformed to the needs and priorities of the target beneficiaries and financier's (Sweden) policies and priorities?
Is the intervention well in tune with the development policies and administrative systems of the Zambian government at national and regional levels?
Is the intervention a technically adequate solution to the development problem at hand? Does it eliminate the main causes of the problem?
Effectiveness
To what extent do development changes in the target area accord with the expected results of the evaluated intervention?
What worked well as expected in the intervention and what didn't work? What are the reasons for the achievement or non-achievement of objectives?
What can be done to make the intervention more effective going forward?
What lessons can be learnt from the achievements or non-achievements of objectives in the intervention?
How has gender equality been integrated into the design, planning and implementation of the intervention? To what extent has the intervention contributed to the improvement of gender equality?
Efficiency
Has INCREASE been managed with reasonable regard for efficiency? What measures have been taken during planning and implementation to ensure that resources are efficiently used?

Application of a Human Rights Based Approach (HRBA) and gender equality approach: The MTE has applied a HRBA and gender mainstreaming. This means that due attention has been paid to the principles of a rights-based approach by assessing the extent to which the project has *expressed linkage to rights*, has ensured *accountability*, *empowerment*, *participation*, *non-discrimination* and *attention to vulnerable groups*.[7] At the same time, the MTE team has applied the same principles to the actual evaluation process by making sure that data collection has been conducted in a participatory, non-discriminatory and transparent manner. A diversified group of stakeholders has been included and no one has been excluded from the process. Both men, women and youth have been consulted. Due attention has been paid to ensuring reflective spaces for dialogue and when deemed necessary consultations have been conducted with women only or only youth in order to ensure that their views are fully reflected in the MTE.

[6] See Footprint Evaluations in Better Evaluations: https://www.betterevaluation.org/en/themes/footprint_evaluation

[7] Human Rights, Poverty and Governance in the Least Developed Countries: Rights-based Approaches Towards a New Framework of Cooperation, Contributions of the United Nations Office of the High Commissioner for Human Rights to the Third United Nations Conference on the Least Developed Countries. May 2011.

2.2 METHODS FOR DATA COLLECTION

The following key methods have been applied by the MTE for data collection:

- **Key Informant Interviews (KIIs)** have been conducted with key stakeholders to obtain qualitative findings on fundamental evaluation issues. A flexible, semi-structured interview guide (Annex 3) was applied to ensure that information was gathered in a consistent manner, covering all relevant evaluation aspects.
- **Focus Group Discussions (FGDs)** constituted a key method in the qualitative approach to collect information from homogenous groups of stakeholders, in particular during the field visit. The FGD sessions were planned and sampled/selected with a view to cover experiences from: i) different value chains and organic/non-organic (cotton); ii) different geographical locations; iii) both older and more recent initiatives; iv) mix of ages and length of farming; and v) both men, women, youth and vulnerable groups. A checklist for FGD sessions is included in Annex 4.
- **Outcome Harvesting Workshop.** An Outcome Harvesting Workshop[8] was conducted in Choma with 23 key stakeholders in Southern Province with a particular view to assess progress in some of the outcome areas that were more difficult to measure, in particular in the short to medium term (such as changes in relationships between project/market actors, behavioural changes etc.). The outline of the Outcome Harvesting Workshop format is included in Annex 5.
- **Site observations** were conducted by the MTE team during visits to all provinces. These observations covered assessments of the relevance and uptake of specific technologies and techniques introduced through the project within different agro-ecological zones (AEZ) and socio-economic contexts, including: i) demonstration plots for the three supported value chains; ii) agro-forestry and tree nurseries; and iii) biodigesters and bio-slurry.
- **Direct observations from training sessions**. The MTE team attended ongoing horticulture training activities during the visit to North-Western Province. The training was facilitated by Impuls Africa who is currently implementing a larger training programme with farmers.
- **Use of existing data and information**. In addition to collection of qualitative information from the field, the MTE team has made use of existing data sets, such as previous studies, evaluations, assessments and reviews from which learning, and recommendations have been extracted (Annex 7) with a view to assess the extent to which these have been adopted by the project.

Table 2 provides an overview of the key stakeholders consulted through KIIs and FGDs and Table 3 reflects participants at the outcome harvesting workshop.

[8] See e.g. https://www.betterevaluation.org/en/plan/approach/outcome_harvesting

Table 2: FGDs/KIIs per stakeholder groups

	Key informant interviews			Focus group discussions						
Stake-holder type	SNV staff	Partners	BCEs/ SMEs	Ext. officers	Gov/ local leaders	Lead farmers	Farmers	Women/ youth groups	LSPs	Total
Male	7	4	7	12	13	12	101	31	4	191
Female	3	3	7	7	8	5	78	128	1	240
Total	10	7	14	19	21	17	179	159	5	431

Table 3: Participants at the Outcome Harvesting Workshop per stakeholder groups

Outcome harvesting workshop						
Stakeholder type	Gov/local leaders	Lead farmers/MCC	Women/youth groups	Extension officer	Partners	Total
Male	4	5	1	1	2	13
Female	3	3	3	1		10
Total	7	8	4	2	2	23

Table 4 sums up all stakeholders consulted during the evaluation process by gender, stakeholder type and province. As reflected in the Tables, there are some differences across provinces and while the total number of females consulted is higher than the total number of males this is mainly due to one engagement with three women-led groups in Zimba where around 70 women attended. In general, emphasis was put on gender balancing the stakeholder participation.

Table 4: Consultations disaggregated by province and stakeholder group (gender in brackets M/F)

Province	Southern	North Western	Eastern	Central/ Lusaka	Total
Lead farmers	12 (8/4)	7 (4/3)	2 (2 m)	4 (3/1)	25 (17/8)
Farmers	49 (39/10)	33 (18/15)	57 (22/35)	40 (22/18)	179 (101/78)
Extension officers	7 (5/2)	9 (5/4)	3 (1/2)	2 (2/0)	21 (13/8)
Gov off./local leaders	13 (9/4)	3 (2/1)	5 (3/2)	7 (3/4)	28 (17/11)
BCEs/SMEs	7 (6/1)	0	0	7 (1/6)	14 (7/7)
LSPs	3 (2/1)	2 (2/0)	0	0	5 (4/1)
Women/youth groups	90 (12/78)	21 (0/21)	45 (14/31)	7 (6/1)	163 (32/131)
Partners					9 (6/3)
SNV staff					10 (7/3)
Total					454 (204/250)

2.3 EVALUATION ANALYSIS

The *MTE Analysis* has been carried out based on data and information collected through the above-mentioned *methods*. The MTE team has triangulated data with information from a variety of sources, collected through the mixed methods approach, to outline a solid and robust picture of the results. The analysis has been gender focused and included the following key features:

- An assessment of the *continued relevance* of the project interventions in view of the developments since the project start in 2020. Here, the impact from the COVID-19 pandemic on different stakeholders, target groups and geographical areas has been of particular concern.
- An assessment of the extent to which *outcomes are being achieved/not achieved* through the supported interventions.
- A methodological consideration of *changes in the various assumptions and contextual factors over time* and how that may have influenced the implementation and resulting outcomes of the interventions.
- An assessment of the *resource utilisation* in the project with a view to both economic, human and natural resources.
- An assessment of the *forward-looking* perspectives of the project interventions, including the nexus between human and natural systems.

For the *learning* part, different reflection points during the implementation of the MTE have fed into this analysis. Inputs to *updating and further development of the ToC* (refer Annex 6) as well as *recommendations* for the remaining project implementation period have come from the above analysis.

2.4 CHALLENGES, LIMITATIONS AND MITIGATION STRATEGIES

The following main challenges, limitations and related mitigation strategies were identified by the MTE team:

- **Limited availability of project data at the outcome level**. Instead, the MTE team has continuously built the analysis on several data sources and ensured an interplay between existing quantitative data on one hand and the qualitative fieldwork and mixed-methods analysis on the other. In addition, other data sources (such as other surveys and studies conducted) have been included.
- **Delays in the implementation process, making some interventions and results areas lag considerably behind**. This relates e.g. to the bio-energy part and the horticulture value chain interventions. In these cases, the MTE has merely looked at trajectories towards achievement of expected results.
- **Attribution of results to INCREASE were in many cases difficult**, due to previously SNV supported interventions (such as the E4A or the SILMS project) or the presence of other related programmes (e.g. GIZ support to the diary value chain in Southern Province). Instead, the MTE team has focused on the *contribution* from INCREASE.
- Since sustainability issues were only vaguely defined and considered by the project, in particular **the nexus between human and natural resources,** the MTE has paid specific attention to the forward-looking aspects of the supported interventions, in

view of the COVID-19 and with more explicit reference to environmental sustainability aspects.

- **Time and logistics only allowed the MTE team to physically visit a smaller sample of the supported interventions**. This has required careful planning of the field mission programme to allow the team to visit different geographical locations and value chains, including to some of the most remotely located project areas within the country in order not to leave out any important project element or stakeholder group.
- In some cases, **limited or no attendance of women in FGDs (mixed groups) organised during the field visit to Southern Province,** due to communication matters and cultural issues. In these cases, women-only FGDs or interviews were arranged on the spot with a few women from the communities.

3 Project Design and Relevance of Interventions

3.1 ALIGNMENT WITH ZAMBIAN GOVERNMENT'S POLICIES

Overall, INCREASE is well aligned to Zambia's current aspirations that development must go beyond growing the economy by ensuring that the Zambian people are at the centre of everything in order to transform their livelihoods, as spelled out in the Eighth National Development Plan (8NDP), whose theme is "Socio-economic Transformation for Improved Livelihoods". The country aspires to become "A Prosperous Middle-Income Nation by 2030". As such by 2030, Zambians look forward to live in a strong, dynamic, competitive and self-sustaining middle-income industrialised country, which is resilient to external shocks and provides opportunities for improving the wellbeing of all. The Vision coincides with the 2030 Agenda for Sustainable Development, which aims to end poverty, fight inequality and injustice and tackle climate change through the pursuance of the Sustainable Development Goals (SDGs). By 2030, the country should have made substantial progress towards the attainment of these global goals. The 8NDP, therefore, provides an avenue for catalysing the nation's response to addressing the developmental challenges over the 2022-2026 period in the quest to attain the Vision 2030, SDGs and other regional and international commitments.

Relevant Development Areas

INCREASE is especially aligned to three development areas: i) Development Area 1: Economic Transformation and Job Creation determined by three outcomes of an industrialised and diversified economy, enhanced citizen participation in the economy, and a competitive private sector; ii) Development Area 2: Human and Social Development determined by four outcomes of improved education and skills development, improved health, food, and nutrition, improved water supply and sanitation and reduced poverty, vulnerability, and inequality; and iii) Development Area 3: Environmental Sustainability determined by two outcomes of enhanced mitigation of climate change, and sustainable environment and natural resources.

Economic Transformation and Job Creation

The 8NDP states that economic transformation will be anchored on industrialisation with a focus on value-addition in agriculture, mining and manufacturing which have strong local forward and backward linkages. INCREASE focuses on increasing incomes based primarily on three agricultural value chains, as well as other income generating activities, with significant forward and backward linkages. These value chains are supported by market-based micro, small and medium enterprises (MSMEs) such as the BCEs and other value chain service providers that have high income and

job creation potential. In all these interventions, the private sector takes a leading role as proposed in the 8NDP.

Human and Social Development

The 8NDP recognises that human development entails having a well-educated, highly skilled and healthy labour force to propel Zambia to become a thriving and industrialised nation as espoused in the Vision 2030. Thus, the plan proposes interventions that focus on increasing access to, and improving the quality of education/skills, health and water and sanitation, as well as enhancing social protection. This will contribute to the reduction in poverty and inequality. INCREASE includes training of beneficiaries in various skills including CSA technologies, biodigester construction, crop and livestock production, and business skills at all levels of the interventions. During these interventions, reaching out to women and youth as well as vulnerable beneficiaries which increases equality in increasing incomes and reducing poverty are given significant recognition.

Environmental Sustainability

The 8NDP further recognises that it is imperative in pursuing the economic transformation agenda that development pathways are sustainable. This entails the sustainable utilisation of natural resources which are the basis for wealth creation, as well as building resilience to the adverse effects of climate change. Thus, measures aimed at promoting green growth, safeguarding the environment and natural resources, enhancing climate change mitigation and adaptation, as well as strengthening disaster risk reduction, have been prioritised. INCREASE places promotion of CSA technologies in both crop and livestock at the centre and the project focuses on increased mitigation of climate change sustainability, while the promotion of bio-gas technology increases the use of clean energy and reduction in deforestation.

Alignment of INCREASE to the 7NDP

At formulation and initial implementation, INCREASE was operating under the Seventh National Development Plan (7NDP) covering the period 2017 to 2021, whose theme was "Accelerating Development Efforts Towards Achieving the 2030 Vision Without Leaving Anyone Behind". By and large, this plan expounded similar aspiration, except that it was largely based on specific sector-based outcomes while the 8NDP re-aligned the plan to amalgamate similar outcomes in different sectors.

The project is also well aligned to the 10 key objectives of the Second National Agricultural Policy (SNAP).[9] In addition, INCREASE is highly relevant through its focus on climate-smart agriculture which is fully in line with recommendations from

[9] 1) To increase agricultural production and productivity; 2) To increase efficiency and effectives of agricultural research and development; 3)To strengthen the capacity of agricultural training institutions; 4) To increase the efficiency of agricultural input and output markets; 5) To promote the availability and accessibility of agricultural finance; 6) To increase private sector participation in agricultural development; 7) To improve food and nutritional security; 8) To promote sustainable management and use of natural resources; 9) To mainstream environment and climate change in the agricultural sector; and 10) To promote the mainstreaming of Gender, HIV and AIDS, and governance issues in agriculture.

various studies and recommendations prepared in advance of the Conference of the Parties (COP) 21 where the government is recommended to scale up training of farmers in CSA.[10]

3.2 SWEDISH POLICIES AND PRIORITIES

While the INCREASE claims to apply a Market-System Development (MSD) to their project, the MTE has found little evidence that this is actually what is being implemented. Research and studies of markets and value chains have been conducted to a great extent but learning from these studies has been less convincing. The Swedish support to INCREASE falls within the Swedish ambition to Doing Development Differently (DDD) by applying an MSD. This implies a focus on locally owned problem formulation, adaptive programming and taking slightly higher risks than "traditional" development programmes. It requires striking a balance between accountability on the one side and the focus on continuous learning, management of risks and ability to adapt development programmes to changing contexts on the other side. The MSD approach embraces the principles of DDD and Sida has applied the approach to an increasing number of projects and sectors during the last two decades.[11]

Swedish priorities have poverty reduction and inclusive development as its point of departure acknowledging that economic growth can occur without benefitting all. This requires a need to focus specifically on gender equality, human rights and security and sustainable use of natural resources to ensure that no one is left behind in benefitting from the market. Sida's main focus in market development includes private sector development, trade and productive and decent work opportunities.[12] Four principles constitute the building blocks for an MSD approach: systems analysis, systemic change, sustainability and scale. As will be discussed under 5.4 M&E and learning a market systems analysis has been conducted but rather late in the project implementation. This analysis provided substantial recommendations, however most of them have not yet been implemented (refer Annex 7). The project has also advocated for inclusion of youth in policy dialogue, but project activities have not been systematically supporting advocacy efforts. In addition, there are important areas such as land rights for women (see section 4.4) that are not covered by the project and human rights are hardly mentioned in any of the documents. Gender mainstreaming and environmental considerations are to some extent reflected in the documents, but important aspects of these perspectives have not been applied with. This will be discussed under Section 3.3 and Chapter 6.

[10] Policy Monitoring and Research Centre (PMRF) (2020), Climate Smart Agriculture Strategies for Zambia - Analysis of Policies and Programmes

[11] Sida 2018, Evaluation of the market systems development approach. Lessons for expanded use and adaptive management at Sida Volume I: Evaluation Report.

[12] Sida (2021), Market Development in Swedish Development Cooperation in Swedish Development Cooperation.

3.3 NEEDS AND PRIORITIES OF TARGET GROUPS

In order to fully ensure that targets groups' needs and priorities are taken into account in the design, there is a need to further specify the target group. Smallholder farmers contain many nuances such as gender, age, ethnicity, languages etc. that need to be considered to fully understand their needs. The INCREASE targets smallholder farmers with an emphasis on reaching both men, women and youth. Besides that, the target group is not further specified. In OYE the target group is further narrowed down to unemployed youth - men and women between 15-35 years old – however with a preference towards male and female youth between 20-30 years old. School dropouts and vulnerable beneficiaries are indicated to be considered if they are duly motivated.[13] Besides these reflections, there is no documented analysis of who the most vulnerable groups are within the different areas. In order to apply with an HRBA it is a requirement to identify who the most vulnerable people are and consider whether/how they can be targeted. Also, the ToC makes no explicit reference to vulnerable people besides the focus on youth and women but these groups cannot per say be considered as vulnerable.[14]

Value chains and the INCREASE model

The design of INCREASE has been based on experiences from SILMS and E4A where substantial learning has been done but not all of this learning has been reflected in the design as mentioned above. INCREASE has focused on cotton, dairy and horticulture value chains. Criteria for selection of these value chains[15] include growth potential, existence of an outgrower system, poverty considerations, SNV's previous engagement etc.[16] It is also indicated in the background documents that dairy, cotton and horticulture value chains are selected due to their employment potential (also for women and youth), but this is however not reflected in the selection criteria.

While the dairy value chain has proven well-suited for demonstrating the potential of the INCREASE model – combining CSA with energy - this has been less evident in the horticulture value chain and in particularly in the cotton value chain. The dairy value chain where farmers keep livestock provides ideal conditions for integrating biodigesters into farm practices. Dairy farmers have proper access to manure needed for feeding the biodigester and producing gas and this way livestock

[13] The Sida annexes however clearly state that beneficiaries should as a minimum have completed primary school so dropouts here refers to secondary school dropouts. SNV (2020), Final INCREASE Annexes to Sida, October 31.

[14] It would require a more in-depth analysis based on parameters such as age, rural vs. urban, income level, ethnicity, minority, language, level of education, sexuality, religion etc.

[15] SNV (2020), Final INCREASE Annexes to Sida, October 31

[16] SNV (2020), Annexes to the proposal submitted to Sida: Large farmer base (considerations of impact on poverty); Existence of an outgrower scheme (as an organising principle for both capacity building and roll out for implementation); Scope for both energy and agricultural improvements (considerations of synergies, technical and efficiency gains); Potential for leveraging existing SNV experience (considerations of track record and hence quality assurance); Large market potential (considerations of growth potential); Potential for scaling and replication by other value chain stakeholders (considerations of impact and sector change).

dung is applied in the farm offering the farmers both clean cooking energy and also bio-slurry for gardening, fruit trees etc.

In the horticulture value chain implemented in North Western Province it has been a challenge to implement the full INCREASE model since few farmers own cattle. While farmers do understand the benefits of the bio-slurry as well as the clean energy, the lack of manure is an obstacle to getting a biodigester and thus the full model is difficult to implement. While elements of the model such as implementation of different techniques e.g. land preparation, early planting, agroforestry etc. are well suited for horticulture the biogas energy aspect will only be applicable to the few farmers who keep livestock.

There are a number of challenges related to implementing the INCREASE model in the cotton value chain. First of all, while cotton is a dry crop that thrives very well under dry conditions and does not require a lot of water, fruit trees such as oranges require a lot of water. Secondly, while the value of bio-slurry as fertiliser is well accepted by the farmers, it poses a challenge that nutrients are considerably reduced when dried, thus challenging the postponement of its use, though the reduction in nutrients is slowed down when the bio-slurry is not stored under direct sunlight.

Environmental considerations

In its design, the INCREASE model is focussed on increasing resilience for smallholder farmers with regards to climate change and the project includes elements that speak to both adaptation and mitigation. However, the design is not based on a human-environment facing approach. The Climate Risk Assessment (CRA, 2021)[17] concluded that there is growing evidence that climate change could potentially vary rainfall on spatial and temporal scales that would be of significant impacts on agriculture. These climatic hazards will lead to an increase in the prevalence of pests and diseases (especially during a flood) and therefore also increase the demand for either spraying or replanting. FGDs conducted with cotton farmers during the MTE field mission confirmed that in order to manage pests in flood years, farmers have changed the frequency of pesticide application, and, in some cases, procured additional pesticides from agro-dealers. It was also pointed out in the discussions that pesticides from agro-dealers were not necessarily used in the combinations with those provided from Alliance Ginneries. According to farmers' perceptions, droughts and dry spells are the most prominent and frequent climatic hazards experienced in all of the three value chains studied. According to the CRA (2021)[18] extreme weather events are expected with regards to both temperature and rainfall in the areas of project implementation and water availability in relation to dry spells and droughts will be the most common threat in future particularly for the dairy and cotton industry.

[17] Siatwiinda, S., Syampaku, E., & Yambayamba, K. (2021). Climate Risk Assesment Report on the Cotton, Dairy and Horticulture Sectors in Zambia, Published by SNV.

[18] Siatwiinda, S., Syampaku, E., & Yambayamba, K. (2021). Climate Risk Assesment Report on the Cotton, Dairy and Horticulture Sectors in Zambia, Published by SNV.

However, overall, the design reflects an agriculture facing climate-aware approach and not a human-environment facing approach. The voices that might have brought environmental concerns into the project design with a stronger weight (environment departments, indigenous and traditional and other elder knowledge) did not have a voice in designing the approach. This shortfall is not so much seen in the planned agriculture treatments as in not making a stronger effort to avoid cumulative harm to natural and through that to future human systems. Basically, the design team seem not to have asked the basic question: what about environmental sustainability? Nor has it sufficiently considered the 2030 imperatives.

The project design has been based on a spatial and temporal framing that has focused on administrative geographical divisions (provinces, districts) and the short-term perspective instead of a broader landscape approach and a longer-term perspective. Thus, important differences in human and natural systems' spatial and temporal scales have not been taken into consideration. INCREASE interventions are framed by province/district level which is a human system scale, an administrative and political unit. Within the administrative units, there are smaller units relating to agriculture, farming communities and household, extension services, markets, etc. None of these has anything to do with boundaries between natural systems or with their coupling. Here it is likely to have ecosystems as the smaller end and landscapes at the other end. Thus, while the project covers interventions in agro-ecological zone 1-3, the characteristics of these zones are rather different and require different risk assessments and adaptation solutions.

Planting or protecting trees is a key element in the promoted practices to gain shade, filtering, sequestration etc. In this situation, it matters what type of trees that are selected. In INCREASE, lucaena and fruit trees have been selected in an effort to supplement livelihoods and promote farmer interest in acquiring the trees. However, fruit trees are heavy water users, thus the benefits of planting fruit trees are to some extent offset by their substantial water use and other adverse effects (herbicides and insecticides for example) attributable to the choice of what to plant and in which agro-ecological zone. For instance, promoting indigenous trees such as lucaena which shade, filter, evaporate at lower rates and retain groundwater would represent a gain for the natural systems, compared to the value chain selected fruit trees which can potentially harm the systems. The temporal scales of the two are similar; the indigenous plantings will be established in 5 or 7 to 10 years, fruit trees might start yielding at year 3 or 4 but returns are only important a few years later. These temporal scales are in any case different from INCREASE interventions which looks at benefits in an earlier time frame.

