Paper

November 2022

Hygiene integration in agricultural value chains

a study on costs and incentives integration in value chains in Kenya

SNV

Table Of Contents

List of tables

List of figures

List of annexes

Abbreviations and acronyms

AVC	Agriculture Value Chain
CBO	Community Based Organisation
CEO	Chief Executive Officer
CRAFT	Climate Resilient Agribusiness for Tomorrow
Coop	Cooperative
CORE Africa	Collaboration for Research Excellence in Africa
CPI	Climate Policy Initiative
EMP	Environmental Management Plan
FGD	Focus Group Discussion
FCS	Farmers' Cooperative Society
HACCPs	Hazard Analysis Critical Control Points
HR	Human Resource
KEBS	Kenya Bureau of Standards
KES	Kenya Shillings
KII	Key Informants Interview
KIRIWASCO	Kirinyaga Water and Sanitation Company Limited
KNCCI	Kenya National Chamber of Commerce and Industry
LGC	LIXIL Groups Corporation
MCA	Member of County Assembly
MT	Metric Tonne
MUWASCO	Muranga Water and Sewerage Company
NEMA	National Environment Management Authority
NGO	Non-Governmental Organisation
OHS	Occupational Health and Safety
PPEs	Personal Protective Equipment
SHG	Small Holder group
SME	Small and Medium-Sized Enterprises
SNV	SNV Netherlands Development Organisation
ToR	Terms of Reference
UHT	Ultra-High Temperature
UNEP	United Nation Environmental Programme
UNICEF	United Nations Children's Fund
USADF	U.S. African Development Foundation
WASH	Water Sanitation and Hygiene

Executive summary

Agriculture Value Chains (AVCs), with their intensive interactions and exchanges between communities and regions are a potential spreader of public health diseases, including Covid-19, with potential to inflict severe impacts. SNV, the Netherlands Development Organisation, is implementing a project on integrating hygiene into AVCs with the aim of enabling VC actors to integrate hygiene along the various nodes. To gain greater insights on hygiene integration in AVCs, SNV engaged a team of consultants to undertake a study whose objectives were to assess, characterise, and document the costs of integrating and/or not integrating hygiene into agricultural value chains (AVCs). The study also captures the incentives for triggering AVC actors (policy makers, business owners/managers, employees, market traders, consumers, and service providers) to integrate and practice hygiene in AVCs. The Value chains and nodes targeted included milk collection and processing firms, aggregation/transportation firms, potatoes and cereals processing centres and local retail markets.

The study uses primary data gathered from the key respondents drawn from 4 different nodes which included the markets (Kagio in Kirinyaga County and Rongai/Limuru in Kiambu County); Cereal aggregators and processors (SOPA in Kiambu County and Topical Ventures in Nairobi County); Fruits and vegetables processors (STAWI Foods and Fruits and Nature Lock both in Nairobi County); and Dairy processors (Kangari United in Muranga County, Njabini FCS in Nyandarua County and Mukurweini Wakulima in Nyeri County). Respondents targeted for interviews included 3 workers, 2 customers and 1 business manager/management committees/or manager in each of the SMEs. For each produce markets, 5 traders and 2 service providers were interviewed. In addition, FGDs comprising 5-9 policy makers (Sub- County employees) were conducted in Limuru and Kirinyaga West Sub-counties. Data was collected using checklists and templates for capturing costs. Eventually, the data was compiled and analysed along key value chain nodes and respondent types using an analytical framework (Annex 6); which isolated the similarities, differences, key conclusions, incentives and possible approaches to pilot the incentives along each stakeholder and nodes.

Key hygiene costs were based on both investment and operations and maintenance (o&m) costs for facilities such as toilets, hand washing facilities, food products handling and transportation equipment, faecal waste management facilities, solid waste management facilities, grey water management facilities and other related facilities/infrastructure/investments. The analysis noted that different nodes had high requirement in specific aspects but lower on other aspects. For example, markets required higher investments for toilets and hand washing facilities, while agro-processors and aggregation/transportation SMEs required higher investments in technologies for food handling and disposal of dust. Both the food processing and milk nodes also indicated they would require more investment on systems that would in-build hygiene in their processes such Hazard Analysis Critical Control Point (HACCP).

Regarding operations and maintenance, all firms noted an increased requirement for toiletries, running water, soaps and detergents especially during the covid -19 periods. Some SMEs also required additional labour to support hygiene activities, including cleaners and supervisors.

The study has also identified reasons that make the business owners and users of nodes to think about (consider) the need for hygiene in respective nodes; these reasons fall under nine categories including: (1) commercial and revenue; business reputation; environmental concerns; fulfilling of business or policy mandates; availability of appropriate technology; human welfare/food safety concerns; adherence to existing regulations and procedures; skill and knowledge capacity/levels; and personal character and gratification. Generally, business owners and managers are aware of the hygiene risks to their business and prepared to integrate appropriate hygiene measures but often challenged by high investment costs.

Food markets mainly lack reliable sources and storage facilities for running water while sustaining hygiene practice is seen more as an individual initiative rather than a communal one. The main barriers for traders to practice hygiene were therefore lack of cooperation from fellow traders and lack of or inadequate facilities such as produce and hand washing facilities as well as toilets.

For various SMEs, lack of water and also lack of or limited facilities and technologies were the main limiting factors for workers to practice hygiene, with the former being unavailability of technology for cleaning of surfaces, extracting dust or cleaning equipment and transport facilities etc.

The study has identified the main *incentives* that drive each of the key actors in each node to demand or invest in hygiene. These are summarised as below:

Policy makers

- Realisation/awareness of effects to county welfare and local economy of poor hygiene by policy makers and legislators; for example, the possibility of emergency of hygiene related problem e.g. COVID -19 or Cholera, with the latter having been reported in Kagio market a few years ago and which forced county to act.
- Pressure from stakeholders- through complains by stakeholders- e.g., demonstrations and lobbying by traders, committees, trade associations etc
- Mandate and overall development agenda- the mandate of Counties is to develop (or adopt) appropriate policies
- Presence and availability of the right or supporting policies (from e.g. the national government) and laws to support the policies that would be developed and also from which to borrow and cascade laws and policies, and
- Knowledge and skills on policy development and initiation among the County MCAs and policy officers

Business owners

- Improved and sustained levels of business- through retaining and attracting customers – e.g. not losing customers, attracting new customers
- Revenue generation motive: ability to sustain or have improved revenues through for example attracting new customers or accessing new markets,
- Enforcement of hygiene adherence- the need to adhere to regulations on hygiene,
- Better reputation/better image/recognition- that the business owners would want to be seen to be practicing hygiene -by their customers and other stakeholders; and
- Cost of health services to businesses and overload in use of county hospitals and facilities- that poor hygiene is seen as costs load to County and business especially when there is outbreak or diseased persons.

Workers

- Generating better and sustaining revenue to be able to retain and earn salaries,
- Enforcement on adherence- from internal enforcement by management or externally by public health officers,
- Realisation of better or sustained salaries and rewards,
- Penalties through e.g., losing job,
- Rewards-that schemes that reward hygiene practices by workers would act as incentives, and
- Timely access and availability of appropriate hygiene supplies and facilities

Traders

- Improved and sustained levels of business- e.g., attracting customers.,
- Enforcement n adherence by market committees or county government staffs
- Commercial gains-ability to sustain or have improved revenues through retained on increased customers,
- Losing business/having stalls closed and therefore losing business, and
- Access and availability of appropriate hygiene supplies and facilities

Customers

- Realisation of good health and avoidance of hygiene related diseases, and

- Ability to generate sustained or improved revenues- especially where customers are also traders- have their own customers to whom they sell to

Service providers

- Improved and sustained levels of business- e.g., toilets attracting and retaining users and ability to attract more customers even from beyond the markets,
- Enforcement on adherence by county government on toilet hygiene adherence,
- Improved revenues- through improved customer base and better/higher payments,
- Health (complains) of other customers and especially for the disabled managed toilets, their fellow disabled customers who are not able to use facilities without a lot of touching of the surfaces.

Ultimately, hygiene promotion needs to lead to realisation of elements/outputs that will build and support the drivers/the motivation factors to hygiene integration. These elements can build from or be incorporated in the system or activities introduced in the node. The study thus recommends supporting of the realisation of the different incentives to different actors through proposed piloting measure discussed below while also undertaking of the short- and long-term interventions. It also recommends starting with short term interventions that are achievable (based on cost and existing systems) and which will activate hygiene integration immediately and lead to sustainability. The short term intervention relate to basic hygiene facilities such hand wash stations; supply of adequate and clean water; capacity building on hygiene; having personnel to clean and enforce hygiene, signages installation; rehabilitating or putting up of new toilets and hand wash stations; having certification programmes such as HACCP and having and EMP and acquiring Environmental audit certificates; installing crucial food handling equipment and machinery such as for dust management, food mixing and aluminium milk cans; improving on working surfaces through putting tiles on floors; having washing area for produce among others.

This would then be followed by long term high costs interventions that have wider long-term support to hygiene. The long-term investment would be those with higher cost/financial implication and more planning, such as expansion of facilities; installation of machinery and equipment for further handling and processing such as for packaging or processing new products; installation of new processing building, washing bays, change rooms, and drainage; having quality-based pricing system; going for more better systems and facilities like installation of epoxy floors, having floor cleaning machines etc. They also relate with higher levels of nodes operations/activities. Some of these investments may include the following:

- In the markets, focus need to be on hygiene facilities and improvements of structures to support installation and also support operation of installed (existing and new) hygiene system and activities (facilities such as fencing, paving, supply of water, and points for washing produce.
- In the businesses on agro-processing and the dairies installation need be those that will improve on existing processes that have impact on hygiene- e.g., installation of cyclones, mixers, pasteurisers etc.
- In both dairy and food processing, there is also need for installation of systems with enforceable procedures and processes that have in-build hygiene activities- e.g., HACCP, quality-based pricing etc

The study has also made recommendations in relationship on how *to pilot the incentives* that includes for *Policy maker's;* sensitising community stakeholders on likely diseases and impacts; increasing understanding of policy makers on hygiene; pushing, supporting and sensitising organised groups to demand/lobby for hygiene; review of department mandates and job descriptions; and sensitising on existing laws and policies. For *Business owners'* the proposed piloting includes sensitising farmers and customers to demand for better hygiene; sensitising and pushing for inbuilt hygiene processes; prevailing upon buyers and regulatory authorities to demand for certain processes; strengthening committees' efforts through bye laws; reinstating of levies in the markets; emphasising importance of hygiene; campaigns to enlighten on status of hygiene in the markets using appropriate messages among others. With W*orkers'* they include;

prevailing on demand side to demand hygiene; emphasising importance of hygiene integration and possible losses from non-integration; pushing for more frequent visits by enforcers; pushing for hygiene adherence reward and penalty schemes; documentation on appropriate facilities; and supporting on hygiene infrastructure upgrade. With the *Customers'* the proposed piloting includes sensitising on effects of good hygiene and types of diseases from poor hygiene; and sanitising customers to demand for more hygiene. The *Traders'* proposed piloting includes strengthening the customers side to demand for more hygiene; enhancing water supply and having of produce washing areas; sensitising on effects of not integrating-including losses and benefits of integrating; pushing for more frequent visits by enforcers; introduction of specific bye laws and sensitising on existing ones; support for more facilities and prevailing on traders to demand for the same. The *Service providers'* the proposed piloting includes some under other stakeholders, but also piloting lower charges and charges per day instead of per visit; sensitising traders and users of nodes on need to pay for services; and sensitising users on diseases and effects of poor hygiene facilities.

Under all the incentives there is need to have a method/ means of assessing the piloting activities; for example, comparing the with and without situations and comparing the change in the incentive itself.

Introduction

1.1 Background and rationale

Agriculture Value Chains (AVCs), with their intensive interactions and exchanges between communities and regions are a potential spreader of public health diseases including Covid-19; with potential to inflict severe impacts. SNV, the Netherlands Development Organisation, is implementing a project on integrating hygiene into AVCs with the aim of enabling actors to integrate hygiene along the various nodes.

To gain greater insights on hygiene integration in AVCs, SNV engaged a team of consultants to identify, characterise and document barriers, incentives, and costs for integrating hygiene in AVCs. The chains and nodes that were studied included: (1) milk collection & processing firms; (2) aggregation/transportation firms; (3) potatoes and cereals processing centres; and (4) local retail markets selling agricultural inputs and products. The study, which targeted small and micro-enterprises (SMEs), covered the period from 10 January 2022 to 28 February 2022 as per the contract and was undertaken across selected counties namely: Kiambu, Muranga, Nyandarua, Kirinyaga and Nyeri. Notably, the firms were selected such that they were different from those targeted in an earlier hygiene integration study by SNV.

1.2 Assignment Study Objectives

The specific objectives of the study were to:

(a) Assess, characterise, and document the costs of integrating and/or not integrating hygiene in (1) milk collection & processing firms; (2) aggregation /transportation firms; (3) potatoes and cereals processing firms; and (4) local retail markets;

(b) Assess, characterise, and document incentives for triggering AVC actors (policy makers, business owners/managers, employees, market traders, consumers and service providers) to integrate and practice hygiene in the AVC nodes in (a) above.

The study is meant to facilitate the firms and units of the nodes to determine the costs of integrating (or not integrating) hygiene in their firms/units. This is meant to later help the units to use these findings while deciding whether to integrate hygiene or not. It also meant to facilitate the selected stakeholders of various nodes to identify incentives that will drive them to not only integrate/embrace but also practice hygiene in their daily life/operations. These incentives will be those that if implemented or realised will make the stakeholders to respond and integrate hygiene.

1.3 Review of Literature related to the study

In addition to primary data, a review of literature was undertaken in line with the analytical framework (

Figure 4) developed from the assignment ToR. According to WHO (2013), there is an economic argument for investments in the social determinants of health, and that aspects such as economic gains through aspects such improved revenues and value for money (VFM) are incentives for investments. At the public level, lack of standardised efficiency-based rationales or market failures may be relevant to address social determinants of health. This rationale includes imperfect information, externalities, public goods, and non-rational behaviour. UNEP (2013) highlights incentives to encourage the private sector to invest in environmentally sound management. These includes supporting and encouraging information exchange; and provision of financial incentives (especially where the social cost of health problem is higher than private cost). Others include appropriate policies such as reduced taxes, permit and regulatory incentives, subsidies (grants, low-interest loans, favourable tax treatment, environmentally preferable procurement policies); as well as indirect financial effects and free information.

Climate Policy Initiative- CPI (2015) indicated that a combination of incentives could promote investment in health and environmental interventions by the private sector. These includes having a combination of policies, regulations and technical assistance measures to help stimulate demand for private investment. The latter is achievable through addressing knowledge gaps; improved

access to finance for integration; and availability of frameworks to catalyse incentives for investment; such as adequate price on the risk of inaction and increasing the rate of return of possible environmental/hygiene integration investment opportunities.

Mills et al. (2020) noted that the drivers to investment are public health, sustainability and economic performance – via the three proxies of contamination, climate change and costs. As discussed by Caplan (2015); the incentives for private sector investment in WASH integration includes measure to increase and meet demand for the services to be provided. These measures includes; marketing and changing behaviour; blending the profit motive with development goals; use of sustainable products (i.e. that meets customers demand/are usable, have systems that are easy to install, maintain and that meet hygiene needs); cutting costs by having and improving technical skills to reduce unnecessary expenses; having or re-structuring credit financing to make it attractive for nodes/investors to take small loans for WASH; and reducing on blind subsidies' in WASH sector to encourage private sector participation.

The determination of both cost of integrating and not integrating uses financial/market prices or for the former mainly economic prices. According to Ross (2020), the cost of hygiene intervention has two major cost components at the time of intervention delivery. These are the costs of promotional activities and cost of hardware. There are also two other type of costs that occur later on across the intended lifespan of the hygiene facilities. These may include: the replacement of consumables (e.g. soap and water); equipment repair and replacement; and human resources for operations (i.e. replenishment of soap, water supply, and cleaning of tank or contact surfaces). Sustained promotional activities may also be required at this stage. According to the study these costs need to be seen from the provider perspective - costs borne by the service provider (e.g., the agency delivering and/or paying for the intervention) and societal perspective- provider costs plus any costs borne by other stakeholders including the users. Market prices are derived directly from market transaction, so for those interventions where this is possible, these prices are used.