In this case, the choice of not planting trees means there would be no benefits to offset the harmful effects of agriculture, and that these effects will be more harmful because of the heavier draws and loading on water bodies, lost sequestration, and other direct effects of farming. From a climate perspective there would be no improved resilience, for example to drought, flooding, winds etc. While value-chain planting, such as fruit trees, can improve this, they are likely not to, given the heavier environmental burden of these trees. Instead, indigenous nature-based solutions such as lucaena may provide better offsets to environmental harm from farming and increase resilience to continuing severe climate and environmental degradation.

4 Results and Implementation

This section first provides an overview of progress towards project targets structured around the three outcomes in 4.1. Renewable energy aspects are discussed in 4.2 and section 4.3 includes an assessment of markets in the three value chains. In section 4.4 gender equality and women's economic empowerment in the project is analysed.

4.1 OVERALL PROGRESS TOWARDS PROJECT TARGETS

4.1.1 Income, food and energy security for men, women and youth farmers

The overall outcome of component 1, is that "*the income, food and energy security for men, women and youth farmers has improved*". The two indicators defined (Table 5). measure adoption of climate-smart practices and increased yield. Data on these indicators will only be collected as part of the end evaluation and therefore information on progress so far is limited to qualitative statements from the field mission and progress on implementation of activities such as training as reflected in Table 6. It should be noted, that the Internal SNV Mid-Term Review (MTR) recommended to "*Include both farmers' participation and adoption rate of practices in project monitoring and reporting*" but this has not yet been implemented.

Table 5: Indicators under outcome 1

Indicator	Target
% of households that have adopted at least two CS practices promoted	75% of 11,300 farmers
% increase in yield due to adaptation of CS practices/technologies	10%

Training of farmers has been the main strategy applied by INCREASE to promote CSA under component 1. Therefore, this section focuses on progress in training farmers and indications for uptake of technologies promoted as reflected in the indicators in Table 5.

Progress towards realising outcome 1 has been considerably delayed due to COVID-19 and changes of implementation strategies and approaches applied. While training of farmers was lagging considerably behind schedule during 2020 and 2021 progress has been made in 2022 and targets are now on track. According to SNV monitoring data around 40% of the trained farmers were women while 60% were men, thus SNV complies with the targets of reaching 30% of female farmers (see more under 4.4.). Especially in 2022, the gap between men and women trained has been improved and an initial gender gap in cotton has been reduced. However, as for lead farmers in horticulture and dairy value chains as well as in agroforestry it is noticed that only 23% of the lead farmers are women. This is mainly caused by the small representation of

women (10%) among trained lead farmers in agroforestry. Refer Table 6 for trained farmers and Table 8 for lead farmers.

Table 6: Trained farmers under outcome 1 by value chain and gender.

Trained farmers	**Target**	**2021**		**2022**		**Total**			**%**
Gender of trained farmers		M	F	M	F	M	F	All	
# of farmers trained in CS practices in the **cotton VC**	**9000**	2007	862	2397	2515	4404	3377	**7781**	**86%**
# of farmers trained in CS practices in the **dairy VC**	**2000**	736	463	247	121	983	584	**1567**	**78%**
# of farmers trained in CS practices in the **horticulture VC**	**300**	-	-	257	133	257	133	**390**	**130%**
# of farmers trained in CS practices in **tree nursery growing/ Southern, Central and Eastern**		40	44	19	11	59	55	**114**	
Total	**11300**	**2783**	**1369**	**2920**	**2780**	**5703**	**4149**	**9852**	

Source: SNV data as reported on 16th December 2022.

Dairy farmers have been reached through the supported MCCs which represent a cornerstone in the milk marketing infrastructure and play an essential role in the dairy value chain and agribusinesses (Component 2).[19] The dairy value chain thus differs from the other two value chains where a lead farmer approach is applied. Initially, 10 MCCs were selected by Lactalis, the milk off-taker, for the collaboration and through these the project was expected to reach and train the dairy farmers. However, several of the selected MCCs also ended up being supported by GIZ,[20] thus in order to avoid overlap, SNV agreed with GIZ to withdraw from supporting six of the MCCs.[21] Instead, SNV added additional MCCs/cooperatives for support during 2022 (Table 7 lists the MCCs/cooperatives supported in 2022).

[19] SNV (2021), INCREASE Market System Analysis Report.
[20] GIZ initially funded SNV to provide capacity building support to MCCs but later decided to take an implementing role. SNV (2021), INCREASE, Annual Report 2021.
[21] Monze, Magoye, Niko, Kalomo, Choma Union and Batoka MCCs.

Table 7: List of cooperatives and MCCs supported in 2022

Region	District	Dairy Cooperative/MCCs	Board Members		Total board	MCC Membership		Total Members
			Male	Female		Male	Female	
Southern	Zimba	Zimba MCC	5	2	7	184	66	250
		Thara				10	15	25
		Bbelo					85	85
		RR						0
	Choma	Mbabala	7	2	9	62	38	100
	Pemba	Pemba MCC	5	2	7	105	28	133
	Mazabuka	Munjire MCC	7	3	10	220	85	305
	Namwala	Mungaila	10	1	11	560	140	700
Lusaka	Lusaka	Chalala	3	3	6	12	18	30
Central	Kabwe	Kasavasa	2	5	7	8	27	35
	Kabwe	Mpima				34	40	74
			39	**18**	**57**	**1.195**	**542**	**1.737**

*The table is developed by SNV, and it includes available information as per December 2022.

Besides the cooperatives/MCCs listed in Table 7, SNV has identified 10 new MCCs (six in in Southern, and four in Central Province) for support in 2023.

As reflected in the ToC (Annex 6), it was initially assumed that the supported MCCs would have received capacity building and training on governance and management issues from previous GIZ or SNV support. This is however not the case with the newly selected MCCs and thus the assumption has changed for these MCCs. INCREASE has been designed to focus on dairy technical capacity trainings and not providing capacity development support to the MCCs. This new situation is being factored in by providing more tailor-made training sessions for the new MCCs where governance is usually part of the training for new MCCs as part of the formation support. Since training in the dairy value chain has been conducted through the MCCs, no lead farmers have been nominated as such,[22] except for a few in Central Province. Therefore, Table 8 only provides an overview of lead farmers in cotton, horticulture and agroforestry value chains (VC).

Table 8: Distribution of lead farmers by value chain and gender as reported be SNV

Trained Lead Farmers	**2021**		**2022**		**Total**		
Gender of trained lead farmers	M	F	M	F	M	F	All
# of lead farmers in **cotton VC**	61	8	130	58	191	66	257
# of lead farmers in the **horticulture VC***	-	-	7	4	7	4	11
# of lead farmers in **agroforestry**	52	6	-	-	52	6	58
Total	**113**	**14**	**137**	**62**	**250**	**76**	**326**

Source: SNV monitoring data provided on 16th December 2022
**One of the was a youth farmer*

[22] Trained MCC members are sometimes referred to as lead farmers which confuses the picture a bit. However, the term "lead farmers" in cotton and horticulture refers to trained farmers who host demo plots.

In particular, the implementation of **horticulture value chain** interventions in North Western Province have been delayed due to a need for adjustment of the original outgrower model towards a lead farmer approach with demonstration plots in the communities. The training of 390 horticulture farmers was finalised in October/November 2022. While the lead farmers have all been given seeds and seedlings, fruit trees, solar driven irrigation system etc. to develop their demo plots, the follower farmers have not received any inputs. This is related to the reality of the planting cycle where October/November is the climax of the dry season and inputs like vegetable seedlings and trees seedlings are only delivered at the onset of the first rains to avoid that they dry off because of lack of watering after they have been given to the farmers. These seedlings are therefore retained at the nurseries. Lead farmers have established demo plots practicing intercropping, better crop production management plant spacing, planted fruit trees and lucaena and are irrigating their plots using drip irrigation. Although the MTE team also noted that trained follower farmers have started to adopt some of the new practices and diversify their vegetables production, as mentioned above they are still waiting to receive seedlings from the project and therefore still not able to implement several of the practices they were trained in.

The vast majority of the farmers targeted for training belong to the **cotton value chain**. Even though the approach and partnership with Alliance Ginneries was already established during the SILMS project, there has still been considerable delays in training cotton farmers. Documentation and stakeholder interviews state the following major reasons for delays and lack of achievement; 1) the agreement on a Memorandum of Understanding (MoU) with Alliance Ginneries took longer than expected and was only signed in September 2020; 2) COVID-19 restrictions challenged the implementation of physical training; 3) procurement issues; 4) the sensitisation of farmers and selecting them for the training took longer than expected (not least under COVID-19); 5) cotton is an annual crop which makes it more difficult to catch up with delays (unlike dairy and horticulture that is a three-monthly crop).[23]

Training manuals and implementation

Training manuals in all three value chains are rather comprehensive and technically sound, although not fully thorough with regards to environmental considerations. The manuals, however, have little focus on facilitation and implementing partners are not offered any guidance on how to ensure full participation, non-discrimination, focus on empowerment and a learning centred approach. Manuals for horticulture, dairy and cotton have been developed to streamline the training. A review of the training manuals shows that they are all exhaustive, covering all issues relating to climate-smart technology and their production, though they tend to be more on the theoretical side. The manuals are distributed to trained lead farmers to allow them to use it as a reference book and according to initial consultations with SNV the topics in the manuals are discussed with farmers, but the manuals are not followed systematically in the training (which would

[23] E.g Sida (2021), Feedback on INCREASE Inception Report submitted on 5th November 2020 by the Swedish Embassy.

require substantial training time). According to implementing partners and SNV staff, practical aspects are emphasised during the training session but these issues are not obvious from the manuals and no training or additional guidelines on how to facilitate and ensure an inclusive training has been provided to partners. There are statements of applying both a theoretical and practical approach to the training sessions in service providers' reporting,[24] but little reflection of how to ensure farmers' empowerment to apply the techniques themselves, how to strive for a non-discriminatory and inclusive learning environment, how to ensure gender equality and women's and youth's meaningful participation in the training sessions etc. For instance, it was noted in the annual report for 2021 that "*SNV realises participation alone is not enough for them* (women and youth) *to truly benefit from these activities*", thus a dedicated strategy for their actual involvement is needed. When no such strategy has been developed and partners have not been trained on inclusion aspects it runs the risk that training will not allow for the full participation of women and youth (which is an assumption of the INCREASE ToC). In addition, if such facilitation guidelines are not provided to lead farmers - who are qualified to do farming but not necessarily to conduct trainings – the risk is to replicate stereotypes to the training sessions for follower farmers.

In the horticulture training the training of farmers had become less participatory than initially planned for. Since the model was shifted from focusing on commercial farmers to lead farmers, the training had to be initiated separately from the establishment of lead farmers demonstration plots. Farmers interviewed indicated that most of the training had been done as a classroom training and the MTE team was able to observe one of the sessions. While the trainer was engaging and very competent in getting farmers involved, it was not a practical "learning by doing" session. Farmers could only remember one practical session on nursery management which had been conducted in the field. According to Impuls Africa three sessions were conducted with a practical component, namely the nursery management session farmers remembered, agroforestry, and the session on vegetable production in Mutanda and Kyabankaka areas. While farmers found the training very useful and inspiring, they did request for more "on the job" learning.

While training manuals could continue to guide the farmers if physical copies were handed out, this has not been done systematically and manuals are not available in local language. INCREASE's budget did not allow for a handout of the manual to all participating farmers, so the strategy applied by INCREASE was to provide manuals for lead farmers and extension officers as well as the MCCs. This would allow follower farmers to access the information with lead farmers, in the MCCs and with extension officers. The practice however differed across the value chains and for instance Impuls Africa provided a manual for all 300 trained farmers. For the MCCs it was not necessarily the leadership of the MCCs who had a copy of the manual. In both Eastern, Central and Southern Province, there were no manuals in local languages and the English versions had been distributed randomly so only the lucky few had access to them. The English language provided a challenge for several of the farmers.

[24] Impuls Africa (2022), Third Technical Report, INCREASE, June 2022.

In North Western Province the manuals were also distributed in English but here it was not considered a problem and it was a deliberate strategy from INCREASE due to political tensions in the Province, and the translation to one local language could be affiliated with support to some groups over others.

Adoption of technologies

There are indications of adoption of climate-smart practices promoted by the project and other actors in the cotton value chain. Especially the yield enhancing technologies to obtain optimum yields per unit area have proven to be useful.[25] Trainings in ripping and/or potholing, early planting, intercropping cotton with legumes soybeans and/or cowpeas, maintaining crop residues (no burning), better crop production management plant spacing, including disease control have been taken up by farmers to varying degree. Especially, early planting has been embraced by cotton farmers. Farmers started planting with the onset of the rains in early December, with land preparation as early as August/September, as opposed to early January and planting on ridges which is meant to increase soil drainage during heavy rainfall. Conservation tillage enhances soil water conservation and the farmers have observed that crops planted under this method do not wilt as much as those planted under the conventional method when there is a prolonged dry spell or drought. Furthermore, applied fertiliser is easily washed away on ridges, which is not the case in ripper lines or potholes.

During the field visit, cotton farmers in both Eastern and Southern Province expressed understanding of the benefits of crop rotation, intercropping and agroforestry but they lacked access to proper seeds (e.g., cowpeas), knowledge of what crops to rotate with and when as well as lack of tree seedlings, indicating that some practices have not been fully implemented and others require more guidance. While farmers were able to explain the importance of crop rotation and intercropping, the farmers met in Mazabuka in Southern Province expressed a need to further understand which crops to rotate with and when and some explained that due to limitations in access to land they had prioritised to focus on cotton without intercropping.

Inputs for the INCREASE model

The cotton manual argues for using hybrid cotton seeds as opposed to conventional seeds and provides a business case that show an almost tripled revenue. The Internal SNV MTR recommended that hybrid seeds would be implemented but the annual report 2021 indicates that Alliance Ginneries has been unwilling to provide these seeds. This situation has not been solved and according to interviews/FGDs with SNV staff, farmers and observations, Alliance Ginneries continues to provide conventional seeds due to higher costs of hybrid seeds and limited availability in Zambia. This challenges the ability to fully demonstrate the full potential of yield increase (see discussion in 4.3).

[25] This is fully in line with SNV's stated intentions as reflected in SNV (2020), Inception report submitted to Sida, INCREASE.

Challenges were also noted with provision of cowpeas seeds. In FGDs with the MTE team, follower farmers pointed out that they had been promised cowpeas seeds from Alliance Ginneries, but Alliance Ginneries ran out of seeds, so farmers had not been able to intercrop. They had however received cowpeas seed the year before where they tested the intercropping but apparently it had not convinced them enough to invest in seeds themselves. Lastly, while the lead farmers in Mazabuka had received cowpeas seeds from Alliance Ginneries, inputs such as fertiliser and chemicals had not been sufficient to avoid diseases on cowpeas, thus yielding poor results for cowpeas. The cotton manual suggests Tephrosia insecticide to prevent insect aphids, but this was not provided by Alliance Ginneries and had not been purchased by farmers so there were no concrete examples of this being used. In Eastern Province, farmers had also experienced that inputs provided by Alliance Ginneries were usually not enough to meet the demand on the ground.

While Lucaena and orange seedlings were only distributed to farmers in Eastern Province in February/March 2022, in Southern Province they were still waiting for the seedlings. Lead farmers and SNV staff explained the lack of delivery of seedlings as shortage of oranges. Nevertheless, as above it should be noticed that seedlings are not distributed in the dry season as there is a high risk of them drying out and since the training only started in May 2022 in Mazabuka this has likely influenced why seedlings were not distributed. Thus, **while some cotton farmers have only been able to implement the full INCREASE model recently, in other places famers are still waiting to do so**. Thus, this **late delivery of seedlings gives the project very limited time to demonstrate its full potential**. Even the three-year time period has been mentioned by several stakeholders as an insufficient timeframe to see the true benefits of the tree planting, the delays in procurement of seedlings has further put the demonstration of the INCREASE model under pressure.

In the dairy value chain, new climate-smart fodder production techniques have been widely adopted by farmers and the understanding of agroforestry and Lucaena as an important ingredient in the fodder production has now been widely embraced although there have been some challenges promoting Lucaena among farmers. The case box below provides an example of a lead farmer who quickly understood the benefits of agroforestry but also that not all farmers embraced the idea of agroforestry from the outset. Under the INCREASE model, oranges are meant to become a significant source of income to assist the dairy farmers with purchasing of dairy feed. The lucaena is also meant for direct feed and improving of soil fertility. While the benefits of oranges have been easy for the farmers to understand it has been more challenging to convince the farmers of lucaena. FGDs with dairy farmers in Southern and Central Provinces however clearly indicated that after some time, farmers realise the concrete results by increased milk production, even in dry season, and understands that there are savings on fodder to be made by using lucaena.

Dairy farmer in Central Province
One male lead farmer received 100 oranges and 5,100 lucaena seedlings for his demonstration plot. The large number of lucaena he received was a result of lucaena seedlings being rejected by other farmers indicating initial lack of understanding of the benefits. The lead farmer had a demonstration plot and lucaena and gliricidia woodlots which will be used for feeding his dairy cattle as well as supplying Supa Moto with stems for making briquettes. He has researched a bit on fodder and realised that the nutrient values of Moringa, azora and lucaena are higher than soybeans cake and has started producing all these on his farm with the intention to stop buying dairy feed within the next few years. He is harvesting lucaena seeds and planting more as he has discovered that livestock prefer this to gliricidia although the latter is easier to grow. He is growing fodder in the demonstration plot and has already taught other farmers (150 so far) even though the project has not yet rolled out the training of follower farmers. In addition, this particular lead farmer is a fodder seed grower and was initially trained under the Enhanced Smallholder Livestock Investment Programme (ESLIP) three years ago and attended a refresher course under SNV two years ago.

Yields have increased in the cotton and dairy value chains where the climate-smart practices have been applied. In Eastern Province, the farmers visited by the MTE team reported an increase in yields in the 2021/22 season by up to 200% (to 1,000 Kg/ha for both cotton and soybeans). These yield increases were confirmed by the district extension officers. This has led to increases in income for the farmers which has mostly been used to acquire motorbikes considering long distances from the cotton producing areas to the central business districts where input and output markets as well as other services are found. The increased income has also been used to build better houses and buy other household assets such as solar panels.

Table 9 shows the cotton and soybeans harvests as well as the estimated gross harvests per hectare by some lead farmers that were interviewed by the MTE team in Ukwimi, Lusangani in Eastern Province. Figure 2 shows how the estimated total value compares with follower farmers' cotton-soybeans intercrops, and the respective monocrops before the project based on the average yields then but using current season prices. It is clear from the table that the average per hectare yields of lead farmers are higher than the average of other farmers, most likely due to better management including earlier planting as the seedlings for the INCREASE model were only supplied in February/March 2022 after the crops were already grown. Lead farmer number 3 reported having serious challenges controlling weeds in her demonstration plot. Three of the lead farmers fertilised their plots with bio-slurry.

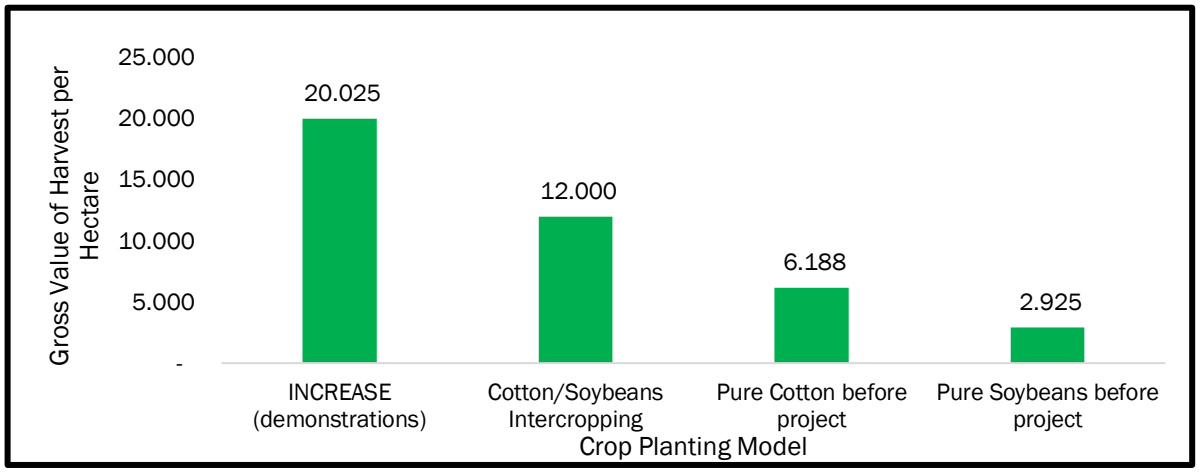
Table 9: Lead farmer cotton/soybeans harvest and estimated gross value per hectare (2021/22 season)

#Lead Farmer	Production (in Kg over 1 Lima)		Prices (ZMW/Kg)		Value (ZMW)		Total Value ZMW/Ha)
	Soybeans	Cotton	Soybeans	Cotton	Soybeans	Cotton	
1	150	150	9	15	1,350	2,250	14,400
2	150	300	9	15	1,350	4,500	23,400
3	100	150	9	15	900	2,250	12,600
4	200	375	9	15	1,800	5,625	29,700
Average	**150**	**244**	**9**	**15**	**1,350**	**3,656**	**20,025**
Yield per Ha	**1,200**	**1,950**					

Source: MTE team computations from lead farmer interview data

Figure 2 emphasises the superiority in terms of gross value of harvest per hectare of the lead farmer demonstration plots while even the cotton/soybeans intercrops are superior to the respective monocrops before project.

Figure 2: Estimates average gross value of harvests from different cropping models.



Source: MTE team computations from lead and follower farmer interview data

It is a key challenge for the cotton value chain that global cotton prices are fluctuating substantially, and yields show large variation over the years.[26] Both yields and prices have influenced the INCREASE farmers during the entire period of the project, but nevertheless the above figures indicate that with the current prices and yields there is a good business case for cotton production.

Milk production has increased considerably with the uptake of the climate-smart practices, such as better fodder. In Munjile MCC dairy farmers shared how they had started to prepare fodder for their cows after being trained by using waste from e.g. maize production to use as feed. While they would normally leave maize leaves and stocks on the fields for the cows to consume, they were now chopping and milling the vegetable waste to make fodder for the cows; thus, limiting post-harvest waste and ensuring feed for cows during the dry season.

Increase in milk production was also confirmed by extension officers and key stakeholders at the Outcome Harvesting Workshop organised by the MTE team in Southern Province. Moreover, extension officers in Central Province reported that milk yields in the dry season have increased by about 100% from 10 to 20 litres per cross bred cow per day. The current milk price is ZMW 8 per litre which reflects an increase from ZMW 6 per litre last year. The milk in Kabwe is not graded as stringent measure are put in place to maintain bacteria count at minimal levels. At some point, the price had reached ZMW 11 per litre as Lactalis was trying to fight off competition from new market actors but has now been reduced to promote local consumption, and competitors have also comparatively reduced their prices. Lactalis tried to promote fodder produced

[26] SNV (2021), INCREASE Market System Analysis Report.

under hydroponics and one lead farmer who participated in this initiative was able to increase the milk yield by 240% (from 2.5 to 8.5 litres).

4.1.2 Business/value chain performance through climate-smart investments in agriculture, water, and renewable energy

The overall outcome of component 2 is: *increased business/value chain performance through climate-smart investments in agriculture, water and renewable energy*. Targets and progress towards these targets are shown in Table 10. The indicators have a focus on access to financial services for households and businesses, this is reflected in three out of four indicators under sustainable markets. The last two indicators focus on increased sales through service provision and measures number of households with access to clean energy. It should be noticed that while this component focuses on businesses and value chain performance most of the indicators relate to the household level and there is a potential overlap in some of the indicators which makes them difficult to apply.[27] This is also evident from the reporting where the same data is applied for different indicators (see more discussion under M&E and learning) and the usefulness of these indicators are therefore questionable.