Costs of installation	Costs of operation and management	Regulations costs	Commercial costs
•Toilets •Hand washing facilities •Food tranporting equipments •Faecle waste equipment •Soild waste facilities •Grey water facilities •etc	•Toilets cleaning •water and soaps •Cleaning surfaces •Sewarge-soild and liquid waste mgt •wearing masks •etc	•Building capacity of regulators •Monitoring hygiene •Enforcing hygiene •etc	•Loss of business due to integration- change in quantities X price •Wages change due to integrations (under operations too) •Net subsidy change •Other business cost due to integration

Figure 1: Cost of integrating hygiene in AVCs

In this study the costs estimation followed the framework illustrated in ***Figure 1*** below and also using the questions presented in Annexes 7 to 13.

Cost of not integrating or inaction could be estimated from other parameters. According to LGC and WaterAid (2016), and also by Radin et al. (2019) the costs associated with poor sanitation can be estimated in relation to four dimensions namely; mortality (e.g., cost of premature death due to poor sanitation); productivity (the value of economic activity lost due to sanitation-related sickness); healthcare (cost of treating sanitation-related diseases) and cost of access (the value of time foregone due to people not having access to a sanitation facility). Other costs would include penalties by inspectorate departments for the low levels of hygiene or sanitation.

Identifying the cost of not integrating hygiene from these dimensions and documenting aspects that would relate with either can be easily determined from Figure 2.

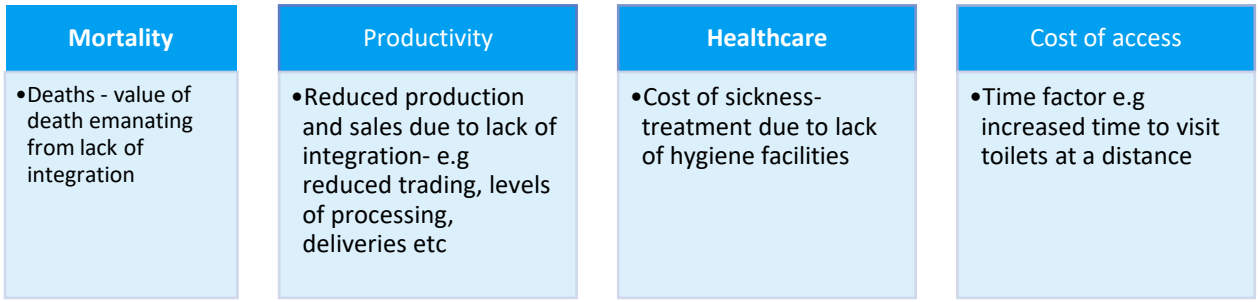

Figure 2: Cost of Inaction/not Integrating Hygiene in AVCs

Drawing from environmental economics, it is also possible to estimate the cost of goods and services (like health and environmental goods) through survey respondents; especially regarding their preferences (stated preference or contingent), or through observation of behaviour (revealed preference) (Simiyu et al., 2017; ADB, 2014). The stated preference methods like the willingness to pay can also be used to estimate the cost of hygiene (integrating or not integrating). However, according to Simiyu et al., 2017, the stated preference methods (like willingness to pay) have faced several critiques, including challenges of reliability and validity, since they are not based on what people actually do; and that in addition, due to the hypothetical nature of most willingness to pay studies, it is argued that respondents may be ignorant, uncertain or unable to make a trade-off on the good or service. This study therefore didn't utilise these methods.

1.4 Materials and methods

1.4.1 Overview of the approach and methodology

The approach and methodology used in the study built on the examination of the scope of works as described in the Terms of Reference (ToR) and was guided by the conceptual approach presented in Figure 3, consultations with the Client (SNV), and the visualised conceptual framework for successful hygiene integration in Figures 3 and 4.

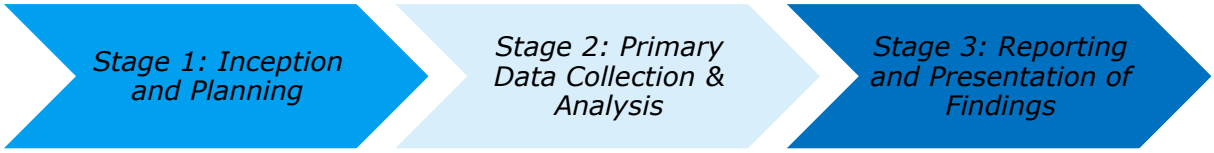

Figure 3: Study Conceptual Approach

Overall, a mixed methodology approach incorporating a participatory and consultative approach was used in the study; and utilising mainly primary research to capture the costs and incentives for hygiene integration study. The data was sourced mainly from primary data (discussions and interviews – key informant and semi-structured interviews). A basic desk review for sites identification was initially conducted. The assignment was therefore carried out in three phases as illustrated in *Figure 3:*

As per the ToR and from the review of literature the following framework (Figure 4) was visualised for successful integration of hygiene in the respective nodes and for acting as a guide in this study. This was used to refine the tools provided in the ToR.

The framework presented in Figure 4 shows the incentives that lead to successful hygiene integration in the AVCs. At the centre are the internal factors (shaded circle) of the node where hygiene integration will be undertaken. Integration of hygiene by the node will depend on internal resources, technological capabilities and the participation by users and managers of the nodes. The implementation and successful operationalisation of the integration will also depend on external factors such as the policies, regulations in place, disease/epidemic emergence due to poor hygiene, cost of hygiene facilities, availability of organisations ready to finance the initiatives and requirements by users. The availability of appropriate policies will emanate from internal and external factors to the departments developing the polices.

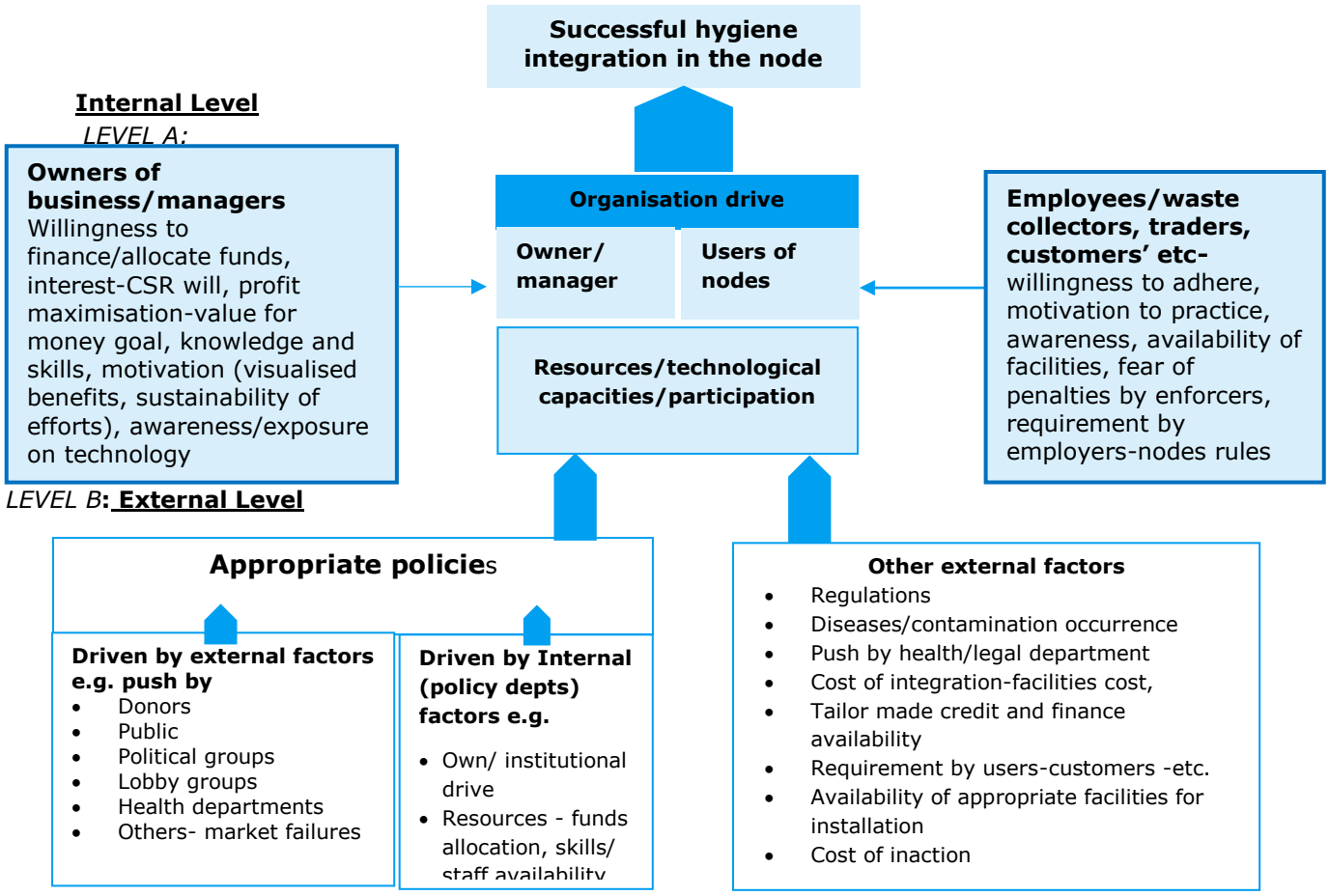

Figure 4: Visualised Framework for Successful Hygiene Integration

1.5 Summary of Tasks Carried Out by the Consultants

A summary of details of the activities carried during the study are presented as follows:

- **Task 1: Contracting and Inception/kick off:** Before the actual execution of specific tasks, the assignment started with a kick-off meeting between SNV and the consultants. The kick-off meeting was used to align expectations, agree on deliverables and affirm the timelines for performing the assignment. During the kick-off meeting the key approach was also agreed upon. In addition, to the kick-off, serval follow up calls and email exchanges were used to sort out emerging issues.
- **Task 2: Carry out a stakeholder mapping and analysis:** The consultant conducted a preliminary analysis in consultation and guidance from the SNV team to find out the key players/node participants in the selected counties and at the national level to be interviewed. These involved identifying the stake holders, their roles and contacts. The stakeholders identified and interviewed are as listed in Annex 1 .

  Task 3: Data Sourcing and Sampling: The study involved three levels of engagement and information/data collection; micro, meso, and macro. The macro level study related to the national level understanding of hygiene integration costings, incentives and policies and was undertaken by seeking information from organisations (through review of literature) involved in development and promotion (including projects, donors, government department and researchers) at national level. The meso-level involved engaging nodes policy developers, project implementers, business players, service providers at the counties; and the micro study involved interviewing the users of the nodes-consumers, traders, transporters etc. Purposeful and random sampling was used in the study. Where stakeholders were many (such as in the markets etc.) random sampling was used to select those to be interviewed- the users. For users and workers interviews 2 to 3 were selected

per unit based on gender and age and, socio-cultural-economic and geographical variation considerations. Focus Group Discussions (FDGs) was conducted for policy makers and implementers to gather, confirm, and assess information to characterise incentives for hygiene integration in AVCs. Each FGD comprised about 5-9 respondents. The selection of the study areas was discussed and agreed on with SNV. The consultant with support from SNV Kenya identified the target clients. The nodes studied were selected based on their interest and willingness to participate in the study. The study focused on pulses, vegetables and potatoes value chains handled by SNV Kenya CRAFT project. Four agricultural value chains (vegetables, potatoes, dairy-milk, and pulses/cereals) were considered. The selected CRAFT projects fall under two types of high-risk nodes or firms; aggregation /transportation firms, and pulses/cereals. The consultant liaised with various stakeholder to identify the other nodes: milk collection and processing firms, and the local retail markets. Appendix 3 shows the respective nodes and their units and the preliminary selected sites.

- **Task 4: Costs Assessment:** The team of consultants assessed and characterised the Costs in each firm. A summary of the number of assessments done and the sites/nodes visited is presented as a summary in Appendix 1. Details in Appendix 2 shows the detailed itinerary used for the assessment, **Task 5: Incentive Assessment**: The nodes presented in **Appendixes 2 and 3** were also used for the incentives assessment: The SSIs and KIIs were undertaken in each of the nodes by the assessment/interview team (initially all team members participated, then thereafter, either two teams with 2 consultants or individual consultants conducted the activity). The number of respondents in each of the methodologies is summarised in the Table presented as **Appendix 3**. This was replicated in two places (counties). An FGD was conducted at the County level of Kiambu and Kirinyaga to assess the incentives for policy makers to invest in hygiene integration.

1.6 Challenges realised during the study

- Some firms were initially identified but either declined to participate or dropped as they were found not to provide required information. For example, Quinam – Off-taker; (Cereals – Sorghum) had initially been identified, but after visits to the firm and discussion with the business owner, its activities were found to be different from those expected for the study. Six potato firms were identified but either declined or indicated they were no longer in production.

- Several nodes had not documented cost data, so most of the cost estimation were done using engineering estimates (bottoms-up approach) or using costs from similar systems in the other nodes where such data was documented or well known.

- A few customers identified and referred to the consultant in some of the nodes declined to be interviewed. In Kangari Dairy, there are only two customers, and one of them declined to be interviewed. STAWI reported to be dealing with about six big customers and small irregular small-scale customers, and the ones initially identified declined, with only one customer agreeing. For the five customers referred to the consultant by Topical Ventures Management, only one accepted to be interviewed, while for SOPA, only one of the referred customers could be interviewed. The cereal nodes have customers spread out in different parts of the country and interaction was therefore only possible through the telephone.

Findings

1.7 Background of selected nodes

1.7.1 Food Traders Markets

1.7.1.1 Rongai (Limuru) market

Rongai market is in Limuru Town, Limuru Sub-County in Kiambu County. The market is built on a 2.5 acres piece of land and is 500m long. The market has three blocks (Block A, B and C), each with 3 gates. The market has 2 main market days in a week during which the number of traders can go as high as 10,000, down from 13,000 before Covid-19. The number of traders during the rest of the days (non-markets day) was estimated to be between 2,000 and 3,000 per day. This is comparable to the numbers before Covid-19 explained by the fact that even though some traders left during Covid period, these were replaced by new traders, especially those that lost formal employment jobs and decided to venture into business.

During the Covid period, traders received a reprieve from paying daily fees of between Kshs. 20 to Kshs. 50. The county government of Kiambu also takes care of bills including water and electricity and undertakes garbage disposal services.

Figure 5: External and internal view of limuru market

Status and efforts towards hygiene integration at Limuru Market

The hygiene at the market was rated to be average. Though not a big problem, there was a challenge of lack of continuous supply of clean water. There was also continuous blockage of sewer and drainage that has made the market unhygienic and transformed the storm water drainage system into a combine sewer system. The following are the results of rating of the level of hygiene by the various category of respondents.

Category of stakeholders	Manager/business owner	Customers	Workers	Traders	Service providers
Rating*	3	4, 4	3, 3, 3	4, 4, 4, 3, 3	3, 3

*NB: *Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

There have been some investments in hygiene facilities at the market including the following:

- ***Hand washing facilities***- During Covid, every of the 8 main entry gates (donated by SDA church and 6 by area MP), was provided with a handwashing tank- 100lts including soaps. Also, 3 casuals were then employed to refill the water and soap but currently have been discontinued. Currently, there are no wash hand stations at the entry of the markets. In addition, every 5 traders were required to have a shared handwashing facility (i.e. a handwashing bucket fitted with tap). Costs of purchase, refilling water, and soaps were

also to be shared by the 5 traders. However, their usage was indicated to have ceased only after a few months as some traders became uncooperative.

- ***Sanitary facilities***: The market is served by two blocks of toilets, one owned by the county government and run by the market management committee (with 8 toilets) and the other constructed by a social enterprise (*Iko toilet*) and currently run by a group of people living with disabilities[1],. The block consists of 6 toilets, a bathroom and a urinal.
- ***Solid and liquid waste management.*** Functions such as garbage collection, cleaning and unclogging drainage systems, and cleaning of the common areas within and outside the market are undertaken by the county government employees while traders clean their own stalls. While the market is generally clean, the drainage system is frequently blocked, and it also receives sewerage from the neighbouring premises. Further, the storm water drainage system frequently blocks mainly because of inappropriate disposal of garbage. The garbage collection which is done twice a week is at times poorly managed. The current skip bins have broken down and requires immediate repairs.