Table 10: Targets and progress under outcome 2

Indicator	Target	2021
Sustainable inclusive markets for climate-smart products and services strengthened		
# of people (+youths) who have increased annual sales through service provision, trading and/or processing	50	114
# of people with access to financial services to practice CS	3,955	1,100
# of SMEs/BCEs financed to apply inclusive business practices	30	28
# of individuals that have gained access to, and make use of financial services (savings, insurance, loan)	8,475	1,700
Adoption of more modern energy solutions for cooking, lighting and productive uses has increased		
Increased # of HHs with access to clean and affordable energy solutions for cooking and lighting	3,000	764*

Source: Annual report 2021.
**Number of installed biodigesters. Data provided by SNV project team 16th December 2022.*

While access to finance is clearly reflected in the ToC and in the indicators, SNV had to change their initial strategy of linking smallholder farmers to finances to instead focus on linking farmers to seeds and inputs. This has however not resulted in a revisiting of the ToC and indicators. The original INCREASE proposal suggested training of local finance institutions on the economics of climate-smart practices and this aspect is also a central element in the INCREASE ToC. However, these activities have been taken out of the current results-framework and besides achievements under outcome 3 (OYE) on saving and loans groups being established,

[27] E.g. the difference between # of people with access to financial services and # of individuals that have gained access to, and make use of financial services is not obvious

activities concerning farmers' access to finance have been few and only recently starting to pick up. While almost all stakeholders confirmed the huge challenges in obtaining access to financial services, thus confirming its relevance, very few of them could provide examples of how the project has promoted access to finance (besides savings and loans groups).

According to SNV the strategy for linking smallholder farmers to microfinance had to be abandoned due to high interest rates (30-50%) that could risk doing harm and even aggravate poverty. Instead, smallholder farmers were linked to outgrower schemes like Alliance Ginneries and Nature Goods who provided inputs that were then paid back upon selling of production. There are also examples of MCCs like Mungaila that are now providing agrovet products, dairy meals, and equipment on credit and this is recovered gradually via check off against farmer milk delivery payments.

Recently, some progress on establishing credit facilities for youth with both Indo Zambia Bank and Zambia Industrial Commercial Bank has been realised. The Indo Zambia bank targets 200 youth to begin with and credit is depending on levels of savings. If savings are ZMW 1,000, a credit of ZMW 5,000 can be accessed (five times the amount of savings) and interest rates will be around 20% (compared to a market interest rate between 30-50% for individual loans and requirement for collateral which youth will often not have). It is however also noted that previously different engagements with financial institutions (e.g., AB Bank and Mayfair Insurance)[28] had been explored without any concrete results due to the high interest rates as indicated above. Thus, it remains to be seen whether the current initiatives will work out as expected but the low interest rate is promising.

Progress on SMEs/BCEs that have been financed to apply inclusive business practices is well on target. While it is not clear how *inclusive business practices* are to be interpreted, the Annual Report 2021 indicates that 28 BCEs have been supported with seed money to construct biodigesters (see further discussion under 4.2). BCEs' access to finance is closely linked to the last indicator on progress on households achieving modern technology. By the time of the MTE, the project has supported 28 BCEs constructing a total of 764 biodigesters.[29] Around 40% of these are in Southern, 20% in Eastern, 18% in Lusaka, 13% in Central, 6% in Northern and less than 1% in Copperbelt, Muchinga, North Western, Western and Mumbwa Provinces. While the intention is to deliver biodigester installations to 2,000 farming households (as a minimum) in contribution to reaching the target of "3,000 HHs with access to clean and affordable energy solutions for cooking and lighting", the progress made so far will make it challenging to reach the final target, even though the applied business model and approach is now being changed (see 4.2).

When it concerns SMEs and women-led enterprises, some progress has been achieved in 2022. According to monitoring data, 52 women[30] from 17 different women-led

[28] SNV (2021) INCREASE, Annual Report 2021.
[29] Data provided by the SNV project team.
[30] Four of the 51 women led cooperatives are reported to be men.

enterprises have been trained three days in business management. 41% of these are from Southern and 29% are from respectively Central and Eastern Provinces. The training and coaching programme was intended to enhance the participants' ability to develop and lead sustainable businesses, improve products and services and increase beneficiaries' access to quality climate-smart services and other related service. While it is unclear how SNV captures the women-led enterprises under outcome indicators in their monitoring data, the training provided to women-led businesses seem to have a stronger focus on inclusive business practices compared to the BCEs and thus could be captured under this indicator. According to SNV this is the intention moving forward and in this regard the target is substantially overachieved.

As of August 2022, four out of the 17 supported women-led enterprises had completed the first draft of their business plan with the remaining enterprises being on different stages of the process.[31] At the time of the field visit, the District Women's Association (DWA) in Monze (see text box) had progressed well and had also submitted a draft plan for the implementing partner Swalisano's review indicating additional progress of the women-led enterprises.[32] While there were no examples of women-led enterprises accessing finance by the time of the field visit, stakeholder interviews indicated potentials for the enterprises to access funds through the government's Constituency Development Fund (CDF) where funds are allocated to districts for local infrastructure and services. The national budget for CDF increased from ZMW 1.6 million to ZMW 25.7 million in 2022 for each of Zambia's 156 electoral constituencies[33] and there were examples of groups/associations who had previously been successful in accessing such finance which is promising.

[31] Swalisano (2022), Promoting Climate Resilience for Women Entrepreneurships, Mid-Coaching Report, for the period of April 2022 to August 2022.
[32] Monze DWA had not submitted a draft by the time of the Mid-Coaching Review, thus not part of the four who had submitted by August 2022.
[33] https://www.dandc.eu/en/article/zambias-constituency-development-fund-decentralises-spending-mixed-results

The District Women's Association (DWA) in Monze started collaborating with SNV in 2022 and has received training and coaching in business planning. The DWA representatives explained how the training had changed a lot of practices due to the training. It had made them start budgeting, bookkeeping, and keeping receipts of all sales, as well as calculate profits. Through this training the DWA realised that their previous prices on cooking oil had been much too low. The DWA had previously received support from the US African Development Foundation (USADF) who provided them with a sunflower processer and developed a business plan for sunflower oil, but the women never understood the plan and was therefore not implementing it. With the support from INCREASE, the women have now developed their own much simpler business plan that they actually understand and therefore also implement. INCREASE has also supported them to develop a brand and label the oil and taught them how to focus on quality and hygiene and how to ensure customer service. The DWA has recently invested in a filter to refine the oil in order to increase the quality and the price.

4.1.3 Enabling environment for developing and scaling of markets for climate-smart agriculture, water and renewable energy practices

The overall outcome of component 3 is "*improved performance of the enabling environment for developing and scaling of markets for CSA, water and renewable energy practices (including opportunities for youth employment)*". Component 3 captures both the advocacy work SNV is doing on national level and elements of the OYE project. It is co-financed with SDC and is a targeted intervention towards youth and women. Implementation is done by 10 Local Service Providers (LSPs) where Sida funds five[34] and SDC funds the other five. Table 11 provides the data on progress for Component 3 during 2021 (most updated figures available).

Table 11: Targets and progress under outcome 3 (OYE + Advocacy)

Indicator	Target	2021
Youth employment ecosystem is strengthened		
Increased # of youth with employment (self/improved)	4000	3815
Increased # of institutions incorporating OYE model	4	3
# of youth-led enterprises established	50	114
# of policy & regulatory framework for promotion of youth employment supported/implemented	3	2
# of self-lending groups incl. for youth established	40	108
Coordination of CS measures among project & VC-stakeholders has improved		
# of best practices in CS business cases captured/disseminated	3	3
# of national policy dialogue meetings held on CS & OYE	3	4

Source: Annual report 2021.

[34] NutriAid (Sinazongwe), Onmark (Lusaka and Monze), Kudu Consulting (Monze and Chipata), Creative Thinkers (Lusaka West), Stratmore (Chisamba, Mpima, Kapiri, Mukonchi, Kabwe). Currently, the collaboration with Kudu Consulting is being reviewed to assess whether it will be continued or not.

Youth employment and saving groups

The qualitative assessment indicates that INCREASE is contributing to youth employment and empowerment. However, M&E data collected by SNV is too inaccurate to confirm this tendency. According to the Annual Report 2021, the OYE component has progressed well towards targets with a total of 3,815 youth[35] having gained new employment, 114 youth SMEs (around 30% of these are women-led according to SNV staff) have been identified for further capacity engagement and training, and 108 saving and loans associations have been formed. While this indicates substantial progress on all parameters, the information is not confirmed by the SNV data collected (as reflected in the OYE MTE) where almost all targets on employment are considered very unlikely to be achieved.[36] This is likely ascribed to inaccurate data which the OYE MTE finds to be a severe challenge in measuring progress towards targets. Based on a more qualitative assessment, the OYE MTE concludes that *"stakeholders believe that the project is indeed contributing to improved youth livelihoods, and a better ecosystem for youth (self-employment in general).*"[37] SNV has dedicated end of 2022 to reconstruct its OYE database and do a thorough check and verification together with the LSPs in order to address the data challenges. At the same time, the overall targets were adjusted and according to SNV, the OYE component is now progressing well towards revised targets.

This conclusion is supported by findings from this MTE, including several anecdotal examples indicating that youth and women are getting better employment in the form of both formal and informal income generating activities. The LSP On Mark Solutions initially targeted 164 youth but this was increased to 228 youth (55% males and 45% females) in Magoye and Lusaka West. While On Mark Solutions was initially challenged by youth's lack of interest, the MTE's FGDs with youths confirmed that this is no longer the case, since they have now seen from others the benefits from participating. According to On Mark Solution, an estimated 800 youth have now expressed interest in joining. On Mark Solutions has supported income generating activities such as tree nursery growing, goats and chicken rearing as well as implemented saving and loans associations etc.

The OYE component activities in Katete have been implemented through Katete DWA and started in 2020. Training of trainers was conducted to train women and youth group members in basic life skills as well as entrepreneurship. Key training subjects include saving and lending schemes, basic life skills, entrepreneurship (including broiler chickens rearing, gardens, shops, motor bikes for transportation). These trainings have enabled the youths to go into self-employment, and some have been able to sponsor themselves to schools and colleges.

[35] From the documents reviewed, the gender division is not clear to the MTE team. Additional information has been requested from the SNV project team.
[36] Orange & teal (2022), Mid-term evaluation of the Scaling Up Youth Employment in Agriculture Initiative OYE+, Zambia and Zimbabwe, Final report, 15 January.
[37] Orange & teal (2022), Mid-term evaluation of the Scaling Up Youth Employment in Agriculture Initiative OYE+, Zambia and Zimbabwe, Final report, 15 January.

In Katete, the Tiyeseko Savings Group was formed in 2019 by youth and has been trained by the DWA in saving and loan schemes, business skills, life skills, group governance issues, and self-empowerment. Group members do various income generating activities using funds they borrow from the group. The group savings increased from ZMW 30,000 in 2019 to ZMW 50,000 in 2022. The businesses of those that attended the FGD with the MTE team have increased by 419% based on quantities traded, profits or capital used in the businesses. Businesses of a women group, Chikulupililo Women's Group, in a nearby area increased by 384%. The group of women started working with SNV/DWA in 2018 under the SILMS project on the soybeans outgrower scheme using sustainable agricultural practices such as conservation tillage, agroforestry and have also been trained in basic life and business skills. Several of the groups consulted in Katete expressed an interest in embarking on group-based businesses like broiler chicken production, baking, sewing which require more capital and returns would be much more than those from individual businesses.

Savings in the saving groups have considerably increased and there are indications of in particularly empowerment of females. However, linkage to financial institutions is still a major concern. Access to finance is reflected in several boxes in the ToC and a number of documents mention lack of access to finance as a key constraint especially for women and youth. The OYE component has a strong focus on establishing of saving and lending schemes to allow for youth groups to jointly save and take credits. The assumption here is that youth will improve its access to finance by taking part in a saving and credit association which is largely confirmed by this MTE. Saving and lending schemes are seen as a way to access finance with a low risk and there has been a high demand for these groups in hard-to-reach areas with limited other financial products available, especially for women and youth.

As indicated by the monitoring data, the OYE component is far above targets for establishing self-lending groups. LSP On Mark Solutions has implemented 17 savings groups. They have all been registered as cooperatives and while they jointly saved ZMW 10,000 in the beginning they now jointly save ZMW 69,000. The savings increase varies across the groups and one of the groups increased their share outs from ZMW 3,000 to ZMW 28,000 in 2022. While access to finance is therefore likely to have improved for established groups, the OYE MTE indicated a widely shared concern that access to finance continues to be a stumbling block for the pathways to work at all.[38] SNV has been exploring some of the financial products with banks as mentioned above to make them user friendly to youth and women and at the same time more progress have been made to further link youth to financial services. There are examples of registered groups implemented by On Mark Solution positioning themselves to access funds from CDF but this is still to materialise. Some groups have also embarked on group businesses.

[38] Orange & teal (2022), Mid-term evaluation of the Scaling Up Youth Employment in Agriculture Initiative OYE+, Zambia and Zimbabwe, Final report, 15 January.

Advocacy

SNV has supported the Zambia Climate Change Network (ZCCN) to coordinate CSO advocacy for inclusion of climate resilient farming techniques and representing farmers' position in national policy processes. In 2020, SNV and ZCCN signed a MoU to collaborate on national advocacy concerning sustainable agriculture, the environment and climate change and throughout INCREASE the two organisations have collaborated on advocacy. While no annual budget has been attached to the ZCCN, SNV has supported specific meetings, workshops, engagements, webinars etc. initiated by both SNV and ZCCN. The project also supported the drafting of the Civil Society COP 26 Position Paper and sponsored a delegation from ZCCN to attend the COP 26 itself.[39] A concrete input from farmers was conveyed by ZCCN in collaboration with CSOs and development partners to diversify the input package to not only include seeds for maize but to focus broader on legumes. This led to the comprehensive input support programme in Zambia initiated in 2021. ZCCN also coordinated more than 20 CSOs from around the country to draft the civil society inputs to the Climate Change Bill in 2021.

Dialogues with government authorities on climate change have been conducted contributing to an enabling environment especially for youth.[40] However, according to the MTE of OYE, advocacy targets are unlikely to be achieved but this is not visible in the Table 11 that merely tracks advocacy outputs and not outcomes.[41]

4.2 RENEWABLE ENERGY

Biogas/Biodigesters

The approach applied so far by the INCREASE for biodigester installation, implementation/use, registration and follow-up/quality control has not been effective. Critical shortcomings in the planning and implementation process have led to a number of biodigesters not being properly installed/used or being dysfunctional. The MTE field visit revealed that most farmers get information on biodigesters from fellow farmers or during training which is an indication that one of the best adoption and sales avenues is farmer to farmer influence based on their personal experiences. Thus, while this should be encouraged, it will be essential for the project to further emphasise focus on quality and functionality issues related to the biodigesters, as non-used or dysfunctional digesters may give a bad farmer-to-farmer reputation and consequently impact negatively on other farmers' demand.

As shown in Table 10, at the time of this MTE only 764 biodigesters have been installed (732 fully operational) with support from INCREASE.[42] By December 2021, a total of 703 digesters had been installed (625 fully operational),[43] thus only 61 new biodigesters

[39] SNV (2021), INCREASE, Annual Report 2021.
[40] SNV (2021), INCREASE, Annual Report 2021.
[41] Orange & teal (2022), Mid-term evaluation of the Scaling Up Youth Employment in Agriculture Initiative OYE+, Zambia and Zimbabwe, Final report, 15 January.
[42] Data provided by SNV project team.
[43] INCREASE Project Annual Report 2021.

were installed during 2022. This reflects serious challenges to the implementation process. Thus, the built-in expectation that INCREASE would be able to continue biodigester installations from E4A through snowballing/cascading effects has not materialised. In addition, the MTE team's meetings with groups of farmers and BCEs in Southern and Eastern Province revealed that the use and functionality of the installed biodigesters varied considerably from one area to another. While in some areas the biodigesters seemed to perform quite good, in other areas the MTE team found indications that the majority of the biodigesters were dysfunctional/not in use anymore.[44]

These field observations by the MTE team are supported by a study from last year that assessed a selection of the biodigesters installed with support from INCREASE.[45] The study found that 46% of the biodigesters visited (17 out of 37) were not in use. [46] The study also pointed to an inappropriate registration and verification of the installed biodigesters: out of the more than 400 biodigesters installed under INCREASE at that time, only 160 could be located in the field. The recently completed Biofertiliser Market Assessment Report[47] also found very low functionality of the installed biodigesters: out of 69 visited households owning biodigesters, 57% were found to be not functional. [48]

It is important to get a proper understanding of the reasons for dysfunctionality/non-use of the biodigesters in order to solve the problems. The challenges are reported to be multiple and seem to include a combination of quality, technical, selection and miscommunication issues:

- The biodigester installations were not properly finished or finished with the BCE leaving the site without giving any or insufficient training/instructions (quality/capacity issue).
- Challenges with follow-up and after-sale services even in cases where warrantee certificates could be presented by the farmers.
- Few examples where agricultural extension staff or fellow farmers had been consulted to solve technical problems (e.g. in feeding the biodigester).
- The biodigesters were built at households without or too few cattle or access to dung (selection issue).
- The SNV subsidy to biodigesters has not reflected general price increases in the market (quality issue).

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[44] This also related to biodigesters installed during 2019 by the E4A Project.
[45] INCREASE biodigester evaluation report, May 2021, Jan Lahm.
[46] The main reasons provided for this were; i) *the digester wasn't finished*. This varied between construction was just started, a pit was dug, to stoves that were not delivered and installed; ii) *the digester was finished but the BCE left the site without giving any training or instructions to the owners on how to put the digester in use*, and; iii) *digesters were built at households without cattle or access to dung*.
[47] Biofertiliser Market Assessment Report, June, 2022, AgriEn Network.
[48] The vast majority of these households indicated that their biodigesters were non-functional due to technical issues which would include a part missing, or not working and needing repair. Others indicated that they did not have enough dung to feed the biodigesters while a very few indicated that they didn't know how to use their biodigesters, hence not using the biodigester.

- No or limited incentive from BCEs to reach remote/hard to reach areas (lack of transportation costs covered).
- Absence of a simple biodigester user manual/leaflet for the farmers.
- Too long gap (up to six months) between demand/registration of farmers to start of biodigester installation starts.
- Delays in payment of instalments and functionality payments to the BCEs.

During the field visit, the MTE team met with several BCEs and masons that have been supported by INCREASE (and most of them also from the E4A Project).[49] From these consultations, the MTE found that **the level of capacity, responsibility and incentive of the BCEs/masons varied considerably.** This is supported by a recent internal assessment done by INCREASE which concluded that only 40% (12 out of 28) BCEs were still active and capable of installing quality biodigesters.[50] In some cases it has been possible for BCEs, through the support received from E4A and INCREASE, to develop into an SME capable of competing in public tendering processes (e.g. in Kalomo). In other cases, the BCEs have remained as a business of a single person with limited capability and incentive to follow-up and reach out to further support the biodigester market development. Adjustments in the biodigester installation payment model have recently been introduced by the SNV project team to address issues that led to compromised quality of BCE performance.[51]

The relationship and proximity between the farmer and the BCE/mason very much seem to define the performance level of the biodigester installation and its use. Many farmers consulted by the MTE team expressed frustration and mistrust to the BCE/mason that had installed their biodigester. The farmers often referred to difficulties in getting in touch with the BCEs/masons and make them come back and help solve functionality issues.[52] In the end, many farmers had just given up and left the biodigester unused. From the BCEs/masons perspective, they claimed to the MTE team that farmers were often reluctant/unwilling to contribute with their share of the costs for the biodigester installation and for transportation. These issues have also been addressed in the new payment model for biodigester installation where masons are no longer allowed to do the purchasing of construction materials in order to eliminate compromising of quality and quantity. In addition, targeted households now have to make an upfront payment of at least 65% for the mason labour for the works to commence.

Potentials for bio-slurry

While the use and functionality of the installed biodigesters are still far from expectations, the MTE team noted that farmers are in general well aware of the INCREASE model and the role that also bio-slurry can play here as cheaper and

[49] INCREASE took over 30 BCEs that were also supported through the E4A Project.
[50] BCE Performance Scoring Assessment (2020). INCRAESE Project (internal assessment), May 2022.
[51] Procedures and requirements for BCEs payments request and retirements. Internal SNV Memo, September 2022.
[52] A call centre has recently been established by INCREASE to help farmers making BCEs/masons fulfil their obligations.

organic fertiliser in the future. When asked for the main reason to procure a biodigester, most respondents mentioned both gas for cooking and fertiliser. However, the MTE team's field mission confirmed that still very few farmers are using this practice now, mainly due to uncertainty on how to dose the bio-slurry correctly. Sharply increasing prices on non-organic fertiliser (removal of subsidies) in Zambia is further increasing the potentials for bio-slurry as a substitute for the traditional fertiliser, including in a marketing perspective.

The Biofertiliser Market Assessment Report concluded that the market demand for fertiliser has increased over time and with the increasing soil degradation and population growth, this demand is expected to further increase. The report also concluded that due to uncoordinated efforts there is no readily available information on organic fertiliser producers, users, and distributors. In addition, currently the policy framework only considers chemical fertiliser including the Farmer Input Support Programme. Other policy and regulatory frameworks, although promoting sustainable agriculture, do not provide for the development of the organic fertiliser subsector. Thus, presently the Zambia Bureau of Standards does not have any quality standards to certify the quality of organic fertiliser in the country. Consequently, currently, the organic fertiliser subsector has low barriers of entry since for locally manufactured organic fertilisers there are very minimal restrictions to produce, distribute and market, making it an opportune time to scale any organic fertiliser. The report concludes that there is a sustainable market for organic fertiliser in Zambia, including specifically bio-slurry fertiliser, with 94% of the consulted farmers responding that they would be willing to buy it if readily available. In addition, the fact that smallholder farmers are familiar with compost and animal manure and their use, means that the bio-slurry is not an overly strange or new farm input to them and many of them were producing their crops 100% organic only a decade or so ago.

It is noted that the bio-slurry quantities presently being produced are not sufficient to sustain a business. Thus, there is a need to first promote increased utilisation (scaling!) of biodigesters to meet the bio-slurry demand consistently in order to become able to compete with other organic fertilisers on the market. Farmers consulted by the MTE team indicated that the major challenge for them to produce bio-slurry fertiliser was lack of awareness, unknown nutrient content and market access.

Linkage between the macro and micro level

So far, it has not been possible by INCREASE to establish a strong linkage between the macro (policy) and micro (farmer) level in support of market and incentive development for biogas and biodigesters. In May 2021, a sub-committee on bioenergy was convened under the Sida-funded Off-grid Taskforce Initiative[53] as one of four sub-committees.[54] SNV has been chairing the bioenergy sub-committee

[53] The taskforce is a government-led platform which brings together representatives of various ministries, statutory bodies, the private sector and cooperating partners to coordinate initiatives and activities in the off-grid space. It is a multi-stakeholder platform that identifies and addresses off-grid market barriers with a view to improving conditions for investment in the Zambian off-grid space.