Figure 6: The private run washrooms (left), and poorly managed solid waste facilities (right)

Challenges to hygiene integration at the market

- **Limited space for the market**. Though the market sits on 2.5 acres, the population is big and the current market is squeezed. This makes further investment in hygiene difficult.
- **Vandalism of hygiene facilities**: The facilities installed after Covid-19 were stolen and the committee feared this would continue if measures are not put in place to stop this.
- **Lack of water at the market and washrooms:** Water was not available all days and this makes cleaning and use of hygiene facilities difficult. Also, previous distribution points of water to the various gates have been vandalised
- ***Unwillingness by traders to pay for charged toilet services***: It was reported that traders at times uses private toilets outside of the market to avoid paying for the services in the two market washrooms; one toilet charges Kshs.5 and the other Kshs. 10.
- ***Poor drainage:*** The market is in the lower reaches of the town and experiences frequent flooding from road runoff due to drainage and sewerage breakages. Further, the drainage system requires re-designing to accommodate all the flows.
- ***Lack of facilities for cleaning produce***: Currently the traders wash the produce at a corner in the washrooms or collect water from there to wash their vegetables and fruits. This was noted to be unhygienic. Water supply was unreliable as well.

[1] *Kamirithu disabled group.*

- ***Poor lighting***: Some blocks of the market (especially block A) have poor roof lighting and this therefore cold, subjecting the traders to cold weather-related infections. There is also poor distribution of bulbs making the market challenging for some traders especially very early in the morning and at night
- ***Poor maintenance***: Some drainage covers within the market are broken thus, this compromises safety and therefore, urgent repairs is required.

1.7.1.2 Kagio Market

Kagio market is in Kirinyaga West Sub-County in Kirinyaga County. It is the biggest market in the County. The market has three sections that are in different sites within Kagio town. These are market A, that deals with green and fresh produce, and which is the main market; market B that deals with cereals; and market C that deal with clothes. The study focussed on market A only shown in Figure 7- exterior photo of Kagio main market.

According to the respondents, the market was built in three phases, but the third phase that would have involved completion of the drainage was never completed. The market currently accommodates, within the markets and outside, about 12,000 traders, up from 10,000 before Covid-19. The increase was reported due to new entrants who came from formal employment, but lost jobs due to Covid-19. The number of customers was estimated at double the number of traders. The traders operating outside the market were moved by the County government at the onset of Covid-19 so as to decongest the market, though other traders have joined them. Both decongestion and increase in the number of traders have created other challenges such as cleanliness, pressure on washing facilities and pressure on sanitation facilities.

Figure 7: External View of Kagio Market (A)

Status and efforts towards hygiene integration at Kagio Market

The hygiene at the market was rated to be average. The market has a challenge of lack of continuous supply of clean water. Currently the water is from a borehole, but this is not well connected and distributed. The following is the rating of the level of hygiene as scored by various respondents.

Category of stakeholders	Manager/business owner	Customers	Workers	Traders	Service providers
Rating*	3	1, 3	3, 3. 3	3, 2, 3, 1, 3	3, 2, 3

*NB: *Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

The Current status of hygiene facilities and infrastructure are low.

- ***Sanitation facilities***- The market have 2 toilet blocks but one of them is non-operable. The only one operational toilet (with 3 females, 2 males and urinal units). The toilet is run by a private person under the authority of the market committee. They were initially

expected to operate the facility but abandoned it because of low incomes. It was reported the facility is not enough and traders seeks toilet facilities in nearby hotels.

- ***Produce cleaning and Hand washing facilities-*** The traders bought own small tanks fitted with taps, but these are no longer used. Existing hand washing facilities and sinks lack water supply while an area that is supposed to be used as a produce washing area is dirty and dilapidated (see Figure 8).
- ***Drainage infrastructure***- The market floor and drainage does also not allow for hygienic environment. The drainage leads to flooding as it does not have a point to empty into.
- ***Cleaning and garbage collection-*** The garbage collection, drainage management and cleaning of the market are undertaken by the County workers, with traders cleaning their stalls.
- ***Insufficient space-*** The committee has tried to solve some of these problems, but there is a challenge of limited space. The committee had spent Kshs 118,000 to put up 4 water tanks and toilets, but there was a dispute on the land where water passed through, and this was removed. The land the County had indicated it would buy for expanding market, turned out to be expensive (Kshs 12 million per acre, against indicated market price (County valuation) of Kshs 7 million), but the traders felt the County would have solved this problem.

Figure 8: Wash hand facility without water (left) and poorly managed washing facilities (right)

Challenges to hygiene integration at the market

- ***Lack of (insufficient supply) water at the market and washrooms***. There is water from a nearby borehole, but this is not well connected and distributed to the market
- ***Non-willingness by traders to pay for charged toilet services***, the current paid for toilet is only able to generate Kshs 150-300 per day despite the huge population at the market. These revenue streams are insufficient to cater for the required supplies and thus compromises hygiene
- ***Limited support from the county*** government to expand the market to install more and better hygiene facilities owing mainly to insufficient land/space
- ***Lack of produce cleaning facilities***. There is only a small facility (about $3m^2$) that can be used for washing produce, the facility is surrounded by mud and also doesn't have enough water supply.

1.7.2 Vegetables and Fruits processors

1.7.2.1 STAWI Foods and Fruits Ltd

STAWI is a private company owned and operated by Eric Muthomi. The company has 15 workers; this includes 6 factory workers and 4 agronomists. It also hires an extra 3 casual workers.

The company started operations in 2011, then processing mostly banana flours but currently the company processes with sorghum, millet, maize and dried banana flour. Its main sources of cereals is Kitui county. The current level of production is 7 tonnes per month, with a sales turnover of Kshs.1.5 million. Before Covid-19 the production ranged from 15-20 MT per month and sales turnovers of a minimum of Kshs. 3.0 million. The company's main clients currently are 2 NGOs and 4 schools there are also 5 to 10 individual customers who picks products on monthly basis. This is a huge reduction compared to before Covid. At that time the company sold to small supermarkets, most of which have closed, at least 10 different schools, 2 NGOs and at least 10-20 individual customers.


Figure 9: Inside the factory(left); interview with the CEO (Mr Muthomi) in his office (right)

Status and efforts towards hygiene integration at STAWI Foods and Fruits Ltd

The following is the rating of the level of hygiene

Category of stakeholders	Manager/business owner	Customers	Workers
Rating*	4	5	4, 4, 4

*NB:*Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

The overall rating of the integration of hygiene was relatively high. The following was noted:

- The CEO and workers reported to be adhering to stringent hygiene requirements of a food industry.
- It was reported that the facility is frequently cleaned (twice a day when in operations), washing hands was also highly practiced, while the company has also encouraged workers to go for Covid-19 vaccination.
- There is only one toilet for both male and female.
- Workers wear protective clothing (white dust coats), and during Covid-19, masks were provided by the company.

Challenges to hygiene integration at SOPA Supplies Ltd

- The common challenges reported by the CEO include; frequent water rationing. Although the company tries to overcome this through water harvesting and storage in 500 ltrs tanks, the efforts are not enough.
- The company also indicated it had a challenge of limited cash flows, more due to limited sales emanating from Covid-19 impact, to undertake HACCPs Certification. The lack of

HACCPs certification reportedly has resulted to withdrawal of a potentially large customer (NGO), thus limits capturing of more formal customers

- It was also reported that the company lacks a laboratory for quality and hygiene control checks.
- The limited space hinders social distancing and putting up of facilities (e.g., washrooms etc) for better hygiene adherence.
- Other challenges include the limited resources to undertake better pest control, as the current method was said not to be effective.

1.7.2.2 Nature Lock

Nature Lock is private company based at Nairobi. The company is an outgrowth of Azuri Foods that was initially based at Thika. Its operations in Nairobi started in July, 2021. It currently manufactures a precooked product that is a mixture of different produce such as green grams, cassava, carrots, onions, chillies, coriander, tomatoes, ginger, and garlic. The company currently produce 4 MT of this product per month.

Figure 10: Front View of nature Lock factory

Status and efforts towards hygiene integration at Nature Lock

The initiatives on hygiene integration at the factory is good, with appropriate facilities installed at the factory. The following is the rating of the level of hygiene.

Category of stakeholders	Manager/business owner	Customers	Workers
Rating*	4	4, 4	4, 4, 4

*NB: *Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

- The factory has five washroom and 4 wash hand and use of sanitiser is high. There is temperature monitoring, wash hand and sanitising facilities at the entry. There are also foot baths at entry to production facility.
- Workers wear protective clothing (white dust coats) and are provided with free mask.
- The company has subscribed to and has its own hygiene guidelines; for example, on OHS, FFC 2200, EMP.
- There is signage in the factory, and the quality officers frequently remind workers during meetings to follow hygiene protocols and standards.
- The company has a private garbage collector who collects garbage regularly and has strict procedure to check for quality on incoming raw materials.

Figure 11: Garbage being sorted and collected by the private garbage handler (left); one of the Wash hand stations with hygiene adherence instructions (right)

Challenges to hygiene integration at Nature Lock Ltd

According to the business owner the main challenges to hygiene integration includes the following:

- Challenges of moulding,
- High cost of cleaning surfaces,
- Lack of a vegetable cleaning machinery or process. These was reported to pose a challenge to the factory hygiene.
- The company also lacks a laboratory to do quality checks.

1.7.3 Cereal aggregators and processors

1.7.3.1 SOPA Supplies Ltd

SOPA is a private company owned by Pauline Kamau. The company started in 2000 in Nairobi (Nyamakima) but has since expanded by opening a bigger facility at Ndieya (Lusegeti) in Kikuyu, Kiambu County; whose construction began in 2013. The company had 27 casual workers before covid-19, currently the number is 28, with 9 and 8 permanent workers before and with Covid-19 respectively. The company relocation to Ndeiya (Kikuyu sub-county, in Kiambu County) saw it install a seamless (conveyor type) of production line, that was driven by desire to meet government requirements for hygienic production. It is also involved in aggregating and transporting cereals from various locations in the country, more so from Western Kenya and has an 8-tonne truck for this purpose.

The company started as a storage and sales business, but latter the company stated milling and packaging flours; *Ugali* and *Uji* (porridge) flours following demand for milling services from its customers. The products range from pure brands or composite flours made from cassava, sorghum, millet, and maize. They intend to start producing banana flours. The level of business was not affected much by Covid-19 as the company diversified more toward porridge flours, which had a good market during the Covid-19 period. Before Covid the level of business was Kshs 3.2 million per month, this currently stands at about Kshs 2.8 million per month. The change was attributed more to competition within the subsector, and a bit to Covid-19

Figure 12: The factory (left); Seamless line installed at SOPA (right)

Status and efforts towards hygiene integration at SOPA

The initiatives on hygiene integration were reported to be driven by market requirements. Business seamless line was reported as a boost towards food hygiene. The following is the rating of the level of hygiene.

Category of stakeholders	Manager/business owner	Customers	Workers
Rating*	3	4	3, 4, 4

*NB: *Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

The following efforts towards integration of hygiene measures:

- The company has installed hand washing facilities and sanitiser at strategic locations.
- There are two toilet blocks, with one built on top of septic system to allow disposal of sanitary pads.
- Workers wear protective clothing (white dust coats), and during peak of Covid-19, masks were provided by the company, but the workers currently buy the masks themselves. The level of wearing of mask was reported to have gone down, though masks at the factory are worn because of milling (dust).
- There are signages in the factory, but it was indicated workers have still to be reminded to follow hygiene protocols and standards.
- The company doesn't have any means of monitoring temperatures or enforcing hygiene adherence, for example at the gate.
- The company received grants (Kshs 1.2 million) from USADF to boast hygiene measures towards Covid-19 relief, more so towards facilities and reinstatement of four workers earlier removed from work due to effects of covid-19 on business

Figure 13: One of the toilets at the factory

Challenges to hygiene integration at SOPA Supplies Ltd

- According to the business owner the main challenges to hygiene integration included that the floor on which they mix their product being poorly done (not of right material); and
- Poor adherence to standards and hygiene measure such as in use of mask, inability to keep distances during processing.

1.7.3.2 Topical Ventures

Topical Ventures is a private company that is based at industrial area. The company started operations in March 2020, that is after Covid-19 pandemic outbreak. The company start activities in 2019, but this was after some delays due to Covid-19. The company trades in cereals, where it buys from farmers in, Western Kenya, and Kitui, Meru, and Makueni counties. It cleans, grades, polishes and packages the cereals (green grams, chickpeas, cowpeas, millet, sorghum and rice). The company has 16 workers most of whom are on contract while another 15-20 are hired during peak periods. The company handles about 100-120 tonnes of cereals (and pulses) per month.

Status and efforts towards hygiene integration at Topical Ventures

The following is the rating of the level of hygiene

Category of stakeholders	***Manager/business owner***	***Customers***	***Workers***
Rating*	3	4	3, 4, 3

*NB:*Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

The company hygiene was rated to be average, more due to the challenge they have on too much dust emanating from the processing activities.

- ***Hand washing and sanitary facilities*** -The company has minimal installations of hand washing facilities and toilets, more so given it's a rented go down that had the facilities installed during construction. There is one toilet block, with four toilets, one change room and a urinal.
- ***Protective clothing***. Workers wear protective clothing (white dust coats) and are provided with mask. The masks being used are not very effective against dust and the company has been looking for alternative dust masks. The level of wearing of mask was high because of need to protect against dust.
- ***Signages.*** There are some few signages in the factory, but it was indicated workers have still to be reminded to follow hygiene protocols and standards.

- ***Environmental monitoring:*** The Company doesn't have any means of monitoring temperatures or enforcing hygiene adherence, for example at the gate, but has sanitisers at some strategic points in the factory.
- ***Product quality:*** Quality of the processed grain is managed by hiring specialised workers to do the selection; these are paid higher (equivalent to Kshs 500 higher per day) than regular casuals.

Figure 14: Signages (left); excessive dust on produce bag (centre); one of the tried dust remover (right)

Challenges to hygiene integration at Topical Ventures

According to the business owner the main challenges to hygiene integration includes:

- ***The problem of dust***. The company has tried different designs, but this has not worked well (see Figure 13 above).
- The company also indicated that the cereals are normally supplied with torn bags that subject the produce to loss and contamination.

1.7.4 Dairy milk collection and processors

1.7.4.1 Kangari United Dairy Cooperative Society

The dairy unit is in Kangari town within Kigumo sub-county in Muranga County. It was started as a CBO in 2013, with a key objective of providing farmers with animal feeds. When the County government started, the CBO converted to milk collection centre, but also continued with provision of feeds to farmers. The organisation processes about 14,000 ltrs per day, this used to be 16,000 before Covid. In June 2021, the collection had dropped to 10,000 ltrs per day. The dairy initially used to supply milk to Murang'a County Creameries-a processing plant owned by the located in Maragua sub-county, but this stopped due to delayed payments for delivered milk.

In addition to milk, the plant sells hay worth Kshs 2 to 2.2 million during dry periods. It serves 1,600 farmers. The dairy plant has 6 permanent workers and has 23 milk collectors. The plant mainly cools milk to 4^0C and sell it to two schools (Njiri high school and Kigumo Bendera through a contracted supplier) and to Daima Processors; a larger milk processor based in Nairobi.

Figure 15: External View of dairy (left), and inside the dairy plant (right)

Status and efforts towards hygiene integration at Kangari Dairy

The hygiene at the dairy was rated as good. The manager estimated that the adherence to Covid by workers is about 80%, but this was lower for transporters at 50%. The following is the rating of the level of hygiene

Category of stakeholders	Manager/business owner	Customers	Workers	Service providers
Rating*	4	4, 4	3, 3, 3	4

*NB:*Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

The hygiene integration is good with some facilities and infrastructure put in place.

- There is a wash hand facility at the gate, also visitors and workers have sanitising facilities at the gate and within the factory.
- Workers are provided with mask and provided with clean toilet facilities.
- The dairy has a solar system to heat water to ensure better cleaning.

Figure 16:Poorly managed milk container washing facility (left) milk delivered by transporters (right)

Challenges to hygiene integration at the market

- Inconsistent water supply. Though the dairy has an underground tank of 20,000ltrs and two top tanks of 10,000ltrs each, water supply from MUWASCO was irregular and not enough.

- Lack of system/equipment to pasteurise milk for longer storage. The dairy indicated lack facilities such as pasteuriser to add value to milk
- Limited knowledge on hygiene amongst committee members and workers.

1.7.4.2 Njabini Farmers' Cooperative Society

Njabini Farmers' Cooperative Society Limited started operating in 1965, then collapsed in the year 2000 after the liberalisation associated with the structural adjustment program. The milk processing plant was revived in 2013 and was only able to process 250 litres of milk per day. Brookside dairies partnered with the farmers to help in revival program. At that time, the sole market was by Brookside dairies, though their prices were low and not competitive. Currently, the plants buy 4,000 litres from the farmers and processes (pasteurising and chilling) an additional 4,000 litres per day. The additional 4,000litres from individual traders is pasteurised at a cost of Kshs. 3.per litre. There are 6 main buyers of the 4,000 pasteurised milk. The terms of operation are strictly cash. The plant employs a total of 21 workers, 15 being permanent employees while another 6 are contract workers. During the Christmas period to January (two weeks period) approximately 3,000 litres were sold at KES 40 per litre daily. The market decreased when the main customers travelled back home from Nairobi. Farmers are paid Kshs 43 per litre. They pay the contracted transported Kshs 3 per litre. The plant sales raw milk at Kshs 47 per litre, pasteurised milk at Kshs 50 per litre. There are 13 board members who control the 13 routes. Each route has a target of approximately 600 litres


Figure 17: External View of dairy (left), inside the dairy plant (right)

Status and efforts towards hygiene integration at Njabini Dairy

The following is the rating of the level of hygiene

Category of stakeholders	Manager/business owner	Customers	Workers
Rating*	3	1, 2	3, 3, 3

*NB: *Scale of 5-Very good 4-Good 3-average 2-Not good 1 - Very bad*

The level of hygiene at the dairy is low with facilities being in not very good condition. This was attributed to various challenges, limited funding, and lack of proper facilities and equipment. Adherence to hygiene and Covid at the plant is also low. But the dairy plant has tried to integrate regulations for hygiene such as:

- Wearing of PPEs by workers,
- Washing hands after lunch or any other break or after visiting the toilet,
- Subjecting workers to medical tests after every six months, thorough cleaning of workstation after work,
- No eating in the factory and not allowing unauthorised persons are not allowed in the factory premises
- On food hygiene the plant has employed a well-trained milk grader who additionally undertakes organoleptic test for every batch of milk delivered to the plant, the dairy also

uses food grade milk storage tanks, supplies PPEs and soap plus detergent to employees and ensures frequent cleaning of surfaces and all milk containers.

Figure 18:Poorly managed milk container facility (left); machine not yet installed (right)

Challenges to hygiene integration at the market

- The main reported challenge was the high debts and loan repayment that reduces the margins and make the dairy unable to make regular and further investments in hygiene;
- There is a challenge of poorly designed buildings or insufficient space to install required facilities;
- There are also several machineries that are already bought and if installed will increase the business revenues for the dairy plant.

1.7.4.3 Mukurweini-Wakulima dairy

The dairy is in Mukurweini sub-county in Nyeri County. It was started in 1990 as a Small-holder group (SHG) and was formed mainly to protect farmers from exploitation by milk buyers. The SHG delivered 32 litres the first day, this has grown to 64,000lts up from 55,000lts before Covid-19. The increase in production has been due to wider catchment for collection; initially the dairy was collecting from the local population of Mukurweini sub- County, but this has since expanded to other sub-counties, including Mathira and Tetu and in other counties especially parts of Kirinyaga. The Dairy produces UHT (50-60%), fresh milk (20-25%) with the rest being yoghurt and other processed products. Before covid the proportion of fresh milk was higher (30-35%) but due to consumers shift to processed and packaged milk the volume fell. The staff level has increased from 300 before Covid to current number of 400, the working hours have also increased as initially the Dairy was only operating during the day, currently some section operate on a 2-3 eight-hour shifts. The only impact Covid 19 had was on downsizing of workers in transport section by about 20% and also there was reduction on allowance by about 20%.

Figure 19: External View of dairy (left), and milk outlet for the factory's products (right)

Status and efforts towards hygiene integration at Mukurweini Wakulima Dairy

The following is the rating of the level of hygiene

Category of stakeholders	Manager/business owner	Customers	Workers
Rating*	3	4, 4	4, 4, 4

*NB: *Scale of 5-Very good 4-Good 3-average 2-Not good 1 – Very bad*

The hygiene at the dairy was rated as average during an FGD discussion with Head of quality, occupational and safety officer, the human resource (HR) manager and the milk procurement and extension officer. They cited the following:

- Low levels of wearing masks due to discomfort while at production facility, and inability to keep distance due to the nature of work.
- The Dairy has installed signages in almost all floors, has wash hand stations and toilets in each floor, monitors temperature at the gate, requires staff to provide covid vaccination certificate among other measures.
- The Dairy also emphasis on personal grooming (use of hair nets, short fingernails, and avoiding strong perfumes) to reduce on milk contamination.
- The Dairy also fumigates lorries and has a designated area for washing and fumigating the lorries.
- At the farms, according to the Procurement and extension officer, the company has ensured that the collection points are scattered and are more, this prevents people crowding at one point

Figure 20:Lorries washing facility (left) milk delivery section in the factory (right)

Challenges to hygiene integration at the market

- Limited resources to fasten the HACCP certification. According to the CEO and the milk procurement and extension officer, the dairy firm indicated that the HACCP is gradually being implemented given that it has, as its business priority, to improve on other aspects, like increasing the volume of business and putting up equipment and machinery and structures to value add milk for better returns; and
- People's reluctance to change behaviour to observe and integrate hygiene.

1.8 Inputs and cost for hygiene integration

1.8.1 Traders markets- Rongai (Limuru) and Kagio markets

1.8.1.1 Cost of hygiene integration in local market (with inputs from Rongai Market and Kagio Market)

Table 2-1 indicates the level of hygiene integration before Covid 19 and currently (after covid-19). The table also estimates additional costs that may still be needed for increased hygiene integration. In comparison, and while additional investments are needed, there are minimal changes in the capital investments before and after covid-19. However, there has been significant additions in operation and maintenance costs in the periods after covid-19 compared to before Covid-19.

Table 0-1: Cost of Hygiene integration at a local market (Kagio and Rongai markets)

Node Mkt 1-Kagio, Mkt 2-Rongai/Limuru		Quantity before covid-19	Total cost before covid-19 (Kshs)	Quantity currently	Total cost currently (Kshs)	Quantity of what is extra required	Cost of what extra is required
Costs of installation of							
1. Functional toilets	Mkt 1	1 block of 8 pit latrines+ 1 urinal 1 block of 5 flush toilets + urinal	650,000	1 block of 8 pit latrines+ 1 urinal 1 block of 5 flush toilets + urinal	650,000	1 block of 5 flush toilets +1 urinal	400,000
	Mkt 2	2 blocks of 14 flush toilets+ 1 urinal	700,000	2 blocks of 14 flush toilets+ 1 urinal	700,000	Repairs of existing toilet +1 block of 8 toilets	528,000
2. Hand washing facilities (tap water and soap)	Mkt 1	None	0	1 -water fountain with 3 taps and 500lt tank	5,000	1-5000 ltrs tank with 4 lines of taps on concrete	300,000
	Mkt 2	9 -100 l water tanks with taps	4,500	1 -100 l water tanks with taps	500	8- 100lt tanks with taps	4,000
3. Food products handling and transportation equipment	Mkt 1 or 2	Washing area for the produce	20,000-50,000	Washing area for the produce	20,000- 50,000	1 washing area-simple - large (away from mkt)	50,000 to 500,000
4. Faecal waste management facilities	Mkt 1 or 2	Either connected to sewer or using pit latrines (as above)	20,000 if connected to sewer 0 if under pit latrine	Either connected to sewer or using pit latrines (above)	20,000 if connected to sewer 0 if under pit latrine	0	0
5. Solid waste management facilities	Mkt 1 or 2	1- 2 truck bins	300,000-600,000	1- 2 truck bins	300,000-600,000	1	300,000
6. Grey water management facilities	Mkt 1 or 2	Within and outside markets	2- 5 million	Within and outside markets	2- 5 million	Improvement of drainage and paving side of market	1.5 to 3 million
7. Other infrastructure	Mkt 1 or 2	0- 8 gates	0- 80,000	0- 8 gates	0- 80,000	2-4 gates	20,000-40,000
	Mkt 1 or 2	Chain link with post or half wall with bars	0 for Mkt 1, -3.5 million-Mkt 2	Chain link with post or half wall with bars	0 for Mkt 1, -3.5 million-Mkt 2	For market 1	750,000
	Mkt 1 or 2	1 tank- 500 or 3,000lt	5,000- 16,000	1 tank- 500 or 3,000lt	5,000- 16,000	1 tank of 10,000lt or 5 tanks of 3000lts	85,000-128,000
	Mkt 1 or 2	Roof water harvesting	0	0	0	Roof water harvesting	350,000

Node Mkt 1-Kagio, Mkt 2-Rongai/Limuru		Quantity before covid-19	Total cost before covid-19 (Kshs)	Quantity currently	Total cost currently (Kshs)	Quantity of what is extra required	Cost of what extra is required
Costs of operation and management/month for:							
1. Toilets	Mkt 1 or 2	Labour for washing (1 part time, or 2 full time)	6,000-20,000	Labour for washing (1 part time, or 2 full time)	6,000-20,000	Extra labour -1 to 2 workers full time p.m.	12,000-20,000
2. Tap water and soap	Mkt 1 or 2	For the public toilets- 1 month stock	2000-6000	For the public toilets- 1 month stock	1,000-6,000	For the public toilets- 1 month stock	12,000-15,000
3. Cleaning of surfaces	Mkt 1 or 2	Same worker under toilet and storm water disposal	0	Same worker under toilet and storm water disposal	0	Same worker under toilet and storm water disposal	0
4. Collection and disposal of solid waste	Mkt 1 or 2	By the County govt- 3 workers@600, 2 days a wk, plus fuel 30lts per day	40,800 p.m	By the County govt- 3 workers@600, 2 days a wk, plus fuel 30lts per day	40,800 p.m	By the County govt	0
5. Sewerage	Mkt 1 or 2	By the County govt- covered under toilets and sewer	0	By the County govt- covered under toilets and sewer	0	By the County govt	0
6. Stormwater drainage (if no sewers are present)	Mkt 1 or 2	By the County govt- 3 workers@600, 3 days a wk	21,600 p.m	By the County govt- 3 workers@600, 3 days a wk	21,600 p.m	By the County govt	0
7. Wearing masks	Mkt 1 or 2	Users of node by own masks	0	Users of node by own masks	0	Users of node by own masks	0
Regulations costs							
1. Building capacity of regulators	Mkt 1 or 2	None	0	None	0	Train 16- 18 committee members-2-4 days on hygiene	160,000-360,000
2. Monitoring hygiene	Mkt 1 or 2	By committee and County	0	By committee and County	0	Labour- 2- 3 gates; 1 in every 2 months, or throughout	9,000-18,000

Node Mkt 1-Kagio, Mkt 2-Rongai/Limuru			Quantity before covid-19	Total cost before covid-19 (Kshs)	Quantity currently	Total cost currently (Kshs)	Quantity of what is extra required	Cost of what extra is required
3.	Enforcing hygiene	Mkt 1 or 2	By committee and County	0	By committee and County	0	Same for monitoring	-
4.	Signages and thermal gun	Mkt 1 or 2	In the markets	0	In the markets	0	30 signages + 2 guns	40,000
Health costs			**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
1.	Average number of absentees per month due to illnesses	Mkt 1 or 2	Absent p.m. due to any illness	500	Absent p.m. due to any illness	500	N/A	N/A
2.	Average numbers of infections /Hospitalisations per month	Mkt 1 or 2	p.m	800	P.m	960	N/A	N/A
3.	Cost of infections/Hospitalisations per month	Mkt 1 or 2	Fund raised from traders	8,333	Fund raised from traders	8,333	N/A	N/A
Commercial prices, costs and revenue			**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
1.	Estimated number of customers served per day	Mkt 1 or 2	Non market/ market days	2,000/20,000	Non market/ market days	2,000/24,000	N/A	N/A
2.	Estimated number workers per day	Mkt 1 or 2	Non market and market days	1700 and 10,000	Non market and market days	1700 and 12,000	N/A	N/A
3.	Estimated price/unit quantity	Mkt 1 or 2	Potatoes per 50kg bag	Buying-800 Selling 1200	Potatoes per 50kg bag	Buying-800 Selling 1200	N/A	N/A
4.	Quantity handled (*per month*)	Mkt 1 or 2	50 kgs bag	9,600	50 kgs bag	11,520	N/A	N/A
5.	Total Cost of doing business (*Kshs per month)*	Mkt 1 or 2	Transport and levy charge /bag	230	Transport and levy charge /bag	330	N/A	N/A
6.	Total sales (*Kshs per month*)	Mkt 1 or 2	Potatoes only	11.6 million	Potatoes only	20.2 million	N/A	N/A
7.	Subsidy external to hygiene	Mkt 1 or 2	External support	0	External support – on tanks	3,500-16,000	N/A	N/A
8.	Total net income/revenue per month	Mkt 1 or 2	Per 50kg potato bag	320	Per 50kg potato bag	320	N/A	N/A

1.8.1.2 Proposed measures to trigger and sustain Hygiene at Rongai Market

Table 1 indicates all the facilities and other requirement that would support hygiene integration in the Rongai market. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the markets, supplies such as soaps, masks and detergent among other general hygiene investments. The node's specific measures that would help trigger and sustain hygiene in the market includes:

- Trainings and capacity development
    - Training 16 committee members for 2 days on hygiene regulation including monitoring and enforcement. The Sub-County administrator had promised such a training, but it has never been done.
    - Development of more appropriate by-laws to enforce hygiene at the market
    - Increase awareness through for example installation of more banners/signages in the markets, sensitisation through word of mouth and other methods, etc -this can be made much better by incorporating stakeholders in the implementation.
    - Intermittent enforcement at the gates. Get people to adopt the hygiene adherence measures through having an enforcement person at the gates, and this to be done after every two months initially. Experience from the market is that there will be continued adherence even after withdrawal of the enforcement. This can be repeated until the users of nodes adopt the practices
    - Increasing capacity of 90 MCA and 10 directors on hygiene for development of relevant policies, through inducting them on the same once they assume office
- Short term investments
    - Provision of reliable water supply to the market.
    - Installation of wash hand stations at the current 8 gates, putting bigger tanks for water storage and having taps from inside the markets to minimising vandalism.
    - Construction of a produce washing place/point
- Long-term investments
    - Liquid waste management as the current system floods the market, clogs drainage and subject produce to contamination
    - Sewer improvement – provision of new line and sewerage treatment to manage the sewer from the market
    - Separation of wholesale and retail to reduce spillage-relocate to new site for wholesale market

1.8.1.3 Proposed measures to trigger and sustain Hygiene at Kagio Market

Table 2 indicates all the facilities and other requirement that would support hygiene integration in the Kagio market. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the market, supplies such as soaps, masks and detergent among other general hygiene investments. The specific node's measures that would help trigger and sustain hygiene in the market includes:

- Training and capacity development
    - Capacity building on and strengthening of the hygiene enforcement and monitoring. The market committee indicated requiring training on hygiene and on enforcement and monitoring hygiene
    - Sensitising on need for paid toilet services and through public private partnerships, introduction of better managed paid for toilet and washrooms services

- Short-term investments
    - Fencing of the market to have control of movement and locating of wash hand facilities and monitoring and control of users of the nodes
    - Construction of produce washing areas for produce. This need to be located away from the market as currently the market space is limited
    - Connecting of borehole water to the toilets and washing areas
    - Installation of hand washing facilities at two entries
- Long-term investments
    - Improving drainage and floors in the market area and completing the drainage through installing canal (about 150m) and disposal point for grey water.