[54] The other three are related to mini-grids, consumer affordability and physical initiatives.

which also include participation of ministries (mainly the Ministry of Energy) as well as various cooperation partners and private sector players. The sub-committee was established based on the rationale that bioenergy constitutes 80% of the national energy profile in Zambia and relates to the vast majority of the population in rural areas. At the same time, the sub-committee supports the Government's stated ambition to reduce the use of charcoal with 40% by 2030[55] and the implementation of the 2019 National Energy Policy's (NEP) objective to provide universal access to clean, reliable, and affordable energy at the lowest total economic, financial, social, and environmental cost by 2030. Still however, a ToR is to be developed for the sub-committee to define its work and support in moving the bioenergy agenda forward. In this process, it will also be important to define a strong lead and link up to the Energy Sector Advisory Group.

Up to now, the sub-committee on bioenergy has suffered from shortage of funding. Only a few meetings have been organised and progress has been slow. According to interviews, the work of the sub-committee has not been a priority among donors which have devoted more attention and resources to the other three sub-committees. Based on interviews, the bioenergy sector has suffered from a lack of data (e.g. number of installations, economic benefits etc.) that could help to present a stronger case at national level. The main outcome of the sub-committees work so far is the recently developed Biogas Diagnostic Study[56] which looked into the investment barriers currently holding back the bioenergy sector (biomass) for cooking and industrial use. The study underlines that biogas is a sector with great potential (less than 5,000 plants are built amongst over 1 million households engaged in animal raising). The study concludes that the bioenergy market in Zambia is nascent, both for cooking and productive use. A range of activities and projects take place, but few have received scale. There is a general lack of information and coordination in the sector which makes it difficult to track progress and to build on on-going initiatives.

Other renewable energy sources

While other renewable energy sources such as solar panels have been recognised for its potential, INCREASE has not succeeded in establishing financing mechanisms that allow for follower farmers to access the technology. The MTE Team noted that the project is now showcasing solar panels for irrigation among lead farmers. While the lead farmers appreciate this support as it reduces their (significantly increased) costs for operation of diesel generators, the solar panels in some cases made a too low pressure and were not functioning as expected. For instance, one lead farmer consulted during the field visit to North Western Province had just got a solar-driven irrigation system installed but the pump was only operating at a very low intensity rate. Interviews also indicated that there had been instances where the project had returned procured materials causing even further delays and concerns about the quality.

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[55] Zambia's Seventh National Development Plan, 2017-2021.

[56] Biogas Diagnostic Study (2022), Partners for Innovation. SNV engaged the EU-funded Investment Climate Reform Facility, which SNV is implementing, to provide Technical Assistance to the Ministry of Energy to undertake the study. To this end, SNV commissioned Partners for Innovation to run the study in close collaboration with the Off-grid Taskforce. October 2022.

While the solar panels represent an attractive solution for irrigation, cooling and drying facilities from an environmental perspective, it was not prioritised during the first part of the project period to introduce financial models to support more farmers getting access to solar driven technologies. This may be seen as a missed opportunity. Only from mid-2022, a solar stream of the renewable energy component has taken off and it has taken a while to gather steam. Solar driers are now prioritised under the project supported horticulture value chain interventions in Q4 2022 and in 2023 as a shared infrastructure. The MTE team noted that the MCC in Munjile had purchased a solar pump on their own to generate energy, supplementing energy sources from the national power grid, for their milk chilling system. This indicates that the interest for uptake of these technologies is indeed there, but financing often becomes a challenge.

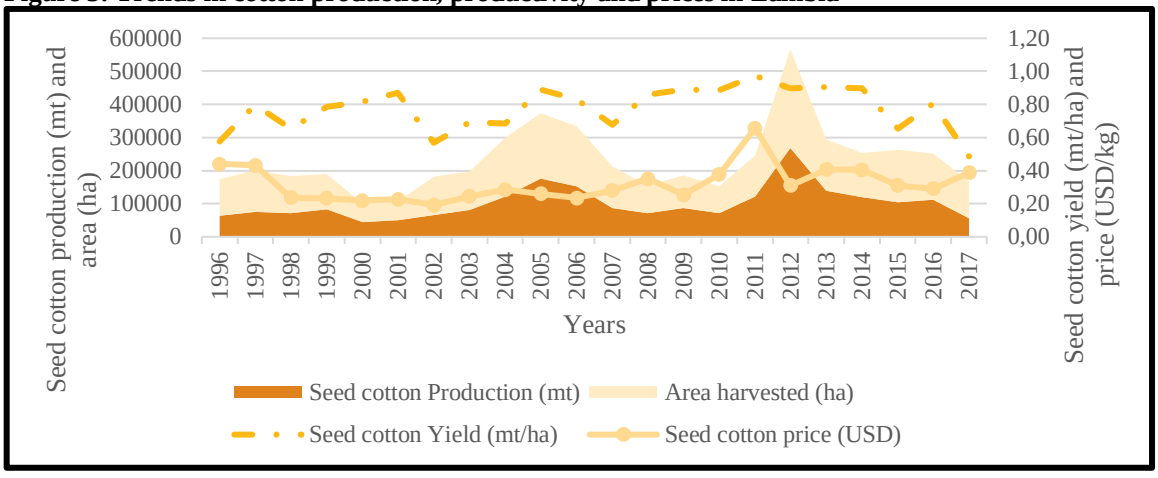
4.3 MARKETS FOR AGRICULTURAL PRODUCTS

Cotton value chain

In the case of cotton, ginning companies including Alliance Ginneries are the only permitted by law (the Cotton Act) to run outgrower schemes to provide inputs to farmers and buy the cotton that the farmers produce. However, a large proportion of farmers interacted with during the MTE field mission expressed dissatisfaction that these outgrower companies arbitrarily determine the input costs which are deducted from the sales proceeds as well as from the selling price of the cotton. Quite often the prices at which the outgrower companies buy cotton from farmers is linked to international lint prices as well as the USD to ZMW exchange rate and the fluctuations in the prices offered to the farmers have over the years led to fluctuations in the total cotton cultivated area as well as national production (Figure 3). These factors have worked against the profitability of cotton production among smallholder farmers in Zambia. This is exacerbated by the fact that outgrower schemes just buy the lint and not the seed embedded into the lint though they profitably use this seed in oil processing cotton seed cake for stock feed.

At the same time, **analysis by the MTE team based on field data shows that cotton profitability can increase significantly with increases in yield facilitated by early planting together with application of good agricultural practices (gross margins increase by about 224%).**

Figure 3: Trends in cotton production, productivity and prices in Zambia



Source: Central Statistical Office/Cotton Board of Zambia, various years

Alliance Ginneries has started promoting organic cotton in Rufunsa district of Lusaka Province under INCREASE. Interviews with Alliance Ginneries staff indicated that the yield levels of this cotton are not, so far, different from the ordinary cotton, and that this cotton was purchased this year at the same price[57] as the ordinary cotton. Alliance Ginneries staff alluded to the fact that farmers are still interested in producing organic cotton mostly due to the reduced cost of pesticides. SNV staff later clarified that what Alliance Ginneries wanted the project to provide was a study on organic variety and to run a pilot of the same for comparison. The insights on this comparison were adversely affected by the rainfall failure in 2021 when Alliance Ginneries realised only 5,000MT from its farmers instead of the anticipated 50,000MT. This reflected in their hesitation to make further investment in cotton beyond the farmer extension services in 2022.

Dairy value chain

Production of dairy products is essential to Zambia's economic and sustainable growth. In particular, for rural households who significantly rely on livestock production, it helps to ensure food security, nutrition, and poverty alleviation. Through advantageous multiplier effects and effective utilisation of the forward and backward links between the agricultural and manufacturing sectors, the dairy industry contributes significantly to the Zambian economy. It is dynamic and affects a wide range of people, from farmers to milk vendors, processors, and consumers, as well as having a significant economic and nutritional impact. Through participation in direct farm production and along the full value chain, from upstream actors (providers of inputs and services) to downstream actors (marketers of finished goods), the sector can play a significant role in job generation for rural areas.

The dairy subsector is separated into two major categories: informal and formal sectors. The informal sector accounts for over 80% of the milk produced and comprises over 300,000 traditional cattle-owning households who equally produce milk but have limited access to modern milk marketing channels. Out of these 80% of milk produced by smallholder farmers, about 90% is traded informally. On the other hand, the formal sector is made up of 3,000 to 4,000 smallholders, emergent and commercial farmers who have access to the formal markets. The smallholder farmers operating in the formal sector are the ones organised in dairy cooperatives most of which operate an MCC. These are some of the smallholder farmers that INCREASE is supporting through the dairy cooperatives.

Large milk off-takers regularly collect milk from the MCCs/dairy cooperatives and pay them on a monthly basis. However, the MTE team's field visit revealed that **due to the increased milk production during rainy season, off-takers often have their tankers full by the time they reach MCCs located further from Lusaka thereby disrupting these farmers' milk marketing endeavours.** This was the case in both Zimba and Kalomo where smallholder farmers were discouraged to bring their milk to the MCC/cooperatives during rainy season because Lactalis would often not be able to take the milk as their tanks had already been filled. In these cases, the MCCs/cooperatives

[57] Any organic crop is supposed to attract a premium price.

would have to return the milk to the farmers since they do not have chillers and therefore need to deliver their milk to urban centres immediately after milking. Since the milk supply is much higher than the demand in the rainy season, the milk is often wasted. On the other hand, during dry seasons, the MCCs/cooperatives are struggling to gather the required minimum of 300 litres for Lactalis to pick it up as it is easier for the smallholder farmers to sell their milk at the local market. Some smallholders whose farms are located near dairy processing plants like in Kabwe are able to deliver their milk individually directly to these processing plants.

The other milk marketing issue that smallholder dairy farmers face is reportedly low and highly volatile prices. Most milk from MCCs is of lower grade hence attracting lower prices due to in most cases lower levels of hygiene. A recent report[58] found that milk prices fluctuated greatly towards the end of 2021 into 2022, and there was a spike in producer prices (from ZMW 6 to ZMW 12) which contributed to a positive supply response. Some processors reduced milk purchases from smallholders claiming to lose competitiveness as this translated into too high prices of dairy products in the retail markets, above the affordability of the majority of the Zambian consumers. Therefore, the high farm gate prices could not be sustained. The prevailing supply and demand conditions – such as strengthening of Zambian currency making imports more affordable and consumer resistance to pricing such that the reduced volumes and margins could not cover off-taker's overhead costs and low cost of milk powder used as a substitute making pure fresh milk uncompetitive - are some reasons put forth to justify the reduction of milk farm gate prices. Additionally, arguments for reduction are tied to the rebalancing of the dairy value chain as well as achieving sustained growth of the dairy sector and stimulating consumption of dairy products. To this end, the basic prices were reduced from as high as ZMW12 to ZMW6.50 for grade 'A' milk as of April 2022. This has however now stabilised to around ZMW 8.

Horticulture value chain

The thrust of INCREASE interventions in North Western Province is to increase the production and marketing of horticultural produce in general and the high value vegetables meant for high end markets. Analysis of the nation-wide representative Rural Agricultural Livelihoods Survey (RALS) of 2019 shows that smallholder farmers in the province produced and sold mostly cabbage, tomato, Chinese cabbage, pineapples, and rape which together accounted for 83% and 91% of the provincial production and sales respectively. Pineapples were the only fruit that was produced and sold in significant quantities. Horticultural production and marketing is geographically concentrated within the districts Mwinilunga, Solwezi, and Ikelenge[59] accounting for 78% and 83% of the provincial production and sales respectively. On average, 78% of the horticultural produce harvested was sold within the communities where the farmers

[58] Lubungu, M. and K. Mujeyi, (2022). Strengthening Member State Capacity to Develop Regional Agricultural Value Chains to Enhance Diversification and Intra-African Trade: The Case of Zambia and Zimbabwe: Assessment study report on regional maize and dairy value chains. COMESA/UNECA (forthcoming).

[59] Out of the total seven districts at that time (Kalumbila was still part of Solwezi).

live, accounting for 72% of the sales. Sales within the farmers' districts of residence accounted for 26% while those outside the district but within the province accounted for 1%.

Linkages to markets play an important role in the development of smallholder horticulture. Although smallholders who produce and sell horticultural produce are more likely to move out of poverty than cereal growers, only about 25% of smallholder farmers in Zambia are able to sell horticultural produce. This is because the share of high-end markets as of 2009 was only 5% with the balance being catered for by the traditional open air markets with poor investment in both hard and soft market infrastructure which most smallholder farmers find difficult to navigate. At the time of the MTE mission, most INCREASE beneficiary farmers had not yet been linked to the high-end markets as most of them expect. However, looking at the numbers being recruited and trained, it is most likely that the production will not allow all to enter the high-end markets. The project typically targets tier 1 farmers who have no capability for engaging premium and high-end markets unless where they are working with an aggregator. The main market target for the INCREASE farmers is thus the local market outlets and farm gate buyers then they can slowly and gradually be organised for the next market levels. However, the progressive farmers within the project who have been in the craft for long are able to engage with more complex markets and they are also an opportunity for the new entrants to sell to them when aggregating for their own supply.

The traditional open-air markets, especially at wholesale level, will still play a significant role in linking these farmers to markets. The North Western Province Horticultural Association could have been looking at improving the traditional markets, through facilitating investments in hard and soft market infrastructure, in addition to trying to link smallholder farmers to high-end market in order for the horticultural development to be sustainable. While such investments may be seen as a long-term intervention, in the short- and medium-term smallholders could be supported to aggregate their produce and other capable value chain actors distribute the produce to other parts of the province, and even in neighbouring countries such as Angola and the DRC. That some high-end markets in the province import their horticultural produce from outside the province such as Lusaka and the Copperbelt only limits the space to be filled by smallholder farmers within the province.

The MTE observed an inherent risk that short-term production increases among better-off smallholding farmers supported through INCREASE may squeeze out poorer smallholders from the local open markets, as long as alternative market opportunities are not provided. The MTE came across, especially in Kalumbila, several examples of supported farmers who had needed to dump their increased produce at the local open market to a much lower price, because they could not sell it to other market actors as they had expected. This caused demotivation and frustration among the farmers and a questioning among the poorer smallholders of their benefiting from the project interventions.

Biodigesters

The biodigester subsidy model applied so far by the project runs several risks and impede development of a real market for demand and supply of biodigesters in

Zambia. Currently, SNV has become synonymous with provision of biodigesters in Zambia and many farmers believe that SNV is the company manufacturing and selling the biodigesters which goes strongly against the intention to pursue a market-based approach. From the MTE team's visit to the field, it was noted that the INCREASE project in many cases were subsidising farmers who could easily have paid for the biodigester on their own. In fact, in some cases these farmers had already started on their own while waiting for the subsidy to arrive. Consultations with BCEs and farmers confirmed a widespread perception among farmers that it is SNV that is"selling" biodigesters in the area and that farmers are expecting to receive a subsidy in order to buy a biodigester. In Central Province, it was the perception that up to 60% of the farmers would be capable of constructing biodigesters without subsidy as long as they knew there would be no subsidy available. Some BCEs have successfully worked with extension workers and farmer cooperatives and have been able to construct biodigesters outside project facilitation.

Nevertheless, the MTE team only came across very few cases where farmers had requested a BCE to construct a biodigester and in most of these cases these requests have also ended up being subsidised by the project, as the BCEs have informed the farmers of this possibility. Thus, more sensitisation of farmers is needed to encourage those that can afford the technology to have the digesters constructed even without subsidies from the project but as long as there is a subsidy provided farmers are reluctant to construct with their own funds. The MTE team also came across cases where the INCREASE project had subsidised installation of two biodigesters within the same household, and in one case even three biodigesters. These observations question the additionality of the biodigester subsidy. From the MTE teams visit to North Western Province, it was noted that the project had promoted installation of biodigesters to lead farmers in areas with few cattle, long transport distances to masons, large dispersion of farmers etc. The SNV project team has since revised their mapping of where additional units will be installed and North Western Province is no longer part of these areas. The bulk is in Southern, then Lusaka/Central and Eastern Province. In addition, the project is now in the process of introducing a cluster model to better facilitate economies of scale, lower the cost of operations and making after-sale services more effective and efficient, including in remote and less populated areas. This means that BCEs must aggregate a minimum of 10 clients in a new area before commencing. [60]

To develop a sustainable market for biodigesters in Zambia, project subsidies will need to be phased out eventually. To enable such a transition, access to alternative sources of finance like carbon financing will be necessary to enable market expansion and help to scale operations of successful and professional BCEs. Similarly, end user finance options also need to be promoted. While a subsidy/results-based financing approach can be useful/necessary to enable and support market development, it may need to become further disaggregated to ensure appropriate incentive structures, e.g. to

[60] Some of these thoughts were raised also in the report on Lessons Learned from the Energy for Agriculture (September 2021, SNV) report but have not been properly followed up by INCREASE before now.

compensate for high transport cost and time to reach more remote areas. Initiatives to promote market development for bio-slurry could also be considered as part of such incentive package. The MTE team has taken note that the INCREASE Project is now in the process of looking further into these issues. A shift towards market driven digester development will need to be tied to availability of alternative technologies/models like prefabs which are plug and pay and costs much less in addition to ability to relocate.

4.4 GENDER EQUALITY AND WOMEN'S EMPOWERMENT

The project document and progress reports clearly express an intention to ensure gender equality in INCREASE and mainstream gender in the implementation. SNV's Balancing Benefits approach is referred to in e.g. the Project Document and the OYE Market Scan which is the project's gender analysis.[61] The Project Document indicates that the Balancing Benefits approach is a "*gender transformative approach applied through four solutions, integrating food, nutrition, energy and climate resilience: household dialogues, growing women entrepreneurs, women in leadership and responsive market systems.*"[62] The approach aims to address the inequitable gender norms and unequal access to productive resources, skills and market opportunities. Thus, SNV's approach to gender equality focuses on both the *household level*, through dialogues and women's economic empowerment through entrepreneurship and skills, and at the *community/market level* where women in leadership is promoted and a more responsive market is advocated. To what extent these aspects have been addressed in INCREASE will be assessed in this section.

While the project proposal clearly expresses an intention to mainstream gender into the project, organisational decisions has not been convincing in this regard and has not responded to recommendations in the internal SNV MTR. SNV's recruitment of a Gender Specialist was delayed, and the Gender and Social Inclusion Officer (GESI) was only engaged in October 2021. His first task was to assess the performance of INCREASE partners in terms of mainstreaming gender.[63] As reflected in the Annual Report from 2021, few partners were assessed to take gender into consideration and not all staff members were fully familiar with gender mainstreaming (also confirmed by interviews). Therefore, a gender mainstreaming training was rolled out with SNV staff and a few partners (mainly in the dairy value chain) to increase their awareness and focus on ensuring gender and social inclusion on the implementation. Training reports with pre- and post-evaluations of participants' knowledge of gender indicate a great improvement in understanding gender equality. While this has

[61] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020.
[62] SNV (2020), Inception report submitted to Sida, INCREASE, September 2020.
[63] SNV (2022), Increasing Climate Resilience in Energy & Agriculture Systems and Entrepreneurship Annual Report 2021.

enhanced the work of staff members working on OYE and INCREASE who were invited for the training, not all project staff attended due to budget constraints.

As a follow-up to the training, it was decided that all project managers should revisit their work plans to see how gender equality could become better integrated in the activities. The planning for 2023 will give more clarity as to what extent SNV staff have been able to do so. The GESI and the M&E officer have also been defining and drafting indicators for SNV's work with GESI, but these are yet to be further developed based on feedback from management, headquarter etc. before they will actually be finalised. A first observation from the MTE team is that this work seems delinked from the results framework for INCREASE, thus it is difficult to see how the indicators will inform the project. While GESI indicators should not be linked only to INCREASE but ideally more holistically to SNV's work it should at least to some extent reflect targets of INCREASE. For instance, although a focus on reduced child marriage, domestic violence and greater shared workload in the household is appreciated it will be difficult to see how INCREASE and SNV as such is likely to contribute to these changes without having it as a specific focus. Instead, it would be more realistic to measure how women's workload has decreased by the introduction of biogas or to what extent women take up more leadership positions in cooperatives and MCCs.

The Internal SNV MTR recommended that INCREASE should focus on the Balancing Benefits instead of complicating matters by introducing the GESI approach at this stage of project implementation. Thus, it was agreed that focus should be on gender mainstreaming without focusing on social inclusion in its broader terms. Nevertheless, SNV hired a GESI expert, conducted training in GESI and argues for a GESI approach in the annual report.[64] While the GESI approach and the ambitions to also pay intention to inclusion is appreciative, it seems to have been too ambitious to also integrate considerations of e.g. people living with a disability at this stage of the project implementation given the serious delays in implementation and an already compromised effort to integrate gender.

While targets of 30% women participation are largely being achieved, the training offered by INCREASE partners is not taking gender considerations sufficiently into account and barriers for women's participation are not sufficiently addressed by the project. Representation of men and women in the training sessions has been reported to be reasonably balanced, or at least complying with the 30% quota of women (see section 5.1), although the representation of lead farmers is less than 30%. There is however little focus on gender equality in the actual training. The manuals do not contain any reflections on gender and youth considerations and specific suggestions for facilitating the training sessions to ensure non-discrimination and full participation of all farmers are also absent. Thus, the training sessions rely on implementing partners and SNV staff which in some cases have limited knowledge of gender dimensions, as mentioned above. This challenge has been addressed with the gender training of SNV

[64] SNV (2022), Increasing Climate Resilience in Energy & Agriculture Systems and Entrepreneurship Annual Report 2021.

staff and few partners, and although this is a step in the right direction, it is unlikely that one training will be sufficient to fully ensure mainstreaming of gender and there is a need to further develop tools to support staff and implementing partners. The field visit did not reveal any examples of discrimination in the training sessions but the lack of at least some awareness of gender dimensions in training situations is likely to skew attention towards male farmers in e.g. male dominated value chains such as cotton and dairy.

While the ToC reflects an assumption that men and women have equal opportunity to participate in project activities (Annex 5), the MTE team identified a number of obstacles for women's equal participation in the project. These include in general more cumbersome processes for reaching female farmers since communication most often has to go through husbands first (to comply with norms). Thus, when meetings are called upon late (which is often the case), men are more likely to show up than women. Other challenges for women's participation included: i) lack of permission from husbands; ii) cultural barriers such as lack of acceptance of women as farmers, consideration of female farmers as unclean during their monthly periods; iii) lack of time to participate in trainings due to household chores and attendance of children; iv) lack of access to land and in particularly lack of ownership of land; and v) for cash crops like cotton, where men are highly involved, women will often be squeezed out.

Sensitisation could address several of these barriers such as husbands not permitting their wives' participation in the trainings but according to stakeholder consultations no such sensitisations have been done by the project to enhance women's participation in training. Prior to the training in the horticulture value chain, announcements were made in churches to ensure the message reached a broad crowd and also extension officers were involved in delivering the message of the upcoming trainings to the farmers. According to the GESI Adviser, it has been piloted to do gender dialogues with farmers groups based on Gender Facilitation Cards that are easy to use and gets the dialogue going without much facilitation so can be applied by staff members without extensive gender knowledge. Thus, there seems to be potential for further exploring how to use these tools to enhance dialogue on gender issues in MCCs, cooperatives, clubs and in the communities.