1.8.2 Potatoes and fruit processors- Stawi Fruits and Foods LTD and Nature Lock processors

1.8.2.1 Cost of Hygiene Integration at STAWI and Nature Lock

Table 2-2 indicates the level of hygiene integration before Covid-19 and currently and the estimated Costs of integration in the short run and long run

Table 0-2:Cost of Hygiene integration at STAWI Foods and Fruits LTD and Nature Lock

Node Firm 1-STAWI, Firm 2-Nature Lock		**Quantity before covid**	***Total cost before covid (Kshs)***	***Quantity currently***	***Total cost currently (Kshs)***	***Quantity of what extra is required***	***Cost of what extra is required***
Costs of installation of;							
1. Toilets- flush type	Firm1 or 2	1 unit of toilet at firm 1	100,000	1 at firm 1-4 at firm 2 units of toilets	100,000-950,000	0	0
2. Hand washing facilities (tap water and soap)	Firm 1	Had only a toilet sink	Costed under toilet	1 tank 500lt with tap	3,000	2 -10,000lt tanks with taps and pump	600,000
	Firm 2	Started after Covid	0	4 station of hand washing	80,000	4 stations	20,000
3. Food products handling and transportation equipment	Firm1 or 2	1cyclone at firm 1	100,000	2 cyclones at firm 1, 6 at firm 2	90,000-100,000	Mould mgt, dust cleaning facilities, & vegetable washing machines for firm 2	4,700,000
4. Faecal waste management facilities	Firm1 or 2	Connected to sewer	20,000	Connected to sewer	20,000	0	0
5. Solid waste management facilities	Firm1 or 2	Supplied with garbage papers	0	Supplied with garbage papers	0	0	0
6. Grey water management facilities	Firm1 or 2	Within faecal waste cost	-	Within faecal waste cost	-	0	0
7. Other infrastructure	Firm1	1 Change room	50,000	1 Change room	50,000	1 new change room	50,000
	Firm1 or 2	Water purification system	0	0	0	1 system	400,000-1,200,000
	Firm1 or 2	1tank for firm 1	5,000	1 tank for firm 1 and 3 for firm 2	5,000-110,000	1 tank of 20,000lt plus pumps for firm 1	110,000
	Firm 2	Raw material washing area	0	0	0	1 partitioning for firm 2	200,000
	Firm 2	Laboratory	0	0	0	1	2,000,000
Costs of operation and management/month for:							
1. Toilets	Firm1 or 2	Part time in firm 1.	1375-firm 1, o firm 2 (not operating)	Part time in firm 1, full time in firm 2	1375-firm 1, 25,000 firm 2	1 Full time firm 1, and 4 in firm 2	11,000 firm 1 100,000 firm 2
2. Water bill	Firm 1 and 2	Firm 1-monthly bill	3000	Monthly bill	5,000 firm 1, part of rent in firm 2	Monthly	0
2. Tap water and soap	Firm1 or 2	Firm 1	1,000	Includes mask for firm 2	2,000 firm 1, 4,000 firm 2	Includes mask for firm 2	2,000 firm 1, 6,000 firm 2
3. Cleaning of surfaces	Firm1 or 2	Same worker under toilet	1,375- firm 1	Same worker under toilet	1,375-firm 1, 40,000 firm 2	Same worker under toilet	0

Node Firm 1-STAWI, Firm 2-Nature Lock		Quantity before covid	*Total cost before covid (Kshs)*	*Quantity currently*	*Total cost currently (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
4. Collection and disposal of solid waste	Firm1 or 2	Firm 1 burns waste	0	Firm 1 burn waste, firm 2 use hired services	0 firm 1, 7000pm- firm 2	0	0
5. Sewerage	Firm1 or 2	By the County govt	0	By the County govt	0	By the County govt	0
6. Stormwater drainage	Firm1 or 2	Under toilets labour/ by county	0	Under toilets labour/ by county	0	Under toilets labour/ by county	0
7. Wearing masks	Firm1 or 2	For workers	0	For workers firm 1	4,800 p.m	For workers- firm 1	2,000
8. PPEs	Firm 1 or 2	For workers 35,000 p.a	2916	For workers 35,000 p.a	2916	0	0
9. Pest control	Firm 1	Monthly	5,000	Monthly	5,000	Monthly – gas type	25,000
Regulations costs							
1. Building capacity of regulators	Firm1 or 2	None	0	On GAPs, ISO, Hygiene etc Both one off	12,800 firm 1, 520,000 firm 2	Train staff on hygiene	90,000-240,000
2. Monitoring hygiene	Firm1 or 2	Under management costs	0	Under management costs	0	New staff	11,000-25,000 p.m
3. Enforcing hygiene	Firm1 or 2	Under management costs	0	Under management costs	0	Same for monitoring	-
4. Signages	Firm1 or 2	Firm 1- one off costs	2,000	Firm 1 and 2- one off costs	2,000-30,000	New signages- one off	20,000-30,000
5. HACCP	Firm 1	0	0	0	0	Certificate and training- one off	1,000,000
6. Environmental Audit	Firm 1 and firm 2	None	0	0	0	Audit and annual	50,000 for audit, 10,000 annual certificate
Health costs		**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
1. Average no. of absentees p.m due to illnesses	Firm1 or 2	Absent p.m. due to any illness- firm 1	2	Absent p.m. due to any illness	1-4	N/A	N/A
2. Average no.of infections/Hospitalisations p.m	Firm1 or 2	p.m- for firm 1	3	P.m	2-5	N/A	N/A
3. Cost of infections/Hospitalisations /Diseased per month	Firm1 or 2	Incurred by employer p.m- firm 1	1,583	Incurred by employers	1,000- 2,240 p.m	N/A	N/A

Commercial prices, costs and revenue	Firm1 or 2	Description	Quantity	Description	Quantity	Description	Quantity
1. Estimated no. of customers served per day	Firm1 or 2	Walk in customers per day firm 1	20	Walk in customers	5-10 firm 1, 2-firm 2	N/A	N/A
2. Estimated no. of workers per day	Firm1 or 2	Employees- firm 1	18	Employees	18-40	N/A	N/A
3. Estimated price/unit quantity	Firm1 or 2	Family flour/kg firm 1	130	Family flour and green grams	230 for flour and 700/kg for green gram	N/A	N/A
4. Quantity handled (*/month*)	Firm1 or 2	Firm 1- tonnes	15-20	Tonnes	7 firm 1, 4 firm 2	N/A	N/A
5. Total Cost of doing business (*Kshs per month)*	Firm1 or 2	Firm 1	1,246,154	All costs	436,957-firm 1, 2,600,000 -firm 2	N/A	N/A
6. Total sales (*Kshs/month*)	Firm1 or 2	Firm 1	3 million	All products	1.5 firm 1, 2.8 firm 2	N/A	N/A
7. Subsidy external to supports hygiene	Firm1 or 2	External support	0	External support – on production and GAPs- firm 1- one off	500,000	N/A	N/A
8. Total net income/revenue /month	Firm1 or 2	Firm 1	1,753,846	Net income	1,063,043 firm 2, 200,000 firm 2	N/A	N/A

NOTE: *Firm 2 started after Covid-19*

1.8.2.2 Proposed measures to trigger and sustain Hygiene at STAWI

Table 2-2 indicates all the facilities and other requirement that would support hygiene integration in the STAWI Fruits and Foods Ltd. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the firm, supplies such as soaps, masks, and detergent among other general hygiene investments. The node's reported specific measures that would help trigger and sustain hygiene in the firm includes:

- Training/Capacity building
    - Capacity building 12 workers on hygiene
- Short term investments
    - Installation of dust management at the milling and roasting area- e.g. installing cyclones and fans
    - In-building hygiene through HACCP and NEMA certification
    - Installation of a system to purify water
    - Improving water supply through more water storage

1.8.2.3 Proposed measures to trigger and sustain Hygiene at Nature Lock

Table 2-4 indicates all the facilities and other requirement that would support hygiene integration at STAWI. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the firm, supplies such as soaps, masks, and detergent among other general hygiene investments. The node's specific measures that would help trigger and sustain hygiene in the firm includes:

- Capacity building ad certification
    - The staff have been trained on such aspects as hygiene, ISO and pest control that have improved their skills on hygiene, however due to the new employees and time a training on hygiene was proposed by the production manager and quality assurance officer.
    - The company has no NEMA certification, this would help to in-build the environmental management within the company. Related to this was a proposal by the quality officer to have a study on effluent discharge with a view of informing on best way to manage the effluent.
- Short-term investments
    - The quality assurance officer reported that cleaning of surfaces is expensive and not regularly done because of the cost (quarterly). Currently the service is hired at Kshs 110,000. She proposed the need for owning cleaning equipment such as mist blower, scissor lift to handle the problem.
    - Moulding was reported by the production manager to posing a problem to the factory, though on small scale. The cause has not yet been identified. The preliminary identified cause could be fluctuation in RH due to inadequate ventilation, having an open washing area. The solution lies in assessing the cause and probably based on this, installation of more cyclones and solar/AC power fans, having a separate washing area and washing machinery for vegetables.
- Long term investments
    - There is no separation of raw material with processing area/product, this poses danger of contamination. The production manager suggested that the problem of contamination could be eliminated by having a separate store, use of mechanical cleaning equipment at the factory.

1.8.3 Cereals & pulses processors- SOPA Supplies Ltd and Topical Ventures Aggregators/transporter and processors

1.8.3.1 Cost of Hygiene Integration at SOPA Services Ltd and Topical Ventures

Table 2-3 indicates the level of hygiene integration before Covid 19 and currently and the estimated Costs of integration in the short run and long run.

Table 0-3: Cost of Hygiene integration at SOPA Services and Topical Ventures

Nodes Firm 1-SOPA, Firm 2-Topical Ventures		Quantity before covid	*Total cost before covid (Kshs)*	*Current quantity*	*Total current cost (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
Costs of installation of:							
1. Toilets- flush type	Firm 1 or 2	2 toilets, 1 urinal at firm 1and 2	250,000	4 toilets and 1 urinal in firm 1. 2 toilets, 1 urinal at firm 1	450,000- firm 1. 330,000 firm 2	Repairs	60,000
2. Hand washing facilities	Firm 1	Had 5 toilet sink	25,000	6 sinks	30,000	2 -wash stations	60,000
	Firm 2	Had 1 toilet sink	5,000	3 sinks	15,000	0	0
3. Food products handling equipment	Firm 1 or 2	Mixers, dust cyclones	0	5 Cyclones -firm 2	50,000	Mixer -firm 1 Improved dust remover- firm 2	880,000- mixer 1,500,000- dust remover
4. Faecal waste management facilities	Firm 1 or 2	None	0	Septic under toilet at firm 1 Firm 2 connected to sewer	Septic- firm 1- 70,000 15,000 – firm 2	0	0
5. Solid waste management facilities	Firm 1 or 2	Firm 1 used waste bins	2,000	Waste bins firm 1 Drums for firm 2	Bins 2,000 Drums - 4,000	Incinerator for firm 1	300,000
6. Grey water management facilities	Firm 1 or 2	Within faecal waste cost	-	Within faecal waste cost	-	Soak pit for firm 1	350,000
7. Other infrastructure	Firm 1	Epoxy floor	0	0	0	Epoxy floor for go downs	6,230,000
	Firm 2	Thermal gun/ Dispenser, dryer	-	-	-	I set of dryer dispenser/ thermal sensor	25,000
Costs of operation and management/month for:							
1. Toilets	Firm 1 or 2	Part time in firm 1.	1250- firm 1, o firm 2 (not operating)	Part time	1875-firm 1, 937 firm 2	1 Full time worker - firm 2	15,000
2. Water bill, water and soap	Firm 1 and 2	Firm 1- monthly bill	4400	Monthly bill	4,400 firm 1, 5,000 firm 2	Monthly	0
3. Cleaning of surfaces	Firm 1 or 2	Same worker under toilet	1,000- firm 1	Same workers under toilet	1,500- firm 1, 5,866 firm 2	Same worker under toilet	0

Nodes Firm 1-SOPA, Firm 2-Topical Ventures		Quantity before covid	*Total cost before covid (Kshs)*	*Current quantity*	*Total current cost (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
4. Collection and disposal of solid waste	Firm 1 or 2	Firm 1 burns waste	250 firm 1	Firm 1 burn waste, firm 2 use hired services	250 firm 1, 10,000pm - firm 2	0	0
5. Sewerage	Firm 1 or 2	Covered under toilets	0	Covered under toilets	0	Covered under toilets	0
6. Stormwater drainage	Firm 1 or 2	Covered under toilets	0	Covered under toilets	0	Covered under toilets	0
7. Wearing masks	Firm 1 or 2	For workers	1,000 p.m.- firm 1	For workers firm 1	2,000 p.m.- firm 1, 1200 p.m.- firm 2	For workers- firm 1	3,000
8. PPEs	Firm 2	For workers	0	For workers	3,500	0	0
9. Pest control/fumigation	Firm 2	Monthly	0	Monthly	10,000	Monthly – gas type	30,000
Regulations costs							
1. Building capacity of regulators	Firm 2	None	0	0	0	Train staff on hygiene	120,000
2. Monitoring hygiene	Firm 1 or 2	Under management costs	0	Under management costs	0	0	0
3. Enforcing hygiene	Firm 1 or 2	Under management costs	0	Under management costs	0	Covered under monitoring	-
4. Signages	Firm 1 or 2	Firm 1- one off costs	14,000	Firm 1 and 2- one off costs	3,000-14,000	New signages- one off	10,000-14,000
Health costs		**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
1. Average no. of absentees p.m. from illnesses	Firm 1 or 2	Absent p.m. due to any illness- firm 1	1	Absent p.m. due to any illness	0.16-1	N/A	N/A
2. Average no. of infections /Hospitalisations p.m	Firm 1 or 2	p.m- for firm 1	1	P.m.	0 firm 2-1 for firm 1	N/A	N/A
3. Cost of infections/Hospitalisations /Diseased p.m	Firm 1 or 2	Incurred by employer p.m- firm 1	833	Incurred by employers	833-1500	N/A	N/A
Commercial prices, costs and revenue		**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
1. Estimated number of customers served per day	Firm 1 or 2	Walk in customers per day firm 1	100	Walk in customers	80 firm 1, 4-5-firm 2	N/A	N/A
2. Estimated number workers per day	Firm 1 or 2	Employees- firm 1	36	Employees	5 firm 2, 34 firm 1	N/A	N/A
3. Estimated price/unit quantity	Firm 1 or 2	Sale sorghum /bag-firm 1	4,600	Sale sorghum /bag-firm 1, green gram /kg-firm 2	5500 - sorghum 100-130 green gram	N/A	N/A
4. Quantity handled e.g.; amount sold (*p.m*)	Firm 1 or 2	Firm 1- bags p.m	700	Bags- firm 1 Tonnes - firm 2	510 firm 1 100-120 tonnes firm 2	N/A	N/A

Nodes Firm 1-SOPA, Firm 2-Topical Ventures		Quantity before covid	*Total cost before covid (Kshs)*	*Current quantity*	*Total current cost (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
5. Total Cost of doing business (*Kshs p.m)*	Firm 1 or 2	76% of sales-Firm 1	2,432,000	All costs-79% of sales-firm 1, 97% of sales firm 2	2,212,000 -firm 1, 9,700,000 -firm 2	N/A	N/A
6. Total sales (*Kshs p.m.*)	Firm 1 or 2	Firm 1	3.2 million	All products	2,800,000 firm 1, 10,000,000- firm 2	N/A	N/A
7. Subsidy external to supports hygiene	Firm 1 or 2	External support	0	SNV support – on production and GAPs-firm 2	600,000 (estimate)	N/A	N/A
8. Total net income/revenue per month	Firm 1 or 2	Firm 1	768,000	Net income	588.000 firm 1, 300,000 firm 2	N/A	N/A

NOTE: Firm 2 main activities started after Covid-19, but some constructions were done before

1.8.3.2 Proposed measures to trigger and sustain Hygiene at SOPA Services

Table 2-3 indicates all the facilities and other requirement that would support hygiene integration in the SOPA Services. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the firm, supplies such as soaps, masks and detergent among other general hygiene investments. The node's specific measures that would help trigger and sustain hygiene in the firm includes:

- Installing of mixer to ensure safe food handling of food at the facility
- Improved sensitisation through more signages at the factory
- Improved floor surfaces that will ensure food safety and hygienic handling of food

1.8.3.3 Proposed measures to trigger and sustain Hygiene at Topical Ventures

Table 2-3 indicates all the facilities and other requirement that would support hygiene integration in the Topical Ventures. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the firm, supplies such as soaps, masks and detergent among other general hygiene investments. The specific measures that would help trigger and sustain hygiene in the firm includes:

- Installing an effective dust remover. Dust once removed should not go to the atmosphere and should be retained in a container. If the dust problem is overcome, then cleaning of the facility will be easier.
- Capacity building workers and management on hygiene
- Ensure clean and less dusty produce is supplied. Promoting the use of threshers with cleaning facility to ensure less dusty produce is delivered to the factory.

1.8.4 Dairy processing firms- Kangari dairy, Njabini Dairy. Kangari Wakulima Dairy plants

1.8.4.1 Cost of Hygiene Integration at Kangari United Dairy Cooperative Society LTD, Njabini FCS and Mukurweini Wakulima Dairy

Table 2-4 indicates the level of hygiene integration before Covid-19 and currently and the estimated Costs of integration in the short run and long run.