Time is a key concern for women to participate in the training sessions. The horticulture training provided by Impuls Africa has been full day sessions, and sometimes facilities are located rather distanced from the households. This means that women cannot attend to their children when they return home from school. While this is a key challenge, female farmers did not consider it a solution to split the training into shorter sessions as they would then have to pay transportation or walk to the venue twice. Transportation costs have been considered a key barrier for both male and female participants but since females often depend on their husbands for funds, they are even more challenged by such costs, especially if their husbands do not see the benefit of them participating, they are likely excluded from the training. While efforts have been done to involve participants in organising, it has still been difficult to fully prevent these obstacles.

Lack of access to land and ownership of land is a key barrier for women's empowerment and there were examples of women being removed from land after

e.g. preparing the land for cultivation or even starting to produce crops. The Market Scan[65] found that particularly in rural areas female youths were excluded from *ownership* of productive resources such as land and cattle compared to their male counterparts. This was confirmed by a number of stakeholders and farmers and in particular in Southern Province lack of access to land is a key barrier for both men and women but more so for women. The Outcome Harvesting Workshop in Choma revealed that there were several examples of women who were given access/permission to cultivate land by e.g. traditional leaders or family members but when the land had been cleared or started producing well, they were no longer allowed to continue the work. Women often did not have paper on their access to the land and thus could do nothing when authorisation was withdrawn. While this is a complicated matter and not the core focus of INCREASE, there is still scope to strengthen collaboration with other Sida partners on land rights in order to ensure that men and women are linked to organisations who can support a proper registration of land, thus supporting farmers to prevent such cases moving forward.

A link between lack of access to and ownership of assets and women's *decision making* on production and investments was found in the Market Scan. At the same time females were not allowed to do business that involved travelling and if they earned money, their husbands would often control its use.[66] The field visit confirmed that men traditionally decide on the use of income, but there were also examples of women being taken more on board in the decision making. For instance, male cotton farmers in Mazabuka shared that they would sit down and budget expenses and do plans for investments with their wives and since the sale of cotton is conducted publicly wives are able to see how much income the farmers are generating (women were however not present to confirm this statement).

In the dairy value chain, men would often be in charge of bringing milk to the MCC or market (see case box on Munjile dairy cooperative and MCC below) and thus receive the income. While some men will share the money with their wives, there were several examples of men keeping a share for themselves without disclosing them to the wife. In Tara Cooperative one female farmer expressed it this way: "*When women go to the market, they will call the husband to count all of the money and decide together but men will just give you something to keep without sharing the full amount"*. In terms of gardening, women were often allowed to keep the small income they could produce but again sometimes men would grab the money saying that it was produced on his land and therefore belonged to him.

[65] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020.
[66] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020.

The Munjile Dairy Cooperative and Milk Collection Centre
The MCC has a total of 500 members of which 25 are females. These are mostly female headed household. The management group is composed of 10 members of which six are men and four are women. The Chair and Vice-Chair are both men while the treasurer and secretary are women. Munjile MCC farmers shared how men and women have different roles in the milk production. While women take part in cleaning utilities for milking and drawing water for the cattle, it is often the responsibility of men and boys to milk the cows and take the milk to the MCC. Besides the support from SNV, the MCC has also received support from World Vision who provided a sunflower oil extractor, a hammermill, a generator for water and an ablution block while the World Bank has provided a total of 80 cows for those MCC members who were able to match grants.

Leadership in the communities

The women-led enterprises serve as an inspiration of female leadership to other community-based groups, organisations and associations but limited effort has been conducted to mainstream gender into management of MCCs, cooperatives and associations. The women-led enterprises such as the DWAs in Monze and Katete and the women's groups in Zimba (Kolima, Simwami and Zebra groups), provide good examples of how INCREASE has supported women leadership in the communities. The groups are clearly progressing and the unity for development in for instance the Zimba groups are quite remarkable. They are hosting the demo plots but are all struggling with access to water (two of the groups have been promised boreholes but they have not yet been constructed). With the support by also youth males (who are receiving a small salary) they have managed to build a fence (materials are provided by INCREASE) to keep out livestock from the plots and continuing to water the trees although this requires quite an effort (some have to walk up to 10 km to fetch water). The groups have also developed business plans and the leaders and members explained how trained representatives from these groups had ensured to train fellow female farmers to ensure knowledge sharing. The case box provides another example from a women-led enterprise in Choma.

Project data on MCC members and the distribution of men and women as both regular members and in management positions is subject to some uncertainty and as reflected in Table 7 data is not available for all the MCCs and not always disaggregated by gender.[67] Nevertheless, in the MCCs SNV has supported during 2022 women represent 31% of all members and 32% of the MCC management members are women. Considering the newly identified MCCs to be supported during 2023, it should be noticed that the gender balance appears to be better. Here, women represent 50% of the management members while regular female members represent 33%.[68] According to management of the visited MCCs, SNV has not insisted on gender equality when selecting farmers for training nor advocated for balanced management positions.

[67] Interviews with members, SNV data and prior reporting does not fully correspond.

[68] Out of the 10 MCCs that have been identified for support in 2023, data on management composition is available for six MCCs.

In Mbabala, the MCC had selected an equal number of men and women and youth for the training, however that was not based on a request from SNV but rather due to the MCCs own established principles. This aspect was fully explored with all the visited MCCs and none of them mentioned SNV as playing a role in ensuring equal representation in management and membership division between men and women. SNV staff also confirmed that focus has been more on identifying dairy smallholder farmers than on ensuring gender equality. No quotes on training participants for instance have been established in these activities. The engagement of a GESI officer is a clear advantage and provides good opportunities to address some of these weaknesses and good progress has been done but more is needed to fully mainstream gender.

The Musanza Agro Forestry Association, Choma

Given the high demand for seedlings, INCREASE has trained women-led enterprises in tree nursery growing. Establishing nursery growers was already piloted in the SILMs project in Eastern Province and has under INCREASE been expanded also to Southern Province. 64 participants (28 male and 36 females) have been trained in production of fruit and fertiliser tree seedlings in the Association. Some of the women groups had (with support from FAO in 2019) acquired access to government land and FAO also constructed a borehole for the groups. In 2022, 28 members (maximum capacity) from different groups were growing seedlings with SNV being their major client (estimated to constitute 75% of the market). Two women-led enterprises had been trained in business management and coached to develop business plans and seven youth from the Oasis group had been trained under the OYE component and were now doing different small businesses such as providing the plastics for the seedlings for the nursery growers etc.

The women and youth are experiencing positive changes in terms of income, nutrition and empowerment but are challenged by men who now wants to enter the business seeing it is profitable. "*We have started a war. Men are challenging us. Men wants to come in now, they see our progress. Where men are there are fights, women just work."* The women groups are now well underway to register a Forestry Association to unite all tree growers under one organisation. The Constitution of the Association clearly specifies who can obtain membership, fees, set out rules for elections of leadership and provides a limitation for 2-years in a management position. It also stipulates non-discrimination based on e.g. religion, sex, gender identity, pregnancy, disability, age, sexual orientation etc. Lastly, it requires that all investments of the association should be environmentally friendly.

5 Project Management and Efficiency

5.1 HUMAN RESOURCES AND ORGANISATION

INCREASE has been challenged by a number of vacant staff positions for long periods. Indications are that fee levels are not competitive in view of the workload and coverage. At the same time, the complexity of the project has made it difficult to identify staff members with required skills within both energy and agriculture. Field officers have to cover a large geographical area. For instance, the Renewable Energy Officer covers the entire Southern Province but also energy aspects in the other provinces. Likewise, the Field Coordinator in Kabwe covers both Central and North Western Provinces and since he is also highly experienced with the dairy value chain he also covers dairy activities in other provinces. The wide geographical project coverage requires relatively many field days for the staff, resulting in long working days and frequent travel. There is a perception among many staff members that their remuneration is not fully compensating this. In addition, recruitment of staff members with the right competences has been a challenge throughout the project leaving positions vacant for long time periods. One example is the GESI Officer who was only recruited halfway into the implementation. The field coordinator for Kabwe was also vacant until August 2021 and unfortunately the staff member passed away in February 2022. While some staff members have contracts that follow the project timespan others have short term contracts (typically for one year) which have to be renewed. This causes uncertainty for the staff and make them look for other opportunities.

The considerably delays in the first years of implementation called for some changes in project management and in 2021 a deputy project manager was recruited. This allowed for more efficient project implementation from the fourth quarter of 2021 where a lot of activities picked up. The deputy manager was also able to take over responsibility for some of the project implementation in North Western Province where the passing of the field coordinator left a gap to be filled in the first and second quarter of 2022. It was also during this period the transition process of project managers was started and the deputy manager was essential to bridge gaps. Since the project manager transition process in practice was stretched out for close to six months, the role of the deputy manager has been crucial in this period to get the implementation process on track.

In early 2022, the entire renewable energy team was relieved from their duties due to perceived misconduct.[69] Interviews with current and previous SNV project staff indicate that INCREASE from the design phase had a perceived bias towards CSA

[69] SNV (2021), INCREASE, Annual Report 2021.

from the SILMS project which the energy team from E4A felt frustrated about as they felt they had to "fight for their territory". This was mainly a result of personality issues and not structural issues since the budget allocation between CSA and renewable energy was and remain almost 50/50. Thus, the two teams from the previous projects (SILMS and E4A) continued to work on their own topic in INCREASE with little integration and synergy. Project management did not succeed in making a coherent and united team out of the two groups and finally the renewable energy team was relieved from their duties. New project management and staff members are now in place and the atmosphere and working environment seem to be improving.

The set-up with a project advisory committee has in practice not been working well. The Project Document outlined intentions to establish a project advisory committee, consisting of key project stakeholders, to monitor project progress and provide ongoing advice. However, the design for the committee saw a committee of 15 members comprised of departmental directors and CEOs, people that are far from the project and hardly have time for convened meetings. Thus, while the advisory group was established with Zambia Agricultural Research Institute (ZARI) as chair, meetings have been very few, and the committee has not functioned in practice and played the foreseen role.

5.2 PROCUREMENT

There have been significant delays with SNV procurement. Implementing partners in all areas have struggled to comply with agreed deadlines and be accountable to the farmers due to the delays. However, improvements in procurement processes have been noticed during the last six months. Implementing partners have experienced significant delays with procurement processes and payment schedules and these delays were also noted in the MTE of OYE and several of SNV's own reports.[70] For instance, payments for Agricultural Officers' transportation in order to provide coaching for the women-led enterprises were not released on time and therefore the officers could not travel as intended.[71] While this could also indicate a low level of engagement from the officers' side, it has been a challenge that such agreements were not complied with by SNV in due time. Impuls Africa has also experienced delays from SNV in terms of procurement of inputs and materials. As mentioned above, the horticulture value chain has been delayed from the outset with challenges of properly engaging commercial partners, and then later the approach was changed to focus on lead farmers. Adding to this, SNV has been delayed in procurement processes and e.g., procuring of irrigations systems were quite delayed leading to frustrations. As also mentioned above there have been challenges with the solar driven irrigation systems in several installations which could indicate quality challenges in some procured materials.

[70] Orange & teal (2022), Mid-term evaluation of the Scaling Up Youth Employment in Agriculture Initiative OYE+, Zambia and Zimbabwe, Final report, 15 January; SNV (2021), Internal Mid-Term Review Report on INCREASE, Zambia – final, 16 December 2021.

[71] Swalisano (2022), Promoting Climate Resilience for Women Entrepreneurships, Mid-Coaching Report, for the period of April 2022 to August 2022.

Interviews with SNV staff and implementing partners indicate that progress has been made during the last six months on solving these procurement challenges. One concrete initiative has been to share the project budget with staff and delegate responsibility for specific budget lines to staff members. There have also been attempts to do procurement through an online system but this has not been fully successful. Interviews with stakeholders indicate that the quality of procured items has also improved over time.

5.3 COMMUNICATION AND INFORMATION

Roles and responsibilities of different stakeholders are not always clearly communicated. Stakeholder interviews and FGDs revealed that the communication from SNV and partners is not fully streamlined which confuses lead farmers, extension officers and follower farmers in terms of what they can expect from the project. While it is clear that lead farmers, in for instance horticulture, receive the full package with solar irrigation pumps, seeds and other inputs, trees and seedlings for agroforestry, materials for fencing the plot etc., it has not been clearly communicated what and when follower farmers will receive in terms of inputs/seeds. It is clearly the ambition of Impuls Africa to provide seeds, seedlings and trees for all trained farmers, but these inputs will not be covered by SNV. Impuls Africa has instead made agreements with other partners to deliver seedlings for the agroforestry part,[72] although it is not clear what coverage the provided seeds and inputs will have. A main problem here is that the communication from SNV and Impuls Africa is not streamlined which hampers accountability towards the farmers.

Similarly, while extension officers are invited to take part in the horticulture training conducted by Impuls Africa and to take lead in selecting of farmers for the training, it is less clear which role they are supposed to play later on. At the time of the field visit there were no funds for supporting extension officers' follow-up activities such as coverage of transportation costs. According to Impuls Africa there was little hope that extension service officers would be able to sufficiently cover all project areas after end training and the idea was instead that private sector actors should be engaged in delivering services. Such arrangement was however not in place yet. Lead farmers in North Western Province were also not sure of the expectations to them. They had not had any discussions on targets for production and they only committed to train follower farmers (25 each) which they often had to surpass due to a high interest in joining training sessions from fellow farmers. In addition, lead farmers did not know when they were expected to train fellow farmers. They were informed with short notice and an overall plan was not provided to them. It is to be noted though that the horticulture value chain engagements just commenced in May 2022 and the first batch of training was only concluded in October/November/ 2022, thus some of the issues itemised here may become clearer in the next round of practical and extension service training.

[72] Impuls Africa (2022), Third Technical Report, INCREASE, June 2022.

In some MCCs, the members knew that they would be invited for trainings but not when the next training would actually take place. Whether this information is stuck with MCC management or just not shared from SNV is not fully clear. Nevertheless, it poses some challenges to farmers' ability to plan as well as to the accountability and transparency of the project. If the challenge lies with the leadership of the MCC it should be duly addressed to ensure transparency in the implementation. Partners are also not fully sure on when activities are to be implemented which challenges the implementation.

While budgets are now made available to the SNV team, it was previously a challenge that the programme manager was the only one with access to the budget. This became a bottleneck and the risk of miscommunicating to partners and farmers was high. The new project management is sharing the budget more openly with staff members who have been delegated more responsibility for the budgeted activities. This is assessed as a step in the right direction to ensure budget transparency at least within SNV project staff. Thereby, the risk of miscommunication to farmers and partners will be reduced.

5.4 M&E AND LEARNING

The M&E system has only to a limited extent been useful for assessing project progress and the data collected does not provide much insight into actual results achieved. The outputs defined in the M&E framework are rather ambitiously defined. Whereas an output is often considered as a "direct product/service stemming from the activities", the interpretation of outputs in the INCREASE M&E framework seems to be much closer related to the outcome level "a change expected to occur once the outputs have been provided/delivered".[73] For instance, the first output under Component 1 is formulated as "Demand for climate-smart services has increased", which the project can stimulate but it will largely be outside the control of the project to ensure.

As mentioned under Section 4.1 indicators are skewed towards activities that have constituted only a smaller part of the project. For example, access to finance is reflected in several of the indicators although this has only been a relatively limited part of the project interventions. On the other hand, water, nutrition and food security are key aspect of the project, however these elements are not reflected in the results framework. While changes are to be expected along the way, it is necessary to revise and reflect such changes in the ToC and also the results framework in order to be able to use these instruments for continuous learning.

The process of implementing the new M&E software LogAlto has been cumbersome and is yet to be fully operational. SNV Global decided to implement the new LogAlto software in 2022, and while most countries have implemented it, Zambia is one of the only countries who still haven't fully implemented it. Currently,

[73] Sida (2016), Kari Örtengren, A guide to Results-Based Management (RBM), efficient project planning with the aid of the Logical Framework Approach (LFA).

data is kept in an excel sheet and in the previous system AKVO and it is difficult to understand and track them. The same figures are used for different indicators which confuses the matter and in some cases it is challenging to track back from where the data is derived e.g. OYE or INCREASE.

The MTE of OYE found a number of inconsistencies in the data collected and this finding was also confirmed by the current MTE. It has been difficult to retrieve data and often the information is not disaggregated to a level where it can be used to assess for instance targeting of farmers. In addition, the data collected is mainly at activity level (e.g., number of farmers trained). As mentioned above, even though the Internal SNV MTR recommended introducing a monitoring indicator related to adoption rates, this has not been done. Thus, it is still not possible to monitor progress and needs for adjustments in the training since adoption data is not systematically collected.

The MTE of OYE also found that LSPs had only recently been trained to use the project database, and that the database seems incomplete and inaccurate, which was considered highly problematic for steering and learning purposes. This has however been addressed in Q4 of 2022 where LSPs and OYE staff has worked hard on cleaning data and implementing them into the new system based on recommendations from the MTR.

While gender equality is considered to some extent in the project, and for instance clearly reflected in the outcome areas it is not systematically mainstreamed in the project and in project deliverables such as the baseline study. Consultations with SNV staff members indicate that INCREASE was primarily formulated by staff from SNV Zambia with some support from headquarter in terms of the proposal writing. According to stakeholder interviews there has been no review of the proposal by any gender specialist from the Zambia SNV office or headquarter which might explain the non-systematic mainstreaming of gender in the project. This is against SNV's own strategic plan (2019-2022) which states that gender considerations will be integrated at the design stage to ensure proper reach of both men and women.[74] The weaknesses of the project design and lack of gender disaggregated data in the monitoring is also pointed out in the Internal SNV MTR from 2021.[75] While it is acknowledged that INCREASE is one of few SNV projects with a dedicated GESI Officer that offers good potentials for enhancing gender mainstreaming (as mentioned above), it is also clear that it is a challenging task since gender was not systematically mainstreamed in the project design. While several documents have pointed to some of these limitations, strategies have largely remained the same throughout the implementation period.

As mentioned above, the project emphasises a focus on women and youth. This is most clearly reflected in Component 1 where "men, women and youth farmers" are explicit referred to. While youth is also explicit in several of the boxes of the ToC and the M&E framework, the focus on women/girls are less pronounced further down the results chain. This is also evident in the reporting where project documentation refers to

[74] SNV (2019), Local know-how for lasting solutions. SNV Strategic Plan 2019-2022.
[75] SNV (2021), Internal Mid-Term Review Report on INCREASE, Zambia – final, 16 December 2021.

farmers, smallholder farmers etc. without specifying men/women/youth. Thus, it becomes unclear to what extent the project is complying with the overall SNV policy to reach a minimum of 30% women. Partners are not systematically reporting using gender disaggregated data which challenges SNV's overall reporting. In addition, data collected does not allow for disaggregation on vulnerability level (e.g. age, religion, ethnicity, language).

In order to properly address household inequalities, it is crucial to know what inequalities exist and a better understanding of the gender dynamics in the households. The gender analysis in the Market Scan was however only conducted in 2021 and thus rather late in the project implementation. The baseline study was conducted in 2020[76] but this study does not systematically mainstream gender and youth considerations in the project activities although intentions to do so have been clearly stated.[77] While it was a clear opportunity to understand household dynamics and thus inform household dialogues (as reflected in SNV's gender policy, see above) this has not been taken advantage of in INCREASE.

In general, the baseline study is facing several challenges: i) it has a clear gender gap with an only 18% representation of women in the survey (1,499 farmers were surveyed in total); ii) the mean age of the survey sample was around 46 years, thus the baseline did not emphasise inclusion of youth in the sample size, although the project clearly targets youth; iii) at the same time, the analysis takes neither gender nor age differences into account. The three value chains are compared in terms of food security, income sources, access to finance etc. but there is no analysis of different types of households (e.g., female headed versus male-headed households) within one value chain. Thus, the baseline does not offer any insight into where the gender gaps are within the specific value chains. There is no analysis of youth headed households nor of their potentially less advantageous position in the society. This is problematic in order to consider gender and youth in the project and a lost opportunity to actually understand the household dynamics to be taken into account in the project implementation.

Learning procedures and knowledge exchange among partners in INCREASE has been limited. A key part of an MSD approach is to ensure learning and adaptation of interventions accordingly. Thus, an MSD approach urges a constant critical reflection and adjustments along implementation. Analyses and studies should be reflected in key documents such as the M&E framework and the ToC to allow for project targets and strategies to be realistic and in accordance with reality on the ground. While a number of analyses and assessments have been commissioned and completed several of them have been delayed and thereby limited their ability to inform the project. Also, several of the publications provide relevant and sound recommendations, however a number of them have actually never been implemented and there are little indications that the ToC and M&E framework have been adjusted

[76] Kalinda, T., Kapunda, C., & Chilimboyi, K. (2020). Increased Climate Resilience in Energy & Agriculture Systems and Entrepreneurship (INCREASE) Project Baseline Survey Report.
[77] SNV (2020), Inception report submitted to Sida, INCREASE, September 2020.

to reflect such studies/analyses. Main recommendations and level of implementation has been summarised in Annex 7.

According to interviews with INCREASE partners there has been little exchange and sharing of information among implementing partners and most activities have been implemented in silos. The different governmental partners, consultancy companies and local service providers involved in INCREASE are largely considered service providers that engage with SNV staff but not with each other.

6 Sustainability Issues

6.1 PARTNERSHIPS

While most partners understand and agrees that the INCREASE model has great potential the lack of involvement from partners in the design phase has compromised their engagement. During interviews, government and implementing partners offered many suggestions on how the project could be enhanced and even further adapted to the specific contexts of the different regions but SNV has not really taken advantage of these competences. Even if the project was a merge of two prior projects where a number of partners were continuously engaged, these were not properly consulted. Instead, they have been provided the framework for INCREASE and have had to work within these boundaries.

MoUs and partnership agreements have been made with a number of project partners. However, according to interviewees and field observations, **little has been done in the project to facilitate and encourage that partners will engage with each other and thereby enhance synergies and development of relationships that could help to further develop and sustain the supported interventions.** A good example of this is the work that has been conducted with Mulungushi University and ZARI as part of the project. While the activities implemented through these partnerships have been closely related, the work has been done mostly in silos without exploring opportunities to capitalise from potential synergies from partners' capacities and knowledge and joint work planning.

While some efforts have been done recently to better integrate OYE and INCREASE activities, no joint work plan has been developed yet as recommended by the Internal SNV MTR. Management has set-up systems for information sharing between the projects and is emphasising linkages but the set-up with OYE largely being implemented by LSPs external to SNV and the lack of joint planning documents challenges the true integration of the projects. However, joint field visits and training of LSPs are conducted jointly by INCREASE and OYE staff, training of benefitting associations, DWAs etc. are conducted jointly with INCREASE staff and LSPs and a number of staff members are working on both INCREASE and OYE which ensures some level of integration (e.g. the GESI Officer, the M&E Advisor and the Communication Officer). The GESI Officer has developed a work plan combining his activities under OYE with INCREASE activities. Learning exchanges between INCREASE staff and LSPs have also been conducted which has supported the integration and understanding of the different projects. Still, there is a need to further integrate the projects at headquarters level to ensure a stronger trickle down to service providers.

Limited coordination and pro-active exchange of experiences have taken place with related field interventions implemented by external actors. Disagreements with GIZ on areas of intervention in relation to MCC support caused initial delays and a need for INCREASE to give up MCCs which the project had already invested in and shift to new MCCs and dairy cooperatives. This was done through an agreement with GIZ in 3rd quarter of 2021. Despite this agreement made with GIZ on division of MCCs to be supported, the MTE team's visit to Southern Province showed that the agreement is only partly working in practice as the MCC in Zimba is still being supported by both SNV and GIZ and that potential duplication of efforts is taking place (e.g. in relation to training on fodder preparation and provision of fruit trees). While SNV started their cooperation with Zimba MCC in 2016 GIZ started the collaboration only in 2020. GIZ support has also included support to governance and financial literacy of the MCC members. Only coordination occurs at the provincial level where dairy stakeholders meet on a regular basis.

In North Western Province, the project's horticulture component was originally structured within the broader partnership framework of the Solwezi Horticulture Consortium, headed by the North Western Chamber of Commerce and Industry with a vast market being offered by the mines, Shoprite and Pick & Pay as well as the DRC. Within this context, MoUs with member aggregators PG Farms, Havillah Gardens and Hanfre Logistics were signed in July 2021. As discussed elsewhere in this report, it was decided in the first quarter of 2022 to completely revise the outgrower scheme approach for the horticulture value chain and instead focus on a lead farmer approach. This message has however not been clearly convened to all business partners in North Western Province and SNV's presence and activity level in the Consortium was reduced drastically during 2022. At the same time, the MTE team met with lead farmers from INCREASE who were also supported by other project actors in the region, such as TechnoServe which focuses on support to SME processing among others.[78] Thus, currently there is clearly a potential for enhanced coordination and collaboration with other partners in the horticulture value chain and it is noted by the MTE that the SNV project team recently has started concrete discussions with TechnoServe on how to work together and a joint field visit was conducted recently.

6.2 HUMAN NATURAL NEXUS

While INCREASE is introducing several improved environmental practices, these have not been selected with a view to longer-term environmental sustainability and the project baseline did not sufficiently capture what was happening within the sub sector at the inception of the project for better metrics during implementation. Climate change adaptation responses is determined by the intended and unintended interaction between the human system and ecosystem which represents the human-natural resource nexus. The Footprint Evaluation Initiative has developed a

[78] TechnoServe is supported by Sida and implements the Food Enterprises for a Developed Zambia (FED) with the overall objective to increase revenues and marketable volumes and create or retain jobs for 100 SME enterprises, 50% of which will be women owned. Decision document for TechnoServe implemented Food Enterprises for a Developed Zambia (FED), December 2020, Sida.

widely accepted standard typology for assessing environmental sustainability.[79] The typology includes four positions reflecting the likely net effect of environmental impact: i) *Destructive* – extractive and damaging practices cause serious harm; ii) *Harmful* – sustainability-aware practices limit environmental damage; iii) *Neutral* – Practices cause no harm OR restoration offsets any harm; and iv) *Beneficial* – restores the natural environment so that it thrives.

With a view to this typology, the MTE team finds that most of the implemented CSA practices can be defined as either "neutral" or "sustainable-aware" to the environment (such as tilling, soil management, early planting, intercropping, agroforestry, use of biogas and bio-slurry, replacing diesels generators for irrigation with solar panels, etc.) or potential "harmful" (such as planting of fruit trees in drought prone areas, extracting of water from boreholes without proper environmental impact assessment, etc.). In order to be "beneficial", the interventions need to be really restorative, restoring natural systems such as increasing aquifers or watersheds, using natural interventions to absorb nutrients and prevent sediment flows. The MTE team did not come across such practices in the project. **The INCREASE intervention approach to farming may however be seen as a very positive, and less harmful, move towards sustainability, although it is still causing harm meaning more is needed**. In particular relating to water since soil issues are improved but still lacking important elements regarding e.g. trees, buffer and windrow planting where appropriate, and using plantings and other methods to improve water capture and retention.

Spatial boundaries being administrative and important sustainability elements have different boundaries such as watersheds and to really reach do no harm there cannot be an appreciable net draw on a watershed. **The MTE team has not come across any interventions directed towards promoting sustainability of watersheds or other landscape considerations.** Here the temporal frames are important (see also section 3.3). Thus, while the net harm to watersheds and aquifers during the period of the project interventions might be quite small and a lot less than without these types of interventions, the draws on watersheds can still be significant over time – especially where rainfall is less, and likely other draws are increasing such as water for a growing population or expanded agriculture.

Therefore, **while the promoted CSA practices are certainly improvements, there will still be a likely net draw on watersheds which in the face of climate, increasing demand for agricultural production, etc. will in fact reduce the sustainability and constrain the adaptive capacity of humans and environment**. Absent remediation actions such as improving water capture and retention by the landscape through physical changes, appropriate planting of trees and shrubs/grasses even low impact agricultural practices will be adverse. However, the MTE team assess very positive the use of ripper lines and potholes. Absent flooding or heavy rains these practices will not cause much sedimentation or leeching not disturb sequestration much. If there are

[79] See e.g. Footprint Evaluations in Better Evaluations: https://www.betterevaluation.org/en/themes/footprint_evaluation

heavy rains or floods then planting is even more important. Likewise, rainwater catchment will be positive so long as evaporation is not important.

Given the agro-ecological context and production system, some interventions may not be particularly harmful to the environment in the short run but have serious negative consequences in the longer term. For instance, in cases where the supported interventions involve increased use of fossil fuels, chemical pesticides or draw down water from a closed aquifer without any offsets planned, the harm may not happen immediately but very likely in the future. Likewise, boreholes will lead to lowering of the water table when extracting too much, thus this needs to be done within acceptable levels. Thus, in order to provide a proper assessment of the human-natural resource nexus, environmental externalities need to be taken into account for a longer time span than the project period itself. This includes the need for properly understanding the scaling and fidelity of the supported interventions (i.e. what portion of smallholder farmers in a landscape or ecosystem actually follows these practices and are they implemented with reasonable fidelity?). Absent these accompanying needs for natural system wellbeing, the interventions will fall short of do no harm.

The implemented CSA methods and techniques have mainly been based on scientific technical knowledge and only to a limited extend taken point of departure in local/indigenous knowledge and practices. Limited consultations were done with target beneficiaries during the project design stage to ensure that their needs and concerns related to natural resources were properly understood and reflected in proceeding with rollout and responding to emerging concerns along the way. While it was the intention to develop the INCREASE model in a participatory manner the pandemic prevented that and in order not to be further delayed the model was developed. Likewise, no assessment was conducted to ensure that natural system elements would receive what is most needed at the right times and places and in the right ways. The CRA was completed only in November 2021[80] at a time when the project was nearly two years into implementation, a lot of things were ongoing and project locations had not been fully identified.

While access to water is a huge challenge in particularly in Southern and Eastern Provinces which is clearly described and acknowledged in the project proposal, this aspect has not been sufficiently addressed by the project. According to the business case for dairy in the annexes for the proposal to Sida it was mentioned that: "*The Project envisions to install the Solar Pumping in combination with rainwater harvesting measures to increase available water for cows during the dry season.*" The MTE did not come across any examples of promotion of water harvesting nor had the project supported installation of solar pumps in the dairy value chain. A main reason for this was the lack of access to water sources where water could be pumped from. Instead, the project had planned for provision of 12 boreholes targeting about 6,000 households (500 per facility) but few of them had been constructed so far and farmers

[80] Siatwiinda, S., Syampaku, E., & Yambayamba, K. (2021). Climate Risk Assesment Report on the Cotton, Dairy and Horticulture Sectors in Zambia, Published by SNV.

were waiting for it. While boreholes solve concrete need for water access it also poses environmental risks that require a further assessment prior to establishing. It is not clear to what extent environmental impact assessments have been considered for construction of these boreholes.

From an institutional perspective, the project has only to a limited extent focussed on engaging environmental authorities in planning, assessment and monitoring of actions with potential damaging consequences for the environment. At district level they have not been involved at all. Although the Ministry of Green Economy and Environment (MGEE) is a stakeholder in the project, it is mainly the Climate Change Department within the MGEE that has been involved on regulatory and technical matters, focusing mainly on strengthening civil society involvement in the national climate change dialogue. MGEE has not been involved in monitoring and assessment of the environmental impact from the supported project interventions and MGEEs measures of concern which misalign with the spatial and temporal scales of the project. For instance, while the MGEE monitors water quality in nearby water bodies, the nutrient flows from a farm are difficult to trace (non-point source emissions). Likewise, use of harmful treatments above the supported farming households in the intervention might be the source, but the harmful material flows through the farm and to the water bodies. This should be something important to consider when selecting project sites.

7 Conclusions and Recommendations

7.1 CONCLUSIONS

Conclusion 1 (Relevance): The relevance of INCREASE is high and the INCREASE model has demonstrated its potential for further uptake and scaling through its innovative and flexible approach and strong adherence to climate resilience for smallholder farmers. It is a flagship project in Zambia which serves as inspiration for the government, other partners in the country and internally in SNV. However, the ambitions in the project have been too high in view of its scope and timeframe. It was a wise and forward-looking decision to merge the SILMS and E4A projects into one single project (INCREASE) to enhance focus on the agriculture-energy-water nexus with a view to address critical livelihood aspects for smallholder farmers and enhance their climate resilience through a more coherent and holistic approach. Overall, the project is also well aligned to key development policies and plans of the Zambian Government. However, the planned 3-year timeframe has been much too short considering the wide geographical scope of the project as well as the introduction of new and innovative CSA practices and technologies. Even without delays it would have been unrealistic to demonstrate the INCREASE model with the full benefits from agroforestry and adoption of new techniques and practices within a 3-year time frame.

Conclusion 2 (Design): INCREASE has been developed and designed with insufficient participation and involvement of partners and target groups and it does not build on proper value chain and market systems analysis. Instead, the design process has been guided mainly by SNV's previous working experience with E4A and SILMS including choice of partners and value chains. This has resulted in shortcomings and weaknesses in the design which affects the potential outcomes and sustainability of the interventions. The design primarily takes outset in experiences and partner arrangements from the SILMS and, to some extent, the E4A project. The design process did not involve proper consultations with national key stakeholders and target groups, nor did it take particular needs and challenges of women and youth into account. The value chain selection was based on commercial partners as outgrowers and their willingness to promote climate-smart practices. However, while there are good opportunities for decreasing pesticide use in cotton, and thus potentials for positively impacting the environment, this value chain is not suitable for reaching poorer segments as it is a mostly male dominated cash crop. The horticulture and dairy value chains offer better potentials for integrating women and youth while also supporting farmers in improving their nutrition.

Conclusion 3 (Efficiency): While INCREASE has had implementation challenges in the past, the project has been on an upward trajectory over the past six months. Change in management and fill-in of vacant positions have been key determining factors for this turnaround. The positive development over the past six months is noted in the budget depletion rate which increased from a multi-year budget depletion of 35% in April to 70% by end of 2022. This positive development ultimately led to the approval of the one year no-cost extension by Sida. Before that, INCREASE has struggled to establish a conducive and motivating working environment for staff members and key positions have remained vacant for long periods. Critical procurement processes were significantly delayed with strong negative impact on the speed and sequencing of the implementation process. Thus, the project has in many cases failed to facilitate a proper planning and timing of related interventions (e.g. training and input delivery) which is still likely in the end to reduce some of the potential results from these interventions. Critical design errors and shortcomings in the M&E system has made it very difficult to measure and follow progress of the implementation process and made it of little use for learning and decision-making processes. It is hard to justify why it has taken so long to adjust the M&E system for operational use. While SNV has recently taken steps towards stronger integration of INCRESE and OYE interventions, still no overall joint work plan has been developed (as recommended in the Internal SNV MTR). Several recommendations from reviews and commissioned studies have not been addressed. Sida also has a responsibility to follow-up and oversee that these issues are being addressed.

Conclusion 4 (Effectiveness): The progress made so far indicates that results are likely to fall short of expectations. **While training targets are likely to be achieved, a strong focus on delivering on quantitative targets runs the risk that critical qualitative aspects may become neglected with potential negative consequences for sustaining the supported interventions after project completion.** The above-mentioned efficiency aspects together with COVID-19 restrictions during the project period are major explanatory factors. In addition, the developed project ToC has not served as a useful guiding framework for project implementation and does not provide a proper reflection of the causal links between the supported interventions and the key assumptions and risks. From an implementation perspective, a tendency in the project to hire in a large number of consultants and consultancy firms to be responsible for implementation of activities without proper guidance on e.g. how to facilitate training in order to ensure full qualitative inclusion of women and youth in the sessions, ensure data is collected systematically across service providers etc. challenges the robustness (and knowledge) as well as the sustainability of results.

Conclusion 5 (Effectiveness): The approach for training of farmers has been adopted over time to reflect challenges with the original planned outgrower schemes and there is anecdotal evidence that farmers are adopting new techniques and improving yields. However, access to reliable and attractive markets remain a key challenge and the project still has not managed to demonstrate how engagement with commercial farmers and market actors will trickle down to also benefit poorer and more vulnerable smallholders. In general, the farmers are satisfied with the training provided and many have quickly adopted some of the techniques related to management and preparation of soil for cultivation, in particularly land preparation and early planting. Cotton farmers have experienced a substantial

increase in yield by implementing these techniques demonstrating the production potentials of the cotton value chain. Dairy farmers have also increased milk production through enhanced fodder, including from lucaena and now farmers are able to also produce milk during the dry season. In horticulture, there are good potentials for diversifying production and increasing yields if techniques are adopted. However, due to the efficiency issues mentioned above (e.g. delay in provision of seeds, seedlings and other inputs) it has so far only partly been possible for them to implement the INCREASE model in practice. The project has succeeded in demonstrating parts of the INCREASE model, but delays and a limited timeframe has prevented the full demonstration. At the same time, uncertainties and barriers related to market access and demand remain critical limitations for the farmers to supply their increased produce at attractive prices and there is an inherent risk that the most vulnerable smallholders may become squeezed in this process when excess production is being dumped on local markets. A suitable market and marketing approach for biodigesters and bio-slurry is yet to be developed.

Conclusions 6 (Coherence): Although the intention of INCREASE was to develop more holistic energy-agriculture-water nexus interventions and integrate strategic partnerships, in practice it has been a challenge to ensure internal and external coherence in the implementation process. Internally, the project has struggled to strike the right balance and focus in implementation between agriculture, energy and water, with agriculture being the dominant part. The OYE component also for a long time was considered mainly an add-on to the project and not an integrated component. From a design point of view, the project integrated strategic partnerships with ZARI (for policy, public influence on agrifood and climate, soil health), Mulungushi University (for influencing of public university curriculum with integration of CSA and renewable energy and joint training of farmers and students to bridge the gap between industry and research, action research through joint demo sites et cetera), ZCCN, the Off-grid Taskforce under the Ministry of Energy, Ministry of Agriculture at provincial and district levels, market actors like Alliance Ginneries, BCEs among others. However, the support provided at macro level (policy) and the micro level interventions (support to smallholder farmers) has not been well balanced. For instance, while SNV is the main actor in the country supporting biodigester installations, the project has not had focus on feeding the policy level with data and evidence from this support to advocate and influence policy makers. Externally, the project has on a few occasions managed to establish effective cooperation and linkages to other projects working on related topics within the same geographical regions. At the same time, a lack of coordination with other actors (e.g. GIZ) has led to delays in implementation and starting over through new MCCs. This also relates to the interaction with other Sida funded projects, although recently some level of coordination has been established e.g. with TechnoServe.

Conclusion 7 (Gender/HRBA): INCREASE has focused on women's empowerment and been successful in developing the foundation for further economic empowerment through targeted support to women-led enterprises. However, there are important gaps in the project's mainstreaming of gender and youth which is not conducted systematically neither in project activities nor in M&E. Several of the women-led enterprises have developed business cases and are in the process of finalising them with support from Swalisano and there are good

opportunities for linking them up to finances such as the CDF. The gaps include lack of systematic collection of gender disaggregated data; absence of analysis of both men's and women's challenges, needs and priorities; and application of implementation strategies that do not take gender considerations fully into account. While there are potentials for both male and female farmers to benefit from the project, focus on gender equality needs to be much more strategic and emphasised towards partners. This also applies to a rights-based approach, where the MTE found challenges with accountability, transparency and a lack of focus on the most vulnerable groups. There is an assumption that all smallholder farmers could potentially be reached by the project which is rather unlikely, especially given the requirement to land access and potentials for actually growing it. The OYE component with skills development for out-of-school youth and the saving and credit groups have some potentials in reaching and empowering more vulnerable groups but this needs to be documented more systematically by proper data collection on vulnerability aspects.

Conclusion 8 (Sustainability – environment): INCREASE is addressing important environmental issues and includes both a climate adaptation and a climate mitigation perspective. However, it is not addressing the human-natural resource nexus from a strategic perspective and has missed opportunities for wider introduction of solutions to water shortage and potentials for further uptake of renewable energy solutions for productive use. Important energy-agri nexus elements are being addressed by the project, including strengthening circularity, exploiting farm waste into energy, biofertiliser and productive use of energy for irrigation**.** On the other hand, stronger consideration on use of landscape approaches and agro-ecological zones for planning of interventions, and more attention to the bridging of indigenous knowledge and practices would have been beneficial. Likewise, the project has failed to effectively address critical issue related to shortage of water and missed opportunities for more strategic introduction of other renewable energy sources than biogas (such as solar) for productive use. While solar technologies are planning to be introduced more widely during 2023, this is happening rather late in the process.

7.2 STRATEGIC RECOMMENDATIONS

Below is presented strategic recommendations from the MTE which look **beyond the time of project completion (beyond 2023)**.

Strategic Recommendation 1: Overall, the INCREASE model has demonstrated good forward-looking potentials and Sida/SNV should positively consider **developing and supporting a continuation/follow-up phase, although** with the need to **rethink and refocus the project design and set-up**. In this regard, it is recommended to:

- Formulate the next phase with **a stronger and more explicit climate "profile"**, building further on and consolidating some of the good and promising practices from INCREASE (CSA practices, biodigesters, bio-slurry etc.) with a view to **scaling** opportunities and attracting of complementary climate funding.
- Plan for **a more inclusive design process**, with a particular view to properly reflect **local knowledge** and make use of **existing research and studies**. Proper involvement of local partners from the outset is key and likely to enhance the

ownership of the project, a more partnership-based approach and ensure further contextualisation of the intervention (also to the specific agro-ecological context of specific locations).
- Aim for a narrower **geographical scope** and **a more realistic timeframe.**
- Establish **stronger coherence and synergies** to other (Sida) support interventions (see concrete suggestions below).

Strategic Recommendation 2: Stronger adherence to a **programmatic approach** should be made (compared to the current project-driven approach) based on iterative learning, to strengthen the framework for management and decision-making and allow for a more holistic implementation. In particular, it is recommended to:

- Include **a much stronger focus on knowledge management** and a process for better integrating M&E with action and decision-making.
- Establish **a more agile project organisation** and encourage **a working culture that supports risk taking** and **learning from failures**. This should include **competitive salaries** and aiming at **longer contracts** (more than a year) for staff to mitigate high staff turnover.
- Develop **a more operational results framework and an associated ToC,** preferably illustrated in a visualised format, which can be used as point of departure for discussion of progress and learning among project staff and partners. **Key assumptions and risk** need to be clearly articulated in the ToC and revisited by the project team in consultation with partners on a regular basis (see suggestions for specific assumptions for the current ToC in Annex 6 as inspiration).
- Develop a more **robust and systematic data collection strategy** that allows for learning and ongoing stock-taking of progress towards targets.
- Enhance **strategic communication and outreach** by further defining target groups and communication channels depending on the target group.
- Enhance focus on **identifying and developing partnerships and synergies** with other programmes and projects working on related interventions.

Strategic Recommendation 3: **Access to markets and finance** are critical aspects for success of INCREASE interventions and should be more comprehensively assessed previous to entering into a follow-up phase. In particular, it is recommended to:

- Carefully assess **market dynamics and capacities**, including **the role of local markets** and **price setting,** to absorb large production increase as a result of project support as well as how this may affect those poor and vulnerable smallholder farmers who are currently not benefitting from the project support. This should also include an assessment of the risk for developing market monopoly.
- **Pioneer a different and market-based approach for introducing and selling of biodigesters**. Fundamentally, SNV needs to step out of their perceived role (among farmers) as sellers of biodigesters. Instead, a more open and competitive market for biodigesters needs to be developed together with alternative models for financing (such as pay-as-you-go and results-based financing). This may include introduction of portable biodigesters.

- Explore opportunities for **further expanding the business diversity of some of the stronger and more developed BCEs** to also include other renewable energy businesses (such as solar panels, other types of biodigesters etc.).
- Further explore the **market potentials for bio-slurry fertiliser** in Zambia in view of its strong environmental and price advantages (compared to chemical fertiliser). This should include enhanced focus on research and testing on how to preserve nutrients from manure under different conditions.
- Further explore the possibilities for **attracting climate financing** as well as making use of other **innovative financing instruments** such as loans and guarantees, etc. Linkages to other partners specialised in financial products should also be further explored here since it is not one of SNV's core areas.
- Further explore opportunities for linking up smallholders to **digital market platforms** which have been boosted during COVID-19.

Strategic Recommendation 4: The supported interventions should more strategically address the **human-natural resource nexus** from an environmental sustainability perspective. In particular, it is recommended to:

- Consider focusing the project design on a **broader landscape approach** with **a longer-term perspective** (compared to a spatial and temporal framing based on administrative geographical (provinces, districts) boundaries and a short-term perspective).
- Ensure a larger indigenous "footprint" in the supported interventions through a **better connection between the applied research and indigenous knowledge** as a basis for decision-making.
- "Break down" the INCREASE model to **climate and landscape specific "packages"** (e.g. fruit trees only in AEZ 3 where there are less water shortage, biodigesters where livestock is kept and water is available, etc.).
- Enhance focus on innovative and in-expensive solutions to **water shortage** (such as water harvesting technologies, water storage, irrigations models etc.).
- Enhance attention and support to **use of renewable energy sources for productive use** (e.g. solar power for irrigation and drying).
- Ensure more **direct involvement of environmental authorities**, including in the planning process and for **monitoring and assessment of environmental impact**.

Strategic Recommendation 5: In order to address **gender equality and social inclusion** more strategically, it is recommended to:

- **Engage either a gender focal point or a local partner specialised in social inclusion already in the project design phase** and when developing the results framework.
- **Mainstream gender throughout the results framework and make explicit reference to gender, youth, potentially other vulnerable groups** (if targeted) in impact, outcomes and outputs. Targets should be established based on research studies and in consultations with partners.
- **Integrate gender and vulnerability considerations into all aspects of the project decisions, priorities, strategies, activities etc.** This includes selection of value chains that offers real potentials for youth, vulnerable groups and

women's participation, enhanced food security, etc. as well as ensuring data collection that allows for gender- and vulnerability disaggregation.

- Ensure that **all SNV staff and implementing partners are fully aware of SNV's GESI policy, and capable of implementing it in practice.** This will require ongoing training of staff and partners as well as development of tools, checklists and guidelines to support implementation.
- **Further explore opportunities for engaging in women's access to and ownership of land**. This could be done jointly with other CSO partners who are specialised in advocacy campaigns and fighting for women's access to land (e.g. Zambia Land Alliance who are part of the Women's Economic Empowerment Project also supported by Sida).

7.3 OPERATIONAL RECOMMENDATIONS

Overall, it is recommended that the project will focus on **consolidating** what is already being implemented or in process and **not start up new activities before the project will be completed by the end of 2023**. This should include focus on **documenting/show-casing** good and successful practices, including between different actors/levels in the value chains and adoption of CSA for further scaling. While it is the **responsibility of SNV to ensure implementation on the ground, Sida will have a strong responsibility to oversee and follow up on agreed actions**.