Table 0-4: Cost of Hygiene integration at Kangari United Dairy Cooperative Society LTD, Njabini FCS and Mukurweini Wakulima Dairy

Node- Firm 1-Kangari, Firm 2-Njabini, Firm 3- Wakulima		Quantity before covid	*Total cost before covid (Kshs)*	*Quantity currently*	*Total cost currently (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
Costs of installation of:							
Toilets- flush type	Firm1 or 2 or 3	2 toilets, 1 urinal at firm 1and 2, and 6 blocks of toilets at firm 3	80,000 each of firm 1and 2, and 2.7 million -firm 3	4 toilets, 1 urinal at firm 1and 2, and 6 blocks of toilets at firm 3	140,000 -firm 1, 80,000 -firm d 2, and 2.7 million -firm 3	2 extra firm 1, 2 for firm 2, and I block for firm 3	180,000-firm 1 500,000 each for firm 1 and 2
Hand washing facilities (tap water and soap)	Firm 1, 2 and 3	0 for firm 1, 1 for firm 2 and 3 for firm 3	25,000- firm 15,000- firm 3	1 for firm 1, 1 for firm 2 and 10 for firm 3	6,000- firm 1 25,000- firm 2, 50,000- firm 3	1 for firm 1, 4 for firm 2 and 3 for firm 3	10,000 firm 1 100,000- firm 2 15,000- firm 3
Food products handling and transportation equipment	Firm 1, 2 and 3	109 cans firm 1, 40 cans firm 2 and 1000 in firm 3	1,199,000 -firm 1 320,000 firm 2 14 million-firm 3	109 cans firm 1, 40 cans firm 2 and 1000 in firm 3	1,199,000 -firm 1 320,000 firm 2 14 million-firm 3	0 cans firm 1, 60 cans firm 2 and 500 in firm 3 CP cleaning system for firm 2	0 -firm 1 480,000 firm 2 7 million-firm 3 855,645 for CP system
Faecal waste management facilities	Firm 1, 2 and 3	Septic tanks- firm 1 and 3, firm 2 using toilets	250,000 -firm 1 600,000 -firm 2	Septic tanks -firm 1 and 3.	600,000	Septic tanks completion for firm 1 and new for firm 2	30,000 -firm 1 and 350,000 firm 2
Solid waste management facilities	Firm 1, 2 and 3	Firm 1 and 2 burns waste, firm 3 has incinerator	20,000 for firm 2, 120,000 for firm 3	Firm 1 and 2 burns waste, firm 3 has incinerator	20,000 for firm 2, 120,000 for firm 3	Firm 1 and 2 need waste pit, firm 3 needs incinerator	100,000 - 150,000 for firm 1 and 2, 400,000 for firm 3
Grey water management facilities	Firm 1, 2 and 3	2 soak pit firm 1, 4 soak pit-firm 2, 5 waste tanks - firm 3	320,000 -firm 1, 800,000 -firm 2, 330,000 - firm 3	3 soak pit firm 1, 4 soak pit-firm 2, 5 waste tanks -firm 3	480,000 -firm 1, 800,000 -firm 2, 330,000 - firm 3	0 for firm 1, 1 integrated system-firm 2, 3 firm tanks -firm 3 Stainless drainage for firm 3	0--firm 1, 855,645 -firm 2, 320,000 - firm 3 1.753 million for drainage for firm 3
Other infrastructure and equipment	Firm 1	Lactometers	6,440	Lactometers	6,440	Milk analyser	80,000
	Firm 1 and 3	Washing areas for lorries and motor bikes	500,000- firm 3, 0 - firm 1	Washing areas for lorries and motor bikes	500,000- firm 3, 0 - firm 1	Tiling washing areas for firm 1+ pressure system	245,000
	Firm 1, 2 and 3	Floors, plumbing, processing areas, weighing scale, loading area packaging etc	225,000 receiving area for firm 1 1.6 million processing floors for firm 3 Other installations and improvements for firm 2-5,515,000	Floors, processing areas, weighing scale, packaging etc	225,000 receiving area for firm 1 1.6 million processing floors for firm 3 Other installations and improvements for firm 2-5,515,000	Improving floors, processing areas, weighing scale, packaging etc	Epoxy floor for firm 3-12.8 million, Other installations and improvements

Node- Firm 1-Kangari, Firm 2-Njabini, Firm 3- Wakulima		Quantity before covid	*Total cost before covid (Kshs)*	*Quantity currently*	*Total cost currently (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
							for firm 2- 4,432,840
	Firm 3	Staff change room	400,000	Staff change room	400,000	Staff change room	0
	Firm 1	Water tanks and water harvesting	Tanks -200,000	Tanks	260,000	Water harvesting	80,000
Costs of operation and management/month for:							
Toilets	Firm1, 2 or 3	Part time in firm 1 and permanent in 2 and 3.	3,730-firm 1, 6000 firm 2, 12,000 firm 3	Part time in firm 1 and permanent in 2 and 3.	3,730-firm 1, 6000 firm 2, 12,000 firm 3	Full time workers-1 in 1 and 2 and 2 in firm 3.	11,000-firm 1, 12,000 firm 2, 18,000 firm 3
Water bill, water and soap	Firm1, 2 or 3	monthly bill	13,667 firm 1, 3,000 firm 2, 498,000 firm 3	Monthly bill	20,667 firm 1, 3,000 firm 2, 698,000 firm 3	Monthly	0- firm 1, 3,000 firm 2, 0 firm 3
Cleaning of surfaces	Firm 1 or 3	Covered under toilet for firm 2	3,250- firm 1; 36,000 for firm 3	Covered under toilet for firm 2	3,250- firm 1; 36,000 for firm 3	0	0
Collection and disposal of solid waste	Firm1, 2 or 3	Firm 1 burns waste	250 firm 1, 0 for others- covered under above costs	Firm 1 burns waste	250 firm 1, 0 for others- covered under above costs	0	0
Sewerage	Firm1, 2 or 3	Exhausting services for firms 1 and 3, firm 2 uses a pit	250 for firm 1, 3,000 for firm 3	Exhausting services for firms 1 and 3, firm 2 uses a pit	250 for firm 1, 3,000 for firm 3	0	0
Stormwater drainage	Firm1, 2 or 3	Covered under toilets	0	Covered under toilets	0	Covered under toilets	0
Wearing masks	Firm1, 2 or 3	For workers	0 for firm 1 and 2, 152,500 p.m.-firm 3	For workers	800 for firm 1 and 2, 167,500 p.m.-firm 3	For firm 3 only, for other firms no extra is required	800
Fumigating vehicles/ lorries	Firm 3	Monthly	0	Monthly	18,000	Monthly – gas type	0
Regulations costs							
Building capacity of regulators	Firm 1, 2 or 3	Training farmer on hygiene/GAP- firm 2 50 people trained in firm 3	17,000 p.m- firm 3 150,000 one off firm 3	Training farmer on hygiene/GAP- firm 2 50 people trained in firm 3	17,000 p.m- firm 2 150,000 one off firm 3	Training 450 farmer groups on hygiene/GAP- firm 3 Training 12 people in firm 1 and 2	360,000 one off training in firm 1 9 million one off- firm 3 to farmers 300,000 one off in firm 2
Monitoring hygiene	Firm1, 2 or 3	Under management costs	0	Labour at gate and under management costs	26,000 for firm 3, under mgt costs for firm 2 and 1	For firm 1- 1 gate person	12,000 p.m.

Node- Firm 1-Kangari, Firm 2-Njabini, Firm 3- Wakulima		**Quantity before covid**	***Total cost before covid (Kshs)***	***Quantity currently***	***Total cost currently (Kshs)***	***Quantity of what extra is required***	***Cost of what extra is required***
Enforcing hygiene	Firm1, 2 or 3	Under management costs	0	Covered in monitoring above	0	Covered in monitoring	-
Signages	Firm1, 2 or 3	0	0	Firm 2 and 3- one off costs	20,000-30,000	New signages- for each firm	20,000
HACCP	Firm 3	0	0	0	0	Training +certification	2 million
Health costs		**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
Average number of absentees p.m due to illnesses	Firm1, 2 or 3	Absent p.m. due to any illness	0.5 in firm 1, 1 in firm 2 and 7 in firm 3	Absent p.m. due to any illness	0.5 in firm 1, 1 in firm 2 and 5 in firm 3	N/A	N/A
Average numbers of infections p.m	Firm1, 2 or 3	p.m	1 for firm 1, 0 for firm 2 and 45 for firm 3	p.m	1 for firm 1, 0 for firm 2 and 40 for firm 3	N/A	N/A
Cost of infections/Hospitalisations month	Firm1, 2 or 3	Incurred by employer p.m	375 in firm 1 Covered by NHIF in firm 2 1500-2000 per visit in firm 3	Incurred by employer p.m	375 in firm 1 Covered by NHIF in firm 2 1500-2000 per visit in firm 3	N/A	N/A
Commercial prices, costs and revenue	**Firm1, 2 or 3**	**Description**	**Quantity**	**Description**	**Quantity**	**Description**	**Quantity**
Estimated number of customers served per day (estimate visitations per month)	Firm1, 2 or 3	Walk in customers per day	5 for milk and 20-30 for feed for firm 1 62 firm 2, 500 – firm 3	Walk in customers per day	5 for milk and 20-30 for feed for firm 1 62 firm 2, 250 – firm 3	N/A	N/A
Estimated number workers per day	Firm1, 2 or 3	Employees- firm 1	8 for firm 1; 15 for firm 2, 300 for firm 3,	Employees- firm 1	8 for firm 1; 15 for firm 2, 400 for firm 3,	N/A	N/A
Estimated price/unit quantity	Firm1, 2 or 3	Per ltr buying/ selling	Firm 1- buying 33 sell 35; firm 2 sell pasteurised 49 and pasteurisation cost of 3/ltr; firm 3 buys at 30 and sells at 50	Per ltr buying/ selling	Firm 1- buying 40 sell 45; firm 2 sell pasteurised 49 and pasteurisation cost of 3/ltr; firm 3 buys at 40 and sells at 45	N/A	N/A
Quantity handled e.g., amount sold (per month)	Firm1, 2 or 3	Per month in ltrs	480,000 firm 1, 4000 from farmers and 4000 for pasteurisation for firm 2 and 1,650,000 for firm 3	Per month in ltrs	420,000 firm 1, 4000 from farmers and 4000 for pasteurisation for firm 2 and 1,920,000 for firm 3	N/A	N/A

Node- Firm 1-Kangari, Firm 2-Njabini, Firm 3- Wakulima		Quantity before covid	*Total cost before covid (Kshs)*	*Quantity currently*	*Total cost currently (Kshs)*	*Quantity of what extra is required*	*Cost of what extra is required*
Total Cost of doing business (Kshs p.m)	Firm1, 2 or 3	34.5 per ltr-firm 1, and 90% for firm 3	16,50,000- firm 1, 300,000 for firm 2 and 101 million for firm 3	44.5 per ltr-firm 1, and 94% for firm 3	18,690,000- firm 1, 300,000 for firm 2 and 149.8 million for firm 3	N/A	N/A
Total sales (Kshs per month)	Firm1, 2 or 3	All services/ products	Firm 1-16,800,000, firm 2- 6,240,000 and firm 3- 112,5 million	All services/ products	2 Firm 1-18,900,000, firm 2- 6,240,000 and firm 3- 159.3 million	N/A	N/A
Subsidy external & other earnings that supports hygiene	Firm1, 2 or 3	External support	28 million for firm 1, 20 million for firm 2 and 0 for firm 3 -for coolers	By county government	28 million for firm 1, 20 million for firm 2 and 0 for firm 3 -for coolers	N/A	N/A
Total net income/revenue per month	Firm 1, 2 or 3	After all costs	240,000-firm 1; 480,000 firm 2 11.2 million firm 3	After all costs	210,000-firm 1; 480,000 firm 2 9.5 million firm 3	N/A	N/A

1.8.4.2 Proposed measures to trigger and sustain Hygiene at Kangari Dairy

Table 2-4 indicates all the facilities and other requirement that would support hygiene integration in the Kangari Dairy. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the firm, supplies such as soaps, masks and detergent among other general hygiene investments. The node's specific measures that would help trigger and sustain hygiene in the Dairy includes:

- Short term investments
    - Provision of a pasteuriser to ensure more hygienic and long-lasting product
    - Provisions of continuous water supply, through a borehole
    - Improved sensitisation through use of posters/signages and trainings on hygiene adherence
    - Separation of feed (hay) with milk handling, and more trainings on GMPs on milk handling
    - Mechanising cleaning of surfaces as the time required to do cleaning is short.
    - Pressurised system for cleaning cans and more hygienic troughs (with epoxy paint) for the cleaning area.

1.8.4.3 Proposed measures to trigger and sustain Hygiene at Mukurweini Wakulima Dairy

Table 2-4 indicates all the facilities and other requirement that would support hygiene integration in the Mukurweini Wakulima Dairy. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the dairy, supplies such as soaps, masks, and detergent among other general hygiene investments. The specific measures that would help trigger and sustain hygiene in the Dairy includes:

- Capacity building and certifications
    - Continuous sensitisation for behaviour change
    - Assess impact of hygiene changes and develop parameters for departmental incentives recognition and award scheme to reward on hygiene integration amongst the different department. According to the HRM (Wanjiku), the rewards policy exits but has not been actualised because of
    - In-building hygiene in the Diary plant processes through HACCP certification. According to the CEO, Mr Kamau, this will go a long way in-building hygiene in the factory operations. It will make everyone adhere to hygiene. Related to this is the need to capacity build staff on hygiene and HACCP.
    - Adopt quality-based pricing for better returns and to also in-build hygiene in the processes. According to Procurement and agribusiness officer (Simon Muchiri), this would entail putting up satellite coolers for spot checks on quality. This would help enforce and track down hygiene implementation at the farm level

1.8.4.4 Proposed measures to trigger and sustain Hygiene at Njabini FCS

Table 2-4 indicates all the facilities and other requirement that would support hygiene integration in the Njabini FCS. These includes the common measures such as toilet facilities, hand washing facilities, solid waste and grey water management, water supply to the firm, supplies such as soaps, masks, and detergent among other general hygiene investments. The specific measures that would help trigger and sustain hygiene in the dairy includes:

- Capacity building
    - Restrict milk processing area from non-workers
    - Prioritisation of hygiene during planning, budgeting, and activities implementation.

- Increasing the level of business and returns to be able to finance hygiene integration. According to the committee their focus is on increasing this and this according to them will enable install hygiene facilities

- Short-term investments
  - Need to construct a toilet for workers near the workplace, and fix more hand wash stations
  - Installation of existing equipment to improve the level of business and value add (e.g., make yoghurt and packaging) for better returns.
  - Improve the ventilation in the processing area, also the floor to avoid flooding.

1.8.5 Summary tables for cost of hygiene integration in the respective node

Table 2-5 summarises the key requirements for installation and management of hygiene in the respective nodes. It gives what would on average be required in an ordinary node, assuming the basis requirements are not there.

Table 0-5: Summary of costs for each node

Local markets		
Cost of installations		
Item	***Quantity***	***Costs (Kshs)***
1. Toilets- flush type	14 Toilets (2 blocks)	700,000
2. Hand washing facilities	2 wash hands stations with 5000lts water tanks, with 4-6 taps line	300,000
3. Food products handling and transportation equipment	Washing area for produce	50,000 if within market, 500,000 if separate area
4. Faecal waste management facilities	Pit latrines or sewer connection	160,000
5. Solid waste management facilities	2 truck bins	600,000
6. Grey water management facilities	Drainage development	2- 5 million
7. Other infrastructure and equipment	10 Gates	100,000
	Fencing in an area of 2 acres	750,000 for chain-link fence, 3.5 million for half wall and mesh fence
	6 3000lts water tanks with stand	150,000
	Water harvesting	350,000
Costs of operation per month (Kshs)		
1. Toilets	2 workers	24,000
2. Water bill, water and soap	Soaps, detergents etc for toilets	15,000
3. Cleaning of surfaces	Covered under toilet	-
4. Collection and disposal of solid waste	2 days per week, 3 workers, 30 ltrs fuel	40,800
5. Sewerage	Covered under storm drainage	-
6. Stormwater drainage	3 workers, 3 days@ 600 per day/worker	21,600
7. Wearing masks	For workers	750
Regulations costs		
1. Building capacity of regulators	Capacity building 16-18 committee members- one off	360,000
2. Monitoring and enforcing hygiene	Labour – 2 workers at 2 gates- p.m.	18,000
3.Signages + temperature guns	30 signage, + 2 guns- one off	40,000

Cereal aggregators and processors		
Cost of installations		
Item	***Quantity***	***Costs (Kshs)***
1. Toilets- flush type	4 Toilets, 1 urinal	450,000
2. Hand washing facilities	2 wash hands stations and 6 sinks	90,000
4. Food products handling and transportation equipment	8 cyclones and dust removing system Food grade mixer	1,500,000 880,000
5. Faecal waste management facilities	Septic tank	70,000
6. Solid waste management facilities	5 drums plus 1 incinerator	304,000
8. Grey water management facilities	Within faecal waste system cost	-
9. Other infrastructure and equipment	Improved epoxy floors	6,230,000
	1 thermal gun + dispenser	25,000
Costs of operation per month (Kshs)		
1. Toilets	1 worker	15,000
2. Water bill, water and soap	Soaps, detergents etc for toilets	5,000
3. Cleaning of surfaces	Covered under toilet	-
4. Collection and disposal of solid waste	Hired garbage collection services	10,000
5. Sewerage	Covered under storm drainage	-
6. Stormwater drainage	Covered under toilet	-
7. Wearing masks	For workers	8,500
8. Pest control	Monthly cost-chemical, plus labour	30,000
Regulations costs (one off)		
1. Building capacity of regulators	Capacity building of workers	120,000
2. Monitoring and enforcing hygiene	Under management salary	-
3. Signages + temperature guns	14-28 signages	28,000

Fruits and vegetable processors		
Cost of installations		
Item	***Quantity***	***Costs (Kshs)***
1. Toilets- flush type	2 blocks of toilets- 6 toilets, 2 urinals	600,000
2. Hand washing facilities	1 tank with 10,000 ltrs with stand and pump or4 wash hand stations	300,000 80,000
3. Food products handling and transportation equipment	6 cyclones and Mould and dust management system	1,00,000 4.5 million
4. Faecal waste management facilities	Connection to county sewer	20,000
5. Solid waste management facilities	Hired services	-
6. Grey water management facilities	Within faecal waste system cost	-
7. Other infrastructure and equipment	Change room	100,000
	Water purification system	1,200,000
	3 tanks with stands- 10,000-20,000 ltrs	110,000
	Produce washing area- partition	200,000
	1 thermal gun + dispenser	25,000
	Laboratory	2,000,000
Costs of operation per month (Kshs)		
1. Toilets	2 workers	50,000
2. Water bill, water and soap	Soaps, detergents etc for toilets and water bill	9,000
3. Cleaning of surfaces	Covered under toilet	-
4. Collection and disposal of solid waste	Hired garbage collection services	7,000
5. Sewerage	By county government	-
6. Stormwater drainage	By county government	-
7. Wearing masks +PPEs	For workers	9,800
8. Pest control	Monthly cost-chemical, plus labour	25,000
Regulations costs		
1. Building capacity of regulators	Capacity building of workers- one off	240,000
2. Monitoring and enforcing hygiene	1 worker at the gate-p.m.	25,000
3. Signages + temperature guns	15-30 signages- one off	30,000
4. HACCP	Certification +training- one off	1,000,000
5. Environmental Audit	NEMA Certificate and initial annual fee- one off	60,000

Dairy -milk collectors and processors			
Cost of installations			
Item		***Quantity***	***Costs (Kshs)***
1.	*Toilets- flush type*	1block of toilets- 6 toilets, 1 urinal	320,000
2.	*Hand washing facilities*	5-wash hand stations	75,000
3.	*Food products handling and transportation equipment*	120 aluminium milk cans	1,680,000
4.	*Faecal waste management facilities*	2 septic tanks	700,000
5.	*Solid waste management facilities*	1 waste pit 1 incinerator	150,000 400,000
6.	*Grey water management facilities*	3 soak pits	480,000
7.	*Other infrastructure and equipment*	20 lactometers+ 1 milk analyser	87,000
		Lorry/motor bikes washing area	500,000
		2 tanks + underground tank	200,000
		Improving floors, plumbing, etc	5 million
		1 thermal gun + dispenser	25,000
		Milk pasteuriser -3000lts	5,000,000
		Staff change room	400,000
Costs of operation per month (Kshs)			
1.	*Toilets*	1 worker	12,000
2.	*Water bill, water, fumigants and soap*	Soaps, detergents etc for toilets and water bill	35,000
3.	*Cleaning of surfaces*	Covered under toilet costs	-
4.	*Collection and disposal of solid waste*	Covered under toilet cost	-
5.	*Sewerage*	Exhausting services	3,000
6.	*Stormwater drainage*	Covered under toilet costs	-
7.	*Wearing masks +PPEs*	For workers	16,000
8.	*Vehicle fumigation*	Monthly- plus labour	18,000
Regulations costs			
1.	*Building capacity of regulators*	Capacity building of workers- one off	360,000
2.	*Monitoring and enforcing hygiene*	1 worker at the gate-p.m.	12,000
3.	Signages + temperature guns	20-30 signages- one off	40,000
4.	HACCP	Certification +training- one off	2,000,000

1.9 Incentives for triggering AVC actors to integrate and practice hygiene

1.9.1 Policy makers incentives to integrate and practice hygiene

1.9.1.1 Introduction

Various national and county government departments and stakeholders are directly or indirectly involved in the various agricultural value chains. In the markets the direct responsibility is with the departments of trade and the public health departments. The Sub- County administrators were reported to also have direct roles. Other departments such agriculture, public works, and water also have roles on hygiene in the markets. In the milk nodes, the cooperative department at the county and department for livestock have direct roles, while at the national level, the Kenya Dairy Board (KDB) has a direct role. The private firms have no departments directly under them but such departments as public health, trade, and agriculture, have indirect roles and enforces or guides in some of the hygiene initiatives. According to sub-county agriculture officer (SCAO) of Limuru Sub-County, the different departments are supposed to work together to support the various nodes but felt that the departments were not working together as expected. She indicated that the department of agriculture handles aspects on value chain mainly at the production stage, but also partially at the post-production stage, with department of trade coming in to take care of issues from transportation after produce has left the farm to final consumption. According to the FGD in Limuru, hygiene standards for locally consumed good are lower compared to export goods. According to public health officer and sub-county administrator in Kirinyaga West, the public health department is involved in supervising standards in the various nodes- these includes standards of cleanliness and on how for example markets are supposed to be maintained. They also advise the various department on hygiene. The water department is involved through the various water companies like KIRWASCO to supply water in the various nodes, and in Kagio the water company installed hand washing points due to Covid-19 epidemic.

The policy stakeholders interviewed during the FGD at Kirinyaga West and Limuru Sub Counties indicated that the levels of hygiene in the various nodes, especially the markets were average. In Limuru the FGD participants for example felt that the Limuru market had challenged of flooding and water supply was inadequate. The market is also very congested, though for both markets (Kagio and Limuru) the county has tried to decongest them through relocation of traders to other sites.

Figure 21:FGD, with Key Informants on Policy, at Kirinyaga West Sub-county (left) and at Limuru Sub county (right)

1.9.1.2 Incentives and reasons on hygiene policy development

The various stakeholders in the two sub-counties (Limuru and Kirinyaga West) indicated there was usually pressure from politicians, public and some pressure groups to introduce policies or interventions on hygiene. Also, during the advent of Covid-19 it was indicated there was indirect push by international and local players for the cascading of policies, and protocols on hygiene. The Kenya national Chamber of Commerce and Industry (KNCCI) was cited to lobby for policies and actions related to hygiene; for example, on drainage, latrines/toilets in the markets, water supply and reliability, quality of water. The market committee also lobby for the same through the various departments and county administration. The political class, especially through the MCAs was indicated to raise issues on hygiene, and in Kirinyaga West it was reported that this is more common during elections campaigns. In Kirinyaga West, it was indicated they lobbied for the non-payment of toilet user fees. In two markets in Kirinyaga West sub-county the traders and their committees have lobbied for cleaning of toilets by the county and also charging of lower fees (Kshs 5 instead of Kshs 10) and which they have succeeded. The public health department was indicated to push for measure on hygiene such as regards to aflatoxins.

The following reasons were indicated to push policy makers to drive or come with policies:

- Mandate of the county government. According to sub-county administrator in Limuru, it is the mandate of the county to oversee hygiene in the markets and in other nodes.
- Concerns of outbreaks and care of public-like once happened in Kagio market where there was a cholera outbreak. It was reported that produce bought at the market is sold beyond the county and any contamination would affect a big population in the country.
- National laws and legislation that need to be cascaded downwards- like the potato policy
- Emerging issues like Covid-19
- Market for commodity at times pushes for policies related to hygiene like EurepGaps etc
- Condition of donor funding- for example, donors like World Bank that have funded markets construction requires some hygiene measures be incorporated in the design and operations of the markets
- Lack of appropriate facilities at the node and the market requirement and demand by users for the same
- The welfare of livestock- especially for markets handling livestock

- County byelaws can trigger integration/cascading of hygiene and policies to the committees and other structures managing the nodes
- The big role of for example the markets in the supply chains and the high requirements of hygiene in these supply chains

The stakeholders involved from the various departments expressed some high level of motivation to coming up with policies, guidelines etc. for the various nodes; of particular interest was:

- To ensure that people feel there is some improvement in the area where they live
- To ensure food security to the community they serve-if there is no hygiene in the market, it will be hard to sell and produce
- To have a healthy community, incur less expenditure (by individuals and the county) on health and save money for production activities
- Reduce food losses- highest food losses occur in the local markets due to poor hygiene.

According to the FDGs participants in the two areas, some challenges were cited to affect legislation and implementation of policies

- Cost of policy development - this is not prioritised, and it was reported that other activities are given priorities
- Misplaced priorities- hygiene is not given priorities in the county budget allocations and activities, despite its being important. The focus was said to be projects that will deliver more votes to the politicians/county government, and given that hygiene impacts is long term, it receives little such support. Also, the budgets are more geared towards curative and preventive activities even on hygiene.
- Embezzlement of funds meant even for some hygiene interventions
- Luck of political good will to allocate funds for hygiene policies development or interventions. This as from FGD participants in Kirinyaga West was due to lack of sensitisation on need for hygiene interventions. The MCAs, politicians and County administrators were said to require capacity building on hygiene once they assume office. They were said not to understand the importance of hygiene.
- Change of guard at the counties- new government do not continue with project initiated by predecessors' government. The case of incomplete drainage in Kagio market is such one example.
- The high population in the markets (like in Kagio market) limits implementation of some policies and interventions.

What more need (including policies) to be done to enhance the process of hygiene policy development and hygiene integration

- There was a feeling among the Kirinyaga West FGD participants that given that all department (about 50 in agriculture, trade, public health) have trained food handlers, such handlers could be tasked with ensuring hygiene in the Nodes
- Capacity building MCAs and administrators once the assume offices.
- Coming up with policies that lower costs of e.g., usage of toilets, for example charging usage per day and not per visit. The "per visit" charge has made users in Limuru and Kagio market to avoid the services.
- Strengthening, and where not currently being done, introduction of public-private partnership in for example managing of the toilet facilities; especially by involving the local community like traders.
- Having arrangements to capacity build all players in the various AVCs and nodes on hygiene - suppliers, feed manufactures etc.

- Involvement all stakeholders in the process, including developing messages for increasing awareness on need for hygiene.

The following were the reported reasons and incentives by policy makers would trigger them (policy makers) to invest in hygiene

1.9.1.3 Policy makers' reasons for integrating hygiene

The reasons[2] for practicing and thinking about hygiene integration by policy makers are indicated in Annex 5 These includes the mandates of organisations, ability to generate revenues, presence, and availability of the right and supporting policies, personal drives, facilitation, and institutional capacities. The capacity of the institutions and policy makers in terms of skills and resources also is an important factor for their consideration of integrating hygiene

1.9.1.4 Policy makers' incentives that trigger them to integrate hygiene

The following were the reported incentives[3] by policy makers that would trigger them to develop policies on hygiene

Table 0-6: Incentives by policy makers to improve on hygiene (through policies development)

Incentive	*Details from the nodes*	*How to pilot the incentives*
Realisation of effects of poor hygiene- e.g., emergency of hygiene related problem- e.g., epidemics	• The awareness/realisation including among legislators and policy makers of possibility of emergency of diseases or pandemics and effects was identified as a driver. The stakeholders in Kirinyaga West indicated that emergence of Covid-19 and Cholera forced the county to cascade legislation and put-up interventions respectively. The load on hospital if emergency occurs and the need to prevent huge expenditures by Counties. If these effects are realised early, then policies will be set in place	• Documentation of effects of pandemic on the local economy • Sensitise community/ stakeholders on likely diseases and impacts of non-hygienic conditions (share experiences) to push for policies even without emergency of diseases • Increase understanding/ induction of policy makers (e.g., MCA) on hygiene • Assess the changes through new policies due to the sensitisation

[2] *Reasons in this case are an actors' view or believe of a cause, explanation, or justification for an action or event such as the need to have hygiene in their nodes*; they are drivers or issues that are observations, feelings, abilities, occurrences, situations or activities that make the actors to consider or think about hygiene integration and they may or may not always trigger (or materialize into) the actors demand for, invest in or make initiatives to integrate hygiene or develop policies.

[3] *Incentives in this case are defined as "a thing that motivates or encourages someone to do something*". They are the triggers that come from/occur through/identified through experiences, observations, occurrences, abilities, or situations that induces, forces or make actors to invest in or initiate hygiene related interventions

Pressure from stakeholders- Complains by stakeholders- e.g., demonstrations/ lobbying	• It was indicated that pressure from groups such as KNCCI, public, market committees, politicians made policy developers to come up with policies/regulations on hygiene	• Push, support and sensitise organised groups (including market committees) to demand/lobby certain levels targeted hygiene and policies in the various nodes • Capacity build MCA and departments head on hygiene so as to increase their lobbying and policies/ legislations development • Sensitise various stakeholders on possible diseases and epidemics outbreaks and effects of poor hygiene in the various nodes • Assess the change on hygiene integration due to this pressure.
***Mandate and overall development agenda*.**	• At the County level, most policy makers are driven by their mandate to provide services. This follows the development agenda set for the country/County as in many cases a budget is provided to facilitate the same. A change or realisation on this is an incentive	• Review mandates and job descriptions of those likely to influence hygiene integration and policy development. In Kirinyaga West Subcounty it was indicated about 60 staff are trained on food hygiene, but many have currently little role in policy development • Assess the change on hygiene integration due to this change and realisation
***Presence and availability of the right or supporting policies*.**	• It was reported that while actions may be needed for example introducing rules and regulations for hygiene or investing in the necessary infrastructure; such measures need to be supported by law. The capacity and the facilitation to make proper laws would then act as an encouragement/incentive for policy implementers	• Sensitisation of existing laws at County and national level • Supporting cascading of all relevant laws developed at the national level; including those that will support the policies to be developed • Assess the change on hygiene integration due to this change and realisation
Knowledge and skills on policy	• It was reported in both Kirinyaga West and Limuru that MCA and newly	• Induction/sensitisation of policy makers (MCA and departments head)

development and initiation	appointed (after general elections) departments head do not fully understand hygiene and its importance. They also lack skills on how to develop relevant laws	• Assess the change on hygiene integration due to improved knowledge

1.9.2 User of nodes incentives to integrate hygiene

1.9.2.1 Business owners' awareness on incentives factors

All the business owners reported the diseases that people can get when food is contaminated; with diarrhoea being reported by the highest number. Other commonly reported diseases were E. coli infection, coughing, allergies, vomiting, typhoid, food poisoning, aflatoxin infection, stomach-ache and Brucellosis.

All the business owners reported to being aware of hygiene regulations at workplace and to having own regulations. The Aggregation/transport/processors firms reported such regulations as; hand washing with running water after using/visiting the ablution blocks and after every break; all workers should dress in PPEs; and no food should be brought into the premises from outside. For the dairy firms the reported regulations included; workers must wear PPEs while on duty at their work station; workers must wash their hands after lunch or any other break or after visiting the toilet; workers must be subjected to medical tests after every six months; thorough cleaning of workstation; always wearing of protective clothing in the factory premises; cleaning the factory daily; no spitting in the factory; no eating in the factory; no unauthorised persons in the factory premises; not accepting milk that do not adhere to hygiene e.g. with dirt; no mask no service and general personal hygiene to workers. The vegetable and food processors (STAWI and Nature Lock) reported wearing of PPEs; adhering to cleaning procedure on -duration, schedule, intensity, detergents to be used, concentration of chemical used etc.; use of foot bath after visiting the toilet at designated points; hand wash after visiting the toilet or when a worker steps out of the workstation. All business also reported to providing workers with some hygiene facilities and supplies, though in several cases workers were buying their own masks. Provision of PPEs was in all nodes, while as indicted in section 2.2, provision of wash hand facilities and toilets varied in each node, with the markets being lowest in providing these facilities.