More specifically, the following operational recommendations are provided (**to be implemented before the end of 2023**):

Overall project:
Call for a meeting/workshop with all key project partners during Q1 2023 to: a) present and jointly discuss work planning for 2023; b) discuss learning and experiences from the implementation so far; and c) discuss possibilities/needs for adjustments during the last year of implementation. These discussions should also **reveal opportunities for synergies and joint work planning among partners as well as potentials for future collaboration**. The discussions should also **clearly explore opportunities for mainstreaming gender and youth considerations** into activities, including defining training principles that are based on an inclusive, non-discriminatory, participatory, learning-centred approach and potentially introducing gender quotas.

Project management
Staffing: The **project manager** and **deputy manager** should more clearly define their division of roles and responsibilities for the remaining part of the project. In particular, it is recommended that the **project manager** will focus on **the strategic direction and partnerships** while the **deputy manager** will take **main responsibility for the operational matters**. Both these functions are deemed crucial for the remaining of the project**.** Priority should also be given to **supporting field staff** who will become very busy with the catching-up and follow-up activities during 2023.

Communication and accountability: Commitments and expectations should be clearly established and agreed with project partners and farmers for 2023. The complexity of the project covering a large geographical area, with many partners

engaged, numerous staff members and a high staff turnover as well as a gap in SNV management presence during some part of 2022 has caused uncertainty among partners and farmers and a number of "loose ends" which need to be wounded up urgently. Thus, there is a need to clearly communicate commitments of the project in terms of who will receive support for boreholes, inputs, biodigesters etc.

Reporting: **Both Sida and SNV should ensure a closer follow-up and oversight of project implementation in the remaining project period**, including more regular meetings and progress reporting. During 2023, it is recommended to organise quarterly progress meetings between SNV and Sida (with formalised minutes of the meetings) based on (timely delivered of) quarterly progress reports by SNV. This should be the responsibility of both partners.

M&E: While the current M&E framework and data collection approach requires a substantial revision, project implementation is now too advanced to re-design it completely. The following short-term recommendations are therefore provided:

- Ensure a systematic gender and youth disaggregated data collection and reporting.
- Conduct smaller case studies on farmers' adoption of CSA techniques. This could be done with farmers that are still to be trained by introducing pre- and post-training surveys.
- Consolidate data and information on biodigester installations and use of bio-slurry as a fertiliser.
- Since the baseline study failed to provide any analysis of the different gender dimensions it is recommended that the final evaluation gets access to the baseline data (if possible) and time is allocated to allow for a proper analysis of differences between both men and women at the timing of the baseline and compare with results in the end evaluation.

Cotton value chain: The following operational recommendations are provided:

- Develop a business case for organic cotton.
- Ensure follow-up training on crop-rotation as this is not convincingly being applied.
- Explore opportunities for farmers who can manage to source legume seed and other chemical inputs from the open market as Alliance Ginneries may not be able to meet the demand on the ground.
- Further explore opportunities for promoting hybrid seeds among farmers and convincing Alliance Ginneries of the business model. Hybrid cotton has higher potential yields and these could be achieved with the improved production management practices that the farmers are being exposed to which will remove the concerns on high cost of seed.

Dairy value chain: The following operational recommendations are provided:

- Organise meeting during Q1 2023 with GIZ, the Dairy Association of Zambia and other NGOs involved in support to the dairy sector to discuss: a) how to address critical capacity issues within MCCs and 2) how to develop synergies and avoid potential duplication of efforts (e.g. Zimba MCC).

- Provide specific attention on how to mitigate the negative consequences from a too low absorption capacity among off-takers for the increased milk production in the Southern parts (in particular Zimba and Kalomo) during the rainy season.
- Pay more attention to the role and functioning of local markets (for dairy products) and to how the MCCs may be strengthened in their capacity to manage and organise selling of milk locally.
- Consider support to establishing additional solar panel-driven cooling facilities locally in Southern Province to avoid damaging of large quantities of milk in the rainy season.

Horticulture value chain (North Western Province): It is recommended to focus support during 2023 on the 423 trained horticulture farmers in North Western Province, as they are currently left with expectations and illusions from the training that will most likely not be fulfilled without continued follow-up and supervision. The farmers are still waiting for input supplies and for support to establishing of market linkages. Thus, focus should not be on training of additional farmers during 2023 but on enabling the already trained farmers to practice their new skills and market their increased produce. In addition, the following operational recommendations are provided:

- The project should support development of 2-3 market chain cases (smallholder farmers – (semi)-aggregators/lead farmers - aggregators - off takers), to clearly showcase and demonstrate the benefit and value-added for smallholder farmers of the project support. As a pilot, this could include identification and matching of lead farmers to work in different ends of the value chain in a joint venture (one lead farmer could be in charge of production and supported with irrigation while another lead farmer could be in charge of packaging/ marketing and supported with storage facilities). Opportunities for collaboration with TechnoServe or other partners on such initiatives could be further explored.
- As the open local markets will remain the most important channel for smallholder farmers to sell their produce, the project should monitor the risk that over produce of some products will lead to dumping of prices at the local market and demotivate farmers to continue production for markets.
- There is a need to more clearly define the role and responsibilities of lead farmers versus follower farmers in terms of follow-up on training, input supplies and the market aggregator function.
- There is an urgent need that SNV project management becomes clearer and more visible in their communication to local partners in North Western Province on the project's market approach and what to expect from the project support up to end 2023.
- It will be essential for the project to maintain a local presence and support in North Western Province during 2023 and at the same time become more proactive in identifying synergies and cooperation opportunities with some of the other projects working on similar topics.

Bioenergy (biodigesters/bio-slurry): The following operational recommendations are provided:

- Make sure to learn from experiences so far - what did not work(!) – before introducing biodigester installations in new areas. Key learning points relate to

availability of cattle in the area, capacity and distance of BCEs and masons to farmers, possibility to "cluster" farmers etc.

- Prioritise solving issues with dysfunctional biodigesters (and thereby also improve the reputation of biodigesters among farmers) before installing additional biodigesters in same area.
- Re-asses the provided biodigester subsidy level in view of price developments on materials and transport in the period.
- Consider linking BCEs to providers of motorcycles, with their payments deducted from the functionality bonus, to help resolve the BCEs' transport challenges.
- Redefine the approach and incentive structure for selecting and supporting farmers and BCEs on biodigester installation, including:
  - Reduce the number of supported BCEs (based on the internal assessment/ scoring) and define specific capacity needs to further strengthen these businesses.
  - Implement the planned "cluster approach" for selection and listing of farmers for biodigester support. The clusters will include farmers from same communities/area who could support each other in a network. At the same time, traditional leaders/headmen from the areas as well as lead farmers/extension officers should become more directly engaged in the clusters. Likewise, the responsible BCE should have a local representation through a mason/assistant within the area to solve minor functionality issues on a short notice. All farmers should also be able to directly contact a customer service centre.
  - Consider introducing differentiated support levels across different farmer groups in line with the additionality principle (e.g. better off farmers, poor remotely located farmers etc.). Moreover, avoid that the same household will receive support for more than one biodigester from the project.
- Develop business case/model for farmers acquiring different proportions of biodigesters, including a valuation of the productive use of bio-slurry with a view to enhance its use. As part of this, it should be explored if a component to promote the aggregation and sales of bio-slurry could be integrated into a redefined biodigester incentive structures in order to kick-start a market development for bio-slurry.
- Alternative biodigester technologies/models, including prefabs, should be tested with a view to introduce a more competitive market-based approach in this area in the future.
- Pilot installation of larger biodigesters on pig farms with better-off farmers.
- Document piloting experiences from commercialisation of bio-slurry fertiliser (e.g. starting with horticulture).
- Support the work of the bioenergy sub-committee from the Off-grid Task Force in implementing recommendations from the national bioenergy study (completed in October 2022), including advocacy efforts to promote biogas/biodigesters at policy level with a view to scale-up the demand for these technologies.

Annex 1 – Main Activities per Province

Table 12: Summary of main activities per province

Activities	North Western	Central	Lusaka	Southern	Eastern
Value chains					
Cotton VC/cow peas/soya		X	X	(X)	X
Organic cotton	(X)*		X		
Horticulture VC	X				
Dairy VC			X	X	
Activities implemented					
Biodigesters installed		X	X	X	X
Women-led enterprises		X		X	X
Milk collection centres (old)				X	
Milk collection centres (new)		X	X	X	
Lead farmers	X	X	X		X
Tree nursery farmers					X
Demo plots	X	X	X	X	X
OYE component		X	X	X	X

*Attempted without success

Annex 2 – Evaluation matrix

Table 13: Evaluation matrix

Evaluation Criteria	Evaluation Question (from ToR)	Judgement Criteria	Means of Verification
Relevance	To what extent has INCREASE conformed to the needs and priorities of the target beneficiaries and financier's (Sweden) policies and priorities?	Extent to which consultations and previous experiences have ensured that the needs and concerns of target beneficiaries and environments are understood and taken into consideration in proceeding with rollout and responding to emerging concerns along the way. Alignment with the Strategy for Sweden's development cooperation with Zambia 2018–2022 and Sweden's perspectives and cross-cutting areas	Study of design documents and amendments Interviews with Embassy staff Interviews with SNV field staff and service providers FGDs with target beneficiaries Interviews with representatives of important farm-related environmental interests
	Is the intervention well in tune with the development policies and administrative systems of the Zambian government at national and regional levels?	Alignment with Zambia's 7th and 8th National Development Plans, Zambia's Vision 2030 and Zambia's National Agricultural Extension and Advisory Services Strategy. Taxation/subsidy incentives.	Review of Zambian national strategy and development plans Interviews with ministry representatives and regional/local authorities Interviews with representatives of important farm-related environmental interests
	Is the intervention a technically	Extent to which the chosen solutions are still considered adequate in	FGDs with target beneficiaries

	adequate solution to the development problem at hand? Does it eliminate the main causes of the problem?	view of poverty reduction and any changes or trends in the socio-economic, human and/or natural conditions/systems (climate and resilience). Extent to which implemented technical solutions (biodigesters, CSA practices) are used/applied as intended and do no harm. Extent to which the Market System Analysis and other studies have been used to inform project design and implementation.	Field observations Interviews with CSA experts in Zambia Interviews with representatives of important farm-related environmental interests Review of technical project reports
Efficiency	Has INCREASE been managed with reasonable regard for efficiency? What measures have been taken during planning and implementation to ensure that resources are efficiently used?	Extent to which the project has prioritised and managed the delivery of support so that the right people and natural system elements receive what is most needed at the right times and places and in the right ways. Extent to which the projects temporary scale is adequate for achievement of results. Extent to which the project's results framework has enabled evidence-based decision making. Extent to which sustainability issues have been considered (natural system, climate, environment).	Review of project documentation Review of budgets and financial reports Results framework and data Interviews with staff from Embassy, SNV and service providers

		Extent to which realised/foreseen project activities have not been unnecessarily delayed. Extent to which realised project costs and expenses are in accordance with budgets. Extent to which procurement has been completed within reasonable time and procedures. Balance and division of roles between project staff and consultants.	
Effectiveness	To what extent do development changes in the target area accord with the expected results of the evaluated intervention ?	Extent to which changes in socio-economic, human and natural conditions/systems (climate and resilience) within target areas can be linked to the project interventions. Extent to which project interventions are leading to changes in institutional models/ approaches, practices/techniques, resource allocation, attitudes/behaviour in support of project outcomes and impact. Extent to which environmental results are captured within the projects defined spatial scale.	Outcome harvesting workshops FGDs with target beneficiaries Interviews with regional/local authorities Interviews with representatives of important farm-related environmental interests Results framework and data
	What worked well as expected in the intervention	Extent to which critical links in the Theory of Change have been continuously assessed and	Outcome harvesting workshops FGDs with target beneficiaries

	and what didn't work? What are the reasons for the achievement or non-achievement of objectives?	verified during the implementation process. Extent to which critical assumptions / risks have been identified and adequate support/mitigation measures taken. Identification of contributing/non-contributing factors to results (intended and unintended)	Theory of Change Results framework and data Review of project documentation
	What lessons can be learnt from the achievements or non-achievements of objectives in the intervention?	Extent to which the project design has been adapted and improved over time to respond to emerging conditions related to the socio-economic, human and natural conditions/ systems (climate and resilience). Extent to which critical project data and information have been systemically collected and processed and subsequently used for learning and for improvement of ongoing project interventions. Extent to which previous evaluations/reviews/assessments have been taken into account and implemented	Outcome harvesting workshops FGDs with target beneficiaries Key stakeholder interviews Review of learning reports Results framework Previous evaluations/reviews/assessments from E4A, SILMs and INCREASE (see Annex 6)
	What can be done to make the intervention more effective going forward?	Extent to which project interventions complement other initiatives or change efforts that affect the target population/value chains and the natural environment.	Field observations FGDs with target beneficiaries Key stakeholder interviews

		Extent to which the supported interventions/ approaches can be expected to be lasting and replicated. Extent to which interventions meet almost certain future demand (rather than focusing on just current and near term). Extent to which larger-scale interventions (e.g. landscape or ecosystem) are being considered.	Interviews with external stakeholders (e.g. other projects/programmes) Interviews with representatives of important farm-related environmental interests
	How has gender equality been integrated into the design, planning and implementation of the intervention? To what extent has the intervention contributed to the improvement of gender equality?	Extent to which gender equality concerns are reflected in all aspects of the planning and implementation of project activities, in the selection of beneficiaries, in the human-natural system nexus (climate and resilience), and in the results framework and reporting. Extent to which the project has contributed to a more equal gender balance and women's empowerment in terms of income, access to/control over resources, decision-making power, leadership, time management and mobility.	Review of project documentation, including gender tools and assessments Field observations FGDs with target beneficiaries Key stakeholder interviews

Annex 3 – Semi-structured interview guide

Interview guide for key project stakeholders

Relevance:
To what extent have national and regional key stakeholders been involved in the **design and planning** of the project activities? Has this been sufficient or would a different level of involvement have been desirable?

Has the project focused on **the right group of people** for training and technical support? To what extent has women, youth, marginalised been included? Have potential change agents been left out or prevented from participating?

Have **environmental and natural resource** concerns been understood and taken sufficiently into consideration (e.g. tilling effects, tree planting, temporary scales)? How to position the project to indicate the stance of interventions with respect to the natural system (typology: ignore, aware, do no harm, restore)? What changed in the design or implementation to address this? Would other options have been more beneficial/less harmful to the environment, and if yes why not included?

Have there been any **major changes** over the past 2-3 years that have affected the (continued) relevance of the INCREASE Project? (probe for changes in farmers needs and priorities, selected value chains, regional development trends, national policy changes etc.)

Has the **demand and interest for participation in the INCREASE Project** activities changed over time - if yes, for what reason?

Results
What have been the **key results** from the INCREASE Project implementation? (probe HH level, community level, cooperatives/SMEs).

What have been the most important **drivers** for results? What have been the major **barriers/hindering factors**?

Are the promoted techniques and technologies applied/used as intended? Are they appropriate in view of markets, human and/or natural conditions/systems?

Has the **training approach** been effective - or what should have been done differently? How has the balance between theory and practice been?

Has the **quality** and **focus** of the training and technical support been as needed – or what should have been done differently to achieve better results?

What has worked in terms of **natural systems**? Is environment seen as a cost to livelihoods or is it possible to have **win-win situations**?

Time and resources
Have the project activities been implemented in the best possible way, or what could have been done to ensure a better **use of time and human/natural resources**?

COVID-19
What have been the critical **challenges** as well as new **opportunities** emerging from the COVID-19 situation? How has INCREASE Project responded to these and what have been the **implications for implementation/results**?

Partnership and synergies
How has the project managed to facilitate and encourage **collaboration** and **dialogue** among different project partners, including the private sector?

Gender and human rights mainstreaming
How are **gender** and **HRBA** aspects reflected in implementation? Are women and men being targeted equally? How have gender considerations informed selected priority areas (e.g. selection of value chains)? What about vulnerable/marginalised groups? What are the challenges?

Sustainability
Has the project catalysed any kind of **change processes** within supported national and/or regional institutions (e.g. change in approaches/focus, resource allocation, collaborations, attitudes etc.)?

Have the project interventions inspired to **broader and wider engagements** (e.g. within a region or among non-supported institutions)? What has triggered this?

Are the supported interventions doing **any harm** to the environment/natural resources?

Recommendations
What should be the **focus** for the continuation of the INCREASE Project? What should be done **differently**?

Annex 4 – Guide for FGD

The FGDs will take place in groups of 6-8 persons with an estimated duration of approximately 1.5 hours per group session. These groups will comprise people with similar characteristics (i.e. homogenous groups). For example, women only rather than mixed male/female groups – to allow for less constrained discussions and manage any safety concerns. The talk will be conducted in an informal setting (e.g. at the edge of a field or under a shadow from a tree). Open questions will be used (see topics below). The interviewer will "go with the flow" i.e. let the person talk and his/her peers follow their own line of thought, as far as possible. Steering will only take place when/if needed to ensure the focus is on the question topics and doesn't stray into unrelated or non-relevant areas/topics unless there's a clear reason for this.

Leadership and membership issues (mainly for MCC's/cooperatives/women groups)

Formal structure and power relations (constitution)? Who are in leadership (m/f/youth)? Were they elected or selected? By whom?
Is the group well-functioning? If not, what are the challenges?
Who joins/are allowed to join the group? Is anybody excluded? Specifically, about women, youth and marginalised.
Has anyone been excluded from the MCC/cooperative?
Are the benefits from the MCC/women group fairly divided among members?
What are the relations to local authorities, politicians, others in power?

Effects/benefits from the support (what has changed) - Check for women and youth!!
What are the main results/benefits from the support? Are these as hoped/expected? If not, why not? (Probe income, food security, new investments, social changes in community and household, division of tasks between men and women, environment).
Who decides on use of funds/investments?
Savings, loans and credit issues? What are the advantages/disadvantages (probe savings, credits, access to credits as part of an association)?
Examples of new production methods/techniques learned and applied? Who/how many have adopted these? Probe successful/unsuccessful techniques. How is the environment affected by these techniques?
Which kind of training has been received? Other support received? Is the training/support responding to the needs and priorities? If not, why not?
Changes in roles and responsibilities of women and youth?

Market linkages and relations

Are relations and linkages between market actors (buyers/input providers/farmers) well-established? Are these linkages working well? If not, why not? What is missing?
For females: probe for access to market/information, mobility

Any other issues

Will the activities be able to continue without project support? What are the main risks and opportunities?

What has changed in the local environment from what is being done? Any changes observed in nearby water, in forests, flora and fauna? In the climate (drought, winds)?

Any recommendations on how to the make project support more useful?

Annex 5 – Outline of outcome harvesting workshop

Duration: 3 hours
Number of participants: approx. 20 participants

i) Introduction

ii) Intended purpose of the Workshop

- open up a space for reflection and learning.
- be an opportunity for project partners to exchange experiences from project implementation.
- provide input to a more comprehensive understanding of change processes related to project implementation.

iii) Presenting overall INCREASE Project ToC and road map

- Remind participants of the overall ToC for the INCREASE project. Explain what the main focus areas are and the importance of actors working in cooperation (e.g. between them as partners, or other non-project partners) and the link to decision-makers/authorities.

iv) Introduction to outcomes

- help participants understand the kind of "short stories of change" that we are trying to collect, and their connection to the ToC.
- Introduce the concept of outcomes as "changes in behaviour, relationships, actions, activities, policies, or practices of an individual, group, community, organisation, or institution". We are going to look for these at different levels. We are not expecting perfect outcomes, but the outcomes do need to be as specific as possible:
  - What happened, what has changed over the last period (behaviour, relationships, activities, policies, practices, environmentally)?
  - Who changed? Be as specific as possible about the individual, group, community, organisation or institution that changed.
  - When did the change happen?
  - Why did the change happen?
  - INCREASE Project contribution: what was the project's role in influencing the outcome? How did it inspire, persuade, support, facilitate, assist, pressure, or even force or otherwise contribute to the change? Note: while the outcome must be plausibly linked to the project activities, there may not be a direct, linear relationship between an activity and an outcome.
  - Significance: Why is this important?
  - Evidence: How do we know this? Is there corroborating evidence?
- provide a few concrete examples

- Invite for queries about the outcomes or the process.

v) Explain the group work exercise

- participants can all contribute with their thoughts and ideas by creating sticky notes and put them on the wall.
- participants will initially get 10 minutes thinking about their own ideas then these will be shared in the group.
- dialogue will be encouraged by looking for connections and similarities.
- Sticky notes will be put on the wall.

vi) Presentation of group work – feedback in plenum and gallery walk

- The facilitator thanks for participation in small group, acknowledges any challenges, and highlights any themes or ideas.
- Engage participants if desired and time allows.
- Encourage participants to look through each other's' work, like a 'gallery walk'.

vii) End of Session

- Ask participants to reflect on the day: What has surprised or affirmed them from today? What concerns or questions do they have about the content or process?
- Briefly summarize the workshop.

viii) Closure

- Thank participants for their participation.
- Explain that the MTE, and SNV/Sida, will be looking at the results of the workshop with a view to improve the support.
- Invite for a light lunch!

Annex 6 – The INCREASE ToC

This Annex provides the MTE's understanding of Theory of Change and the initial assessment and discussion of main elements from the INCREASE ToC which the MTE has investigated further in the data collection.

A ToC is useful to inform evaluation questions, further specify aspects of implementation that needs to be examined and be aware of contextual factors that should be assessed in data collection.[81] A good ToC also allows checking of where in the chain assumptions did not materialize and check whether the problem analysis has carefully considered all potential risks and sufficiently mitigated them. The MTE team's understanding of drivers and assumptions are described in the box. It is essential to understand that while assumptions (of what will happen) are *externally* defined, drivers are the *internal project* strategies/approaches that INCREASE can apply to support development in the intended direction.

Definitions
Assumptions are **statements** of variables or factors that need to be in place to achieve a change (external relations)

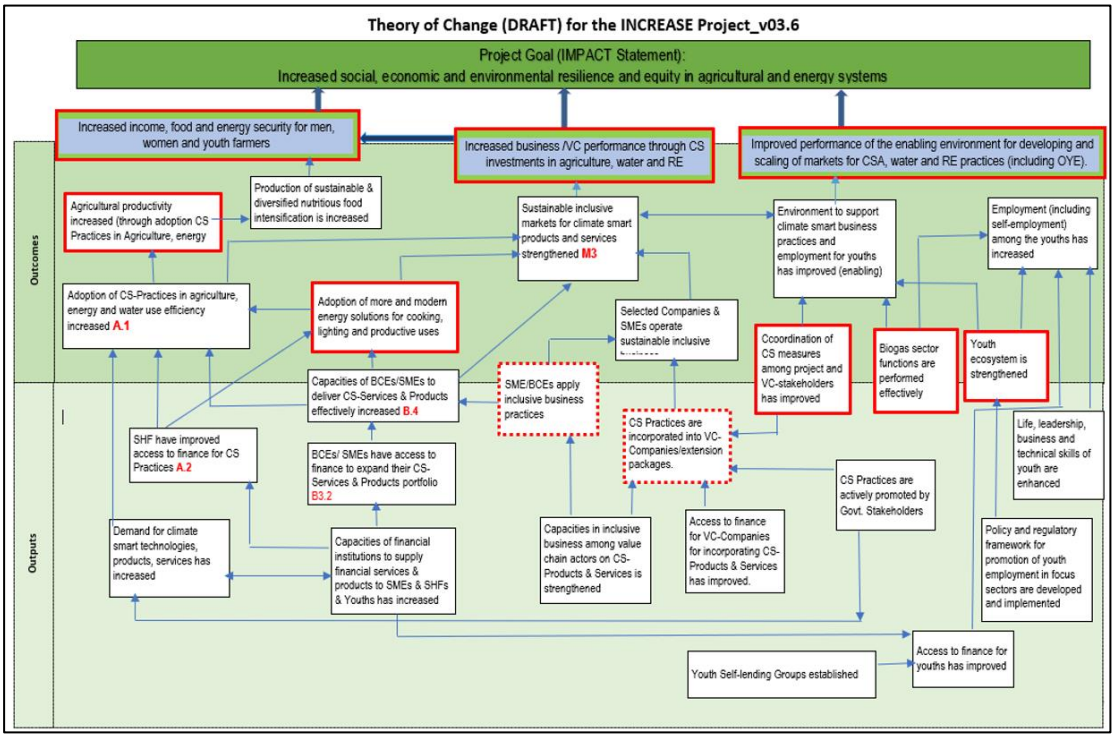
Drivers are **factors** (internal/external) that influence or facilitate a change process and lead from one step to another.

The Increase ToC

The INCREASE ToC has developed over the years and was first visualised in the annual report from 2021 (see Figure 4).[82] However, assumptions and drivers of the ToC are neither explicit in the project document nor the annual report. Thus, a key aspect of the inception report has been to define what assumptions lie behind the chain of changes and what are considered to drive this process. Below, observations from the desk review are structured under key project topics.

[81] Rogers, Patricia (2014), Methodological Briefs, Impact Evaluation No. 2, Theory of Change, UNICEF. The box also draws on the United Nations Development Group Latin America and the Caribbean Secretariat/PSG (2016), Theory of Change Concept Note.
[82] SNV (2021), INCREASE, Annual Report 2021.

Figure 4: ToC for INCREASE



The three components are reflected in the grey boxes in the top of the figure and the focus on three different stakeholder groups is clear and understandable. It also reflects a HRBA where both rights holders (e.g. farmers) and duty-bearers (institutions, companies) are targeted. However, the inclusion of the youth focused OYE project under Component 3 is a bit puzzling since it doesn't follow the same structure. The OYE focuses both on youth as a target group (thus under Component 1 if defined by stakeholders) but also on the enabling environment for youth which responds to Component 3. This is likely due to the fact that it is co-funded by SDC and thus there is a need to isolate the component to track achievements from this specific component. Nevertheless, this challenges the understanding of the ToC.[83]

Selected value chains: cotton, dairy and horticulture

While the specific value chains are not explicitly mentioned in the ToC, they provide the framework for the project and expected achievements. As discussed above there are a number of assumptions related to the selection of the three specific value chains. These are reflected in Table 14 and primarily based on findings from the OYE Market Scan in 2020 and the Market Systems Analysis Report from 2021 as discussed above.[84]

[83] This could for instance have been solved by having an OYE sub-component under each component which would also have allowed for a better integration of the component throughout the INCREASE project.

[84] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020; SNV (2021), INCREASE Market System Analysis Report

Table 14: Drivers and assumptions related to value chains

Drivers	The selected value chains will allow smallholder farmers to connect to outgrowers to access agriculture inputs and markets
Assumptions	Outgrower schemes will allow smallholder farmers to get better prices and increased income for their production
	Selected value chains have the potential to increase income and reduce poverty
	Selected value chains have employment potential, also for youth and women
	Selected value chains have potential for applying CSA techniques and renewable energy

Training in climate-smart agriculture techniques

Training sessions of lead farmers and farmers in CSA within the three value chains, including agro-forestry, bio-slurry etc. constitute a major part of the project. This is the fulcrum and key *driver* expected to create the learning that will allow for improved agricultural practices. Lead farmers are crucial in the "training of trainers" approach and should be carefully selected with due attention to geographic consideration in order to ensure farmers have access to them. Due attention to gender and youth representatives among lead farmers should be taken since they will serve as trainers but also as role models for other farmers to follow. The desk review indicates that it has been difficult to identify youth and females to become lead farmers and e.g. in North Western out of 10 lead farmers in the horticulture value chain only two are females/youth representatives.[85] The MTE will explore to what extent a dedicated strategy to identify youth/female lead farmers has been applied, whether this has not been a focus or whether e.g. lack of female land ownership could constitute a barrier for females to become lead farmers.

Manuals for horticulture, dairy and cotton have been developed to streamline the training. Preliminary review of the three value chains' training manuals shows that they are all exhaustive, covering all issues relating to climate-smart technology and their production, though they tend to be more on the theoretical side. The manuals are distributed to farmers to allow them to use it as a reference book and according to initial consultations with SNV the topics in the manuals are discussed with farmers, but the manuals are not followed systematically in the training (which would require substantial training time). Practical aspects are emphasised during the training session although these issues are not obvious from the manuals. Thus, while the content is rich there is little consideration reflected on how the training should be facilitated. There are statements of applying both a theoretical and practical approach to the training sessions in service providers' reporting,[86] but little reflection of how to ensure participatory approaches to allow for farmers' empowerment to apply the techniques

[85] Impuls Africa (2022), Third Technical Report, INCREASE, June 2022.
[86] Impuls Africa (2022), Third Technical Report, INCREASE, June 2022.

themselves, how to strive for a non-discriminatory and inclusive learning environment, how to ensure gender equality and women's and youth's meaningful participation in the training sessions etc. For instance, it was noted in the annual report for 2021 that "*SNV realises participation alone is not enough for them* (women and youth) *to truly benefit from these activities*", thus a dedicated strategy for their actual involvement is needed. Therefore, the MTE will explore with farmers to what extent the manuals, training materials and instructions have been suitable for them and if the training has been participatory, inclusive and practical. Table 15 summarises identified drivers for the change and assumptions.

Table 15: Assumptions and drivers of training of farmers

Drivers	Training of lead farmers will enable scaling of agriculture training
	Establishing of demo plots and measurement/observations by farmers at appropriate stages will allow farmers to see the benefits of CSA techniques
	Technical support to adopt agro-forestry and biodigesters will allow farmers to adopt CS-practices
Assumptions	Lead farmers gain the capacity to train other farmers and ensure that all farmers (incl. youth and women) are included in the training
	Manuals cover farmers' needs and farmers use them in their agriculture techniques
	Farmers will understand the benefits and apply the training of lead farmers and use CSA techniques in their fields

Extension services and value chain companies

Training and alliances with extension services and value chain companies/cooperatives to promote CSA are envisaged in the ToC. Extension services (private and governmental) are key stakeholders in making all ends meet and ensuring that farmers have the correct inputs and services, adopt new techniques etc. Therefore, the project trains extension service officers to understand the benefits of climate-smart techniques but also to ensure that services and inputs are included in the extension service packages. Findings from the Endline evaluation of E4A[87] indicated a need to further strengthen the collaboration with extension service officers in order to promote the uptake of e.g. biodigesters and thus potentially spur demand for services from SMEs and other value chain companies.

Strengthening of cooperatives and MCCs is also considered the way forward within all value chains and this is a key recommendation of the baseline report.[88] While some MCCs and cooperatives have invested in demo plots, fodder production plots etc. and provide good examples of collaboration e.g. saving and loans associations under OYE, there is little reflection in the documents of how the cooperatives will be supported to

[87] AnChiCon Ltd. (2020), End-Line Evaluation of Energy for Agriculture (E4A) Project, Volume 1: The Report.
[88] Kalinda, Thomson et. al (2020), INCREASE Baseline report, October 2020.

strengthen their capacity and obtain e.g. greater bargaining power towards large companies. Consultations with the SNV project team during the inception phase indicates that little capacity development of MCCs and cooperatives have been provided through INCREASE since SNV already had provided capacity support to several of the initially supported MCCs in earlier projects. The focus in INCREASE has therefore mainly been on production aspects.

Table 16: Drivers and assumptions on extension services and value chains companies

Drivers	Support to extension services to have CSA promoted
	Support to enhancing production of MCCs
	Coordination of value chain actors
Assumptions	Lactalis would select most viable MCCs for the cooperation
	Trained extension services officers will promote CS-practices among farmers
	With increased demand for CS services and products more SMEs/VC companies will be developed and benefit

Access to finance

Access to finance is highlighted in several boxes of the ToC and a number of documents mention lack of access to finance as a key constraint for e.g. investment in biodigesters.[89] The OYE component (Component 3) has a strong focus on finance and saving and credit associations are established to allow for youth groups to jointly save and take credits. The assumption here is that youth will improve its access to finance by taking part in a saving and credit association. The Market Scan[90] revealed however that this is not always the reality[91] and the recent MTR of OYE indicated a widely shared concern regarding access to finance, which some stakeholders perceive as a stumbling block for the OYE pathways to work at all.[92] The Market Scan also found that saving and credit associations tended to be female dominated. Thus, while women have access to savings and credit in the associations, this access is limited for men. It is likely that men in general have better access to finances due to less barriers and more assets,[93] but such aspects need to be taken into account, reflected in the project documents and addressed in the implementation.

Access to finance is also reflected in the ToC under Component 1 and 2. Under Component 1, one output concerns capacities of financial institutions to supply financial services and products to SMEs are expected to improve. While the project proposal included activities to train local finance institutions on the economics of CS-

[89] SNV (2018) Biodigester Market Study in Zambia
[90] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020.
[91] In Mumbwa the saving and credit associations worked well allowing youth to access small funds but in Kabwe the associations were financially inactive due to youths' reluctance to make savings.
[92] Orange & teal (2022), Mid-term evaluation of the Scaling Up Youth Employment in Agriculture Initiative OYE+, Zambia and Zimbabwe, Final report, 15 January.
[93] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020.

practices, these activities have been taken out in the current results-framework. Instead access to finance seems to be defined as access to inputs in the annual report 2021 where it is noted that "*Good Nature Seeds loans given to* (Lundazi District Women's Association) *LDWA (500 farmers) and* (Katete District Women's Association) *KDWA (600) in form of seed. GNA guarantees purchases from the same farmers (out grower system)*".[94]

Table 17: Drivers and assumptions on access to finance

Drivers	Financial support for installing biodigesters and inputs
	Technical support in implementing saving and loans associations
Assumptions	Participation in saving and loans associations will provide men/youth/women access to finance
	Access to finance will allow for more investment in CS-services and products

Energy – biogas

The INCREASE ToC assumes that biodigesters will benefit productive use, household lightning and energy needs as well as cleaner cooking. *Drivers* for adaptation of the technology is financial support to a results-based finance mechanism to BCEs who will construct the biodigesters. When other farmers see the potentials of the biodigester, demand is assumed to increase which will provide additional work for BCEs.

However, previous experience with biodigesters has indicated that there are a number of challenges with these assumptions: sustainability of the biodigesters has proven to be less than expected and findings from the recent Biofertiliser market assessment showed that of the 69 biodigesters surveyed, only 30 representing 43% were still functional while 39 representing 57% were not functional.[95] Thus, quality issues continue to be a challenge which is also recognised in the Lessons Learned report[96] and in the Annual Report 2021 which is why a quality assessment study was commissioned.

The End-line Evaluation of E4A indicated that while BCEs have demonstrated capacity to construct biodigesters, the level of demand in this market was insufficient to support a sustainable business.[97] While this report is two years old, and the demand could have increased, it is likely that some of the trained BCEs will not be able to sustain their businesses after end project support. Especially since lack of demand and access to finance continue to be obstacles. Therefore, it is also recommended that sustainability should be a criterion in a register for BCEs as reflected in the End-line Evaluation of

[94] SNV (2021) INCREASE, Annual Report 2021.
[95] AgriEn Network (2022), Yvonne Mtumbi Mwanza: Biofertiliser Market Assessment Report, June 2022
[96] Household biodigester market development in Zambia, lessons learnt from the energy for agriculture project
[97] AnChiCon Ltd. (2020), End-Line Evaluation of Energy for Agriculture (E4A) Project, Volume 1: The Report.

E4A.[98] Annex 7 sums up recommendations from previous evaluations/reviews/assessments.

The primary focus of the E4A project was bio slurry for productive use. However, the Lessons Learned report[99] indicated that bio slurry was underutilised despite the fact that farmers understood that bio slurry has a very high nutrient value. Therefore, it was recommended to engage extension services to a higher extent to ensure promotion of bio slurry for production.

As indicated also above, it is the assumption that demand for biodigesters will increase with enhanced access to finance. While that assumption is likely to hold true, besides the saving and loans associations under OYE there is little reflection of strategies to ensure more farmers get access to finances.

Table 18: Drivers and assumptions for the biodigesters

Drivers	Results-Based-Finance (RBF) scheme for BCEs to install biodigesters
	Training of BCEs to provide quality products
Assumptions	Biodigesters will last for at least 10 years
	Farmers will use gas for cooking and bio slurry for productive use
	Demand will increase when farmers see the economic and social benefits of the biodigesters increasing demand from BCEs
	Access to finance will increase demand

Gender equality and inclusion of youth and vulnerable groups

As mentioned above, the project emphasises a focus on women and youth. This is most clearly reflected in Component 1 where "men, women and youth farmers" are explicit referred to. While youth is also explicit in several of the boxes of the ToC, the focus on women/girls are less pronounced further down the chain.

The Market Scan found that especially in rural areas female youth were excluded from *ownership* of productive resources such as land and cattle compared to male counterparts. This influences women's

Assessment of women's empowerment in the MTE:

- Income and control of use
- Access to/control over resources
- Decision-making power in household (productive resources)
- Leadership in community
- Time management
- Mobility

[98] AnChiCon Ltd. (2020), End-Line Evaluation of Energy for Agriculture (E4A) Project, Volume 1: The Report.

[99] Household biodigester market development in Zambia, lessons learnt from the energy for agriculture project.

decision making on production and investments. At the same time females were not allowed to do business that involved travelling and if they earned money, their husbands would often control its use.[100] Thus, women are restricted on several parameters defined as essential for women's empowerment as reflected in the International Food Policy Research Institute (IFPRI)'s Women's Empowerment in Agriculture Index (WEAI).[101] Key elements in this index includes decisions about agricultural production, access to and decision-making power over productive resources, income (and control over use), leadership in the communities, and time management. While both SNV's Balancing Benefits and WEIA focus on women's *income generation, decision making in the household* and *leadership in the community*, the WEIA supplements SNV's Balancing Benefits approach by also including a focus on *time management* (since when engaged in more productive activities women's time for leisure is likely to be further constraint) as well as *access to and control over resources*. As indicated in the Market Scan, *mobility* has proven to be a limiting factor for women which can influence their ability to scan the market and get the newest information about prices, quality etc. It also limits their possibility to go to market fairs, thus minimising their income potentials. While these elements (highlighted in italics) are all key for gender equality and women's empowerment in the agriculture sector they are primarily dealt with in some of the analysis (e.g. the Market Scan) but not fully reflected in the ToC and strategies for ensuring these elements are often missing. The MTE will explore how these elements are considered in practice and come up with suggestions for how they could be enhanced in the project ToC.

The ToC makes no explicit reference to vulnerable people besides the focus on youth and women but these groups cannot per say be considered as vulnerable. They often face more barriers than men, but women constitute half the population in the world and not all of them are vulnerable. Thus, the target group needs to be further broken down to understand whom the most vulnerable groups are within the specific context in the sector.[102] Table 19 summarises key drivers and assumptions for gender equality and inclusion of vulnerable groups.

Table 19: Drivers and assumptions for gender equality and vulnerable groups

Drivers	Skills development and training targeted at youth and women for empowerment
	Policy engagement (with government and businesses) to create a better environment for youth and women
	Technical support for youth and women in implementing saving and loans associations

[100] SNV (2020), Opportunity for Youth Employment (OYE) under the INCREASE Project, Market Scan, Desk Review and Field Study Draft Report, October 2020.
[101] https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/126937/filename/127148.pdf
[102] It would require a more in-depth analysis based on parameters such as age, rural vs. urban, income level, ethnicity, minority, language, level of education, sexuality, religion etc.

Assumptions	Youth and female participation in project activities will support their empowerment (economically – income - and socially -decision making and community leadership)
	Men, women and youth have the same possibilities to participate in the project activities

Annex 7 – Recommendations from previous assessments

Table 20: Actions agreed upon based on recommendations from SNV's internal MTR 2021

#	Recommendations	Level of implementation
1	Use the internal MTR as an important source document for the external MTR to show SNV has acted on identified challenges	This is being done in the MTE
2	Consider engaging additional business partners and implementers to accelerate implementation/depletion; and engage SNV experts on dairy and horticulture from other countries	At the point of the iMTR the project depletion was at 30% and although the recommendation here was to explore external support, this route was not adopted because already Sida was concerned about many consultants on the project. The new project leadership resorted to filling the vacant project positions in April/May 2022 and this was followed up with a team building session. Work plans with partners like ZARI, Mulungushi and Impuls Africa were reviewed, and new targets set to catch up.
3	Establish clear linkages between INCREASE and the OYE component by preparing and implementing a joint work plan for 2022	Some linkages have been established but no joint work plan has been conducted. It was decided not to do a joint work plan but instead strengthen coordination. This was done with joint monitoring visits, joint trainings of beneficiaries and LSPs.
4	Include both farmers' participation and adoption rate of practices in project monitoring and reporting	Has not been done but a consultant will be engaged in Q1 2023 to assess adoption rate/level.
5	Allowing farmers to adopt components of practice & input packages rather than focusing on their entire adoption	Focus has continued to be on adopting the full package which the current MTE has found to be less effective. However, in 2022 the project has allowed for some more flexibility by letting farmers choose at least 2 CSA/RE practices that they prefer.

6	Develop and implement a system to get biodigesters sold, constructed/installed and serviced by the private sector at quality	Process started but was not completed at the time of the MTE. In 2022 the priority was to screen BCEs and only continue with the ones providing quality work. Modality of payment has been changed and SNV is now procuring materials to avoid materials of poor quality, farmers need to pay 60% of fee to masons before commencing the work. A cluster model has been introduced so at least 10 HH need to sign up for biodigesters.
7	Consider offering solutions for farmers facing a water shortage like farm ponds and boreholes	A total of 12 boreholes have been agreed upon but are yet to be implemented. Solar irrigation pumps are promoted for productive use in collaboration with Vitalite. No examples of farm ponds and rain harvesting were identified.
8	Keep the focus of the project on women (applying Balancing Benefits rather than GESI) and youth to avoid additional complexities	The recommendation to continue to use Balancing Benefits was welcomed by management but still a GESI approach seems to have been applied reflected in having a GESI position and a GESI training conducted.
9	Use the four parameters of SNV's earlier concept (leveraging additional finance; kick-starting sustainable markets; governments and others adopting SNV approaches; and shifting norms, new normal) to monitor developments related to systems change in a qualitative manner, for example through keeping of a logbook	Not implemented. No changes to the initial M&E system have yet been conducted. No examples of qualitative monitoring have been shared with the MTE Team nor does the annual reporting reflect such methods.

Table 21: Recommendations from Market Systems Analysis 2021

#	Recommendations	
Horticulture		
1	Investment in cold storage and processing facilities	Horticulture cooling pilot has been explored
2	Training and capacity building in horticulture production and quality assurance for the off-takers' farm workers as well as the small-scale	Has not been done

	farmers to be engaged as outgrowers by off-takers with technical support	
3	Establish financing model for acquiring of solar powered drip irrigation systems and irrigation kits to be paid off through sales of horticulture products.	Has not been done
Cotton		
1	Switching to organic cotton production as it does not require costly inputs and when certified it fetches a premium price	Still mainly a focus on conventional cotton. Only three places where organic cotton is grown. However, it has been marketed as conventional cotton so no premium price.
2	If organic cotton is taken as an option then the Cotton Board of Zambia need to isolate more areas for cotton production.	This has not occurred.
3	There is need for a transparent mechanism to be established for setting a base price or pre-planting reservation price to guide the farmers on decision making on which crop to grow based on price comparisons.	Has not been done though the MTE learnt of plans to hold a national cotton indaba (meeting to resolve pertinent issues)
Dairy		
1	Training and capacity building in hay/silage and fodder production for supplementary feeding of dairy animals during the dry season, disease control and quality assurance at community level.	A number of MCCs have received this training
2	Practising Climate-Smart Agriculture, such as, shifting grazing to allow vegetative regeneration and conservation of the grazing areas	Not done and constrained mostly by communal grazing with unfenced grazing lands
3	Promotion of solar-powered cooling cans to transport milk from farmers to bulking centres, especially in hot season	Has not been done. Munjile MCC acquired this at their own initiative to supplement power from the hydro national grid
4	Solar-powered chillers would be ideal for remote areas to maintain milk quality	Agreed as Munjile MCC is able to use its solar power to run chillers when there are power outages
5	Introducing innovative ways of collecting milk such as mobile milk collection centres	Has not been done
6	Integration of crops, fruit trees, agro-forestry pasture such as Lucaena and livestock is one way of sustaining the	Implemented partly. Not all farmers have received all inputs yet.

	environment while promoting the dairy value chain. Animal waste is used in a biodigester to produce biogas for cooking, while the bio-slurry is applied to the crops, fruit trees and Agro-forestry pasture as biofertiliser.	

Table 22: Recommendations from Lessons learned report from E4A 2021

#	Recommendations	Implementation level
1	Strengthen the biomass policy framework and broader enabling environment for biodigesters	Has not been done
2	Promote biodigesters for productive purposes and diversify end use applications of biogas and bio-slurry to improve rate of return	This is being included in the trainings
3	Expand access to finance options for suppliers and end users through adequate financing facilities	Not implemented

Table 23: Recommendations from E4A End- of Line Evaluation 2020[103]

#	Recommendations	Implementation level
1	Ensure to develop and implement a clear exit strategy	Not completed.
2	Conduct cost-benefit analysis of biodigesters (on production, health etc.) to promote the technology	Not conducted
3	Register and certify BCEs and masons based on quality, sustainability, customer satisfaction.	This has been started and criteria for ranking the BCEs and masons was shared with the MTE team
4	Collaboration with research and education institutions (e.g., Southern African Biogas Industry Association (SAYBIA) to ensure continuous advancement of biodigester installations (e.g. for chilling, electricity etc.)	Has not been done

[103] Summarised by the MTE team.

5	Linkage to Climate Change Funds through the Clean Development Mechanism (intended in E4A but not implemented)	Has not been done
6	Enabling legal framework for the biogas sub sector should continuously be supported	Has not been done

Annex 8 – List of documents

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Increasing Resilience in Energy and Agriculture Systems and Entrepreneurship (INCREASE)

The evaluation object is INCREASE Project that is implemented by SNV for the period 2020 to 2023. The 79 Mill SEK large project focuses on climate-smart agriculture, renewable energy, support to SMEs, smallholder farmers and cooperatives to implement climate resilient techniques, women's economic empowerment and gender equality. The goal of the INCREASE project is "Increased social, economic and environmental resilience and equity in agricultural and energy systems". This goal was formulated based on the understanding by SNV that the key challenges facing farmers, agribusinesses and Small and Medium Enterprises (SMEs) stem largely from the impact of climate change. Therefore, the INCREASE project aims to strengthen the adaptive capacity of agricultural and energy systems as well as the promotion of climate-smart (CS) diversification practices and productive use of renewable energy (RE). The project envisions making agricultural and energy systems more resilient to a changing climate (IMPACT). Horticulture, Cotton, and Dairy are the economic sectors the intervention targets. The objective of the Midterm Evaluation (MTE) of the INCREASE Project is to inform progress towards results and lessons learned after 2-years of implementation.

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