Seven of the nine nodes business owners indicated credit providers being interested in improving services on hygiene. There was some relationship between financial support in all the nodes as reported by the business owners; the markets indicated that though not directly a requirement, the issues of hygiene are critical in the designs and structures that are supported by for example world bank. Topical Ventures only indicated hygiene was a requirement only in insurance. According to SOPA services credit institution normally asks for KEBs and trading certificates, which are related to hygiene. According to Kangari dairy, AMICA normally visit the plant to assess the hygiene integration before providing Credit, while Wakulima dairy indicated that organisations like VET Without borders will also be interested in knowing how hygiene is being enforced before any support. STAWI indicated that banks will normally not asks for this, but the grants that the company has received will have a direct or indirect requirement on hygiene integration before giving credit.

Most of the nodes indicated changes in business being affected by Covid-19. There was a reduction in levels of businesses and quantity handled in most of the business as shown in section 2.2. Wakulima Dairy and SOPA indicated they had expanded their business through new products and markets and were therefore not much affected by Covid-19. All nodes reported that revenue was highly likely to be affected by levels of hygiene. The Nodes acknowledged that revenue depends on appearance and apparent safety of product with for example Kangari reporting that buys will offer between Kshs 45 to 47/ltr based on this aspect. According to Topical Ventures, the small do not

bother much about this, but big markets especially targeting supermarkets are concerned about this.

Only STAWI reported to have participated in lobbying to have hygiene regulations lowered, they lobbied through Kenya Association of manufacturers to have the permitted levels of aflatoxins lowered.

1.9.2.2 Business owners' reasons for integrating hygiene

Business owner reasons (as defined in section 2.3.1.3) for the need to have hygiene in their nodes are presented in Annex 5 These for the different nodes includes; availability of resources; knowledge and skills, fear of diseases, commercial drive, pressure from stakeholders; appropriate design of systems and technology; requirement to adhere to for example Covid-19 standards and other guidelines; adherence to government requirements; safety concerns- fear of having workers and other node and product users including consumers being diseased; gain market access; reputation; cost of integration; and ability to generate revenues.

1.9.2.3 Business owners' incentives that trigger them to integrate hygiene

The following were the reported incentives by business owners that would trigger them (business owners) to invest in hygiene

Table 0-7: Incentives by business owners to trigger hygiene integration

Incentive	Details from the nodes	How to pilot the incentives
Improved and sustained levels of business- e.g., attracting customers.	• In Kangari the plant indicated they had been able to grow because of better hygiene. They indicated farmers were relocating from other dairies to their plant • In Wakulima, they indicated the ability to capture farmers in other Sub-counties (Mathira and Tetu) was a result of their ability to ensure hygiene in their processes • It was s reported in STAWI and Wakulima their consideration on having HACCP (with inbuilt hygiene processes) was to ensure they are able to penetrate markets • One of the buyers, Daima, inspected the facilities at Kangari before committing to buy milk, these requirements still drive the adherence to hygiene as the company staff (Mr Charlse Marete) still makes frequent visit to the site. Kangari dairy management indicated that if Daima and other buyers find poor hygiene standards, they are likely to withdraw buying milk. Dairy cooperative societies based on the quality of hygiene i.e.,	• Sensitise farmers and customers to demand for better hygiene • Sensitise and prevail upon business owners to have inbuilt systems that leads to business opportunities such as HACCP • Prevail upon segments of the markets/buyers to demand certain forms of processes (e.g., HACCP, quality based pricing etc) • Introduce hygiene facilities and interventions proposed in costing tables and assess the change in customers

	price of milk varies from sh.40 per litre to Sh. 47 per litre depending on the level of hygiene	
Enforcement of hygiene adherence	• The enforcement organisations like Kenya Dairy Board, KEBS, Public health department in the Counties were said to visit the nodes frequently to enforce hygiene. According to Business owner, SOPA, the government, and KEBS make it mandatory for food processing industries to meet hygiene requirements, the drives them to practice hygiene. • It was reported that when market requirements from buyers by demanding certain procedures and requirements such as those in HACCP (and not buying from those not adhering to such); hygiene integration is more prevalent in the institutions that implement and adhere to such regulations	• Prevail upon the regulators to make frequent visits and enforce as per the law • Development and introduction of bye laws that strengthen the committees in markets enforcing hygiene. For example, develop guidelines on quality of farm produce at farm gate that will also entail frequent tests on the allowable level of impurity at farm gate before the produce leaves the farm for the factory • Prevail upon regulatory authorities to demand certain forms of processes (e.g., HACCP, quality based pricing etc.) • Encourage enterprise to go for certification such as HACCP
Revenue generation motive: ability to sustain or have improved revenues	• The cleaning of grains at both SOPA and Topical ventures, and the seamless line production at SOPA is meant to make product competitive and to attract customers. According to business owner of SOPA, she has seen buyers shift to her due to her hygiene (seamless production and overall hygiene). SOPA is also targeting WFP and UNICEF and indicated that these customers require high level of hygiene at processing plants and high-quality products • Rongai market is one of the largest and busiest market in Kiambu County. This market is therefore a major revenue source for the County. The County is	• Prevail or push demand side to ask for more hygienic products and services and even to embrace quality-based pricing • Prevail upon businesses to have hygienic processes • Introduction of levies at the markets and prevailing on the traders and users of markets on the need to pay for services • Sensitisation on the importance/business value of integrating hygiene-including potential commercial value, market

	therefore keen to improve the market infrastructure and maintain hygiene in the market; through services such as timely cleaning, garbage collection, provision of water and provision of sanitary facilities. These measures encourage traders to continue paying daily market fees. On the contrary, the County indicated may not be very keen to invest in a similar market that does not have increased revenue potential. Traders do not pay any fees. While this decision was made as a Covid-relief measure by the political leadership, the Subcounty of Limuru indicated they were not able to provide hygiene services as traders were not paying any fees currently and which had led to the County administration facing reduced revenues. This in turn limits its abilities to provide future/additional/extra services to the market instead preferring to concentrate on areas that generate more revenues.	access, expansion of customer base
Better reputation/ better image/ recognition/ meeting requirements	• To donors e.g., to attract donor funding. According to Kangari Dairy, AMICA come and check the premises before giving credit. They look at both cashflow and hygiene • STAWI CEO reported that some markets like Living Good randomly check products quality, and that the Company adheres to strict hygiene measure to ensure the meet the requirements. STAWI indicated that they compete with a company like NUTRIPRO on quality and hygiene and are both able to price their products higher than the low pricing	• Sensitise and prevail upon business owners to have inbuilt systems that leads to stakeholders recognising their hygiene integration- such as HACCP and assess the level of new investments on the same • Prevail upon segments of the markets to demand certain forms of processes (e.g., HACCP, quality based pricing, NEMA auditioning, QMS etc) all that have inbuild hygiene practices

	organisations like UNGA Ltd. STAWI is also targeting WFP and therefore would wish to match their requirements in terms of hygiene. Also, they expect to venture into the export market, and whose requirements in terms of hygiene are high. STAWI Reported that USAID once declined to buy from them due to lack of certification	• Promotional campaign on status of hygiene in the respective nodes • Development of messages to emphasise on quality and hygiene available in the respective nodes • Assess the change in levels of customers' / stakeholders' satisfaction with businesses after hygiene integration.
Cost of health services to businesses and overload in use of county hospitals and facilities	• The County governments are the business owners of markets. In Kirinyaga West it was indicated that the Counties are overloaded and incur high expenditures (from consolidated funds) whenever there are epidemics • Also, businesses are bothered by high costs incurred through treating workers from infections-including hygiene related ones	• Prevail upon communities push for justice and compensation by County in relationship to effects of poor hygiene facilities • Introduce measures proposed under costing tables and observe the change in infections, and also costs incurred by businesses. • Sensitise on ability to reduce costs through investments in hygiene and assess the increase in investments

1.9.2.4 Other node users

Workers

Table 0-8: Details on awareness by workers on some factors related to hygiene incentives

	If Y-yes or N-no:								
	Markets		**Aggregation/transport/ processors**		**Milk collection**			**Food processing firms**	
	Kagio	*Limuru*	*SOPA*	*Topical Ventures*	*Kangari*	*Njabini*	*Wakulima*	*Stawi*	*Naturelock*
Mentioned diseases from contaminated food	Cholera (50%), Diarrhea (10%), Typhoid (30%), Malaria (10%),		Stomach-ache (16.7%), coughing (33.2%), food poisoning (16.7%), aflatoxin infection (16.7%), cholera (16.7%)		Diarrhea (44%), Brucellosis (22%), Cholera (11.0%), dysentery (5.5%), typhoid (5.5%), stomach problems (11.0%), TB (5.5%), stomach worms (5.5%)			Diarrhea (22%), Cholera (22%), chest infections (5.5%), typhoid (16.5%), flue & cold (5.5%), Amoeba (5.5%), Food poisoning (16.5%), nausea & vomiting (5.5%)	
If aware of hygiene regulations at workplace	100%-Yes	100%-Yes	66.7-Yes	-	75%-Yes	100%-yes	100%-yes	100%-yes	100%-yes
If workers strictly follow regulations	100%-Yes	66.7%-Yes	66.7%-Yes	100%-Yes	100%-No	66.7%-Yes	100%-Yes	100%-Yes	100%-Yes
If can comply more if salary is higher	50%-Yes	33.3%-Yes	66.7%-Yes	100%-No	100%-Yes	100%-Yes	100%-Yes	100%-Yes	33.3%-Yes
If employees have to pass health check	100%-No	33.3%-Yes	66.7%-Yes	100%-Yes	66.7%-Yes	100%-Yes	100%-Yes	66.7%-Yes	100%-Yes
If have access to tap water, toilets, wash hand station at workplace	100%-yes	33.3%-yes	100%-Yes	100%-yes	100%-yes	33.3%-yes	100%-Yes	100%-Yes	100%-Yes

Workers were aware of various hygiene regulations. Markets indicated that compliance was high by workers as they have to lead from the front and show the traders. For example, it was reported that workers in Kagio follow 95% follow the rules apart from a few causal workers. In the other businesses it was indicated that workers must follow regulations by the company. Stringent laid down rules must be followed, for example during. At Nature Lock, it was said following down of regulations was at about 99%. The workers were said to follow regulation, e.g., for their own safety, i.e., wearing the safety boots to avoid slipping and falling. One of the Dairy indicated there is no enforcement of hygiene issues; but milk handlers wear PPEs during receiving, cooling and dispatching milk. But a number do not strictly adhere to laid down rules, they follow what they already know. In some firms it was indicated that failure by employer to supply PPEs and other facilities and supply led to the failure adhere. According to one worker most of these rules need personal initiative- as one cannot be supervised to maintain them throughout. It was reported in one firm those casual workers were the lowest in adhering to the rules. Workers were divided on whether salary can motivate them to improve on hygiene, with some indicating it was their nature, so not driven by the salary. Others felt that reducing workload by adding more cleaners was more important than increasing their salaries. As from table 10 above a number indicated they would be motivated by salary to comply more on hygiene regulations.

Some nodes indicated that the firms they work in were not strict in having workers comply with health checks. However, as from table 10 a number must pass the tests and the SMEs were assisting their workers to have the tests after every six months.

1.9.2.5 Workers' reasons for integrating hygiene

The reasons why workers feel of the need to have hygiene in their nodes is as indicated in Annex 5. These for the different nodes includes; availability of relevant bye laws; support from managers and market committees; regulations; need to collaborate with other stakeholders in the node; fear of losing employment and desire to earn (extra) incomes; access and availability of appropriate hygiene resources, supplies and facilities; personal initiatives; concern for a clean environment; safety and welfare concerns; help improve image and reputation of the node; own upbringing and inherent behaviour; need to adhere to for example Covid-19 standards and other guidelines; recognition and reward; having right knowledge and skills; revenue motive; feeling of a need to reciprocate incentives by employer; and the nature of the products.

1.9.2.6 Workers' incentives that trigger them to integrate hygiene

The following were the reported incentives by workers that would trigger them (workers) to practice hygiene

Table 0-9: Incentives by workers to trigger hygiene integration

Incentive	Details from the nodes	How to pilot the incentives
Generating better and sustaining revenue	• The ability to attract customers and generate enough revenues for the businesses and for them to earn good salaries	• Prevail the demand - workers- side to demand for better hygiene • Sensitisation on the importance/business value of integrating hygiene- including potential commercial value, market access, expansion of customer base, • Sensitisation on the possible losses for not

		integrating hygiene measures • Assess the change in customer base due to the sensitisation
Enforcement on hygiene adherence	• Enforcement by the quality departments and managers on hygiene (at a personal level and in the sections, they work in). Most nodes have internal systems to check on hygiene integration, though this are not well structured/strengthened/ full operational	• Asist in strengthening the internal hygiene adherence checks • Prevail upon the enforcers to make frequent visits and enforce as per the law • Sensitise workers and assess the change in hygiene adherence due to increased enforcement.
Realisation of better or sustained salaries	• In Wakulima Dairy, the fear of losing salary/lower salaries as happened with Covid-19 due to reduced incomes from hygiene related effects was indicated as a trigger.	• Sensitise and push business owners on the need to have salary adjustments parameters related to hygiene. • Sensitise workers and assess the change in renumeration/ salaries and hygiene adherence and change in hygiene integration from salary adjustments
Penalties through e.g., losing job	• It was indicated that the fear of losing job was a major trigger to practicing hygiene by the workers. It was reported that employees follow hygiene protocols at the workplace so as to keep jobs, especially those they perceive to be well paying and where their welfare is catered for	• Strengthening or initiating company schemes that have penalties for non-adherence to hygiene • Sensitising workers and institute penalties and assess change in hygiene integration/ practice among workers
Rewards	• It was reported in Wakulima that there are schemes for rewards on the person or departments that have high levels of hygiene integration. However, the industry indicated it had not developed parameters to assess this • Additional/extra earnings- The promise of Increased	• Development of parameters to assess and award marks on level of integration • Strengthening or initiating company schemes that have rewards for adherence to hygiene

	allowances or salary is an incentive for employees to practice and sustain hygiene in their workplace	• Sensitising workers and institute rewards and assess change in hygiene integration/ practice among workers
Access /Availability of appropriate hygiene supplies and facilities	• Employees that are provided with the right infrastructure, supplies equipment's and protective clothing are more likely to enhance hygiene. In most cases, a proper environment acts as an incentive for those working in it to enhance it further. For example, providing an extra pair of protective clothing's would encourage an employee to ensure they are always clean while providing a cleaning machine that makes work easier would for example encourage employees to clean often and properly. In the same manner, a well-constructed, easy to clean floor surface would encourage employees to always keep the floor safe	• Sensitise/push workers to demand for better facilities and technologies and assess change in supply of facilities and supplies • Documentation of appropriate facilities, technology, and supplies for hygiene integration by workers • Support for infrastructure/ facilities upgrade and better supplies (as proposed in costings) • Assess the change in hygiene adherence due to change in level of technology and supplies

Customers

Table 0-10: Details on awareness by customers on some factors related to hygiene incentives

	If Y-yes or N-no:								
	Markets		**Aggregation/ transport/ processors**		**Milk collection**			**Food processing firms**	
	Kagio	*Limuru*	*SOPA*	*Topical Ventures*	*Kangari*	*Njabini*	*Wakulima*	*Stawi*	*Nature lock*
Mentioned diseases from contaminated food	Cholera (24.9%), typhoid (16.7%), vomiting (8.3%), diarrhoea (41.8%) and stomach-ache (8.3%)		Diarrhoea - (100%)	Food poisoning- (100%)	Stomach-ache (22.2%), Diarrhoea (33.34%), Brucellosis (22.2%), Worms (11.1%), typhoid (11.1%)			Diarrhoea (33.3%), Vomiting (33.3%), stomach-ache (33.4%)	Stomach pains (100%)

All the customers interviewed indicated that food can be contaminated in unclean market, they consider cleanliness of vendor and stall before buying, and consider freshness and cleanliness of food before buying. They indicated that unclean environment could cause spread of diseases through contamination, that failure to observe hygiene in handling food will see it being contaminated in one way or another, particularly in open market set up; Unclean environment has germs which are the disease carriers; it acts as a host to micro-organisms. According to one cereal customer, fumigation can also bring some form of contamination, but this she said need be overcome through instruction given on package on need to wash the cereals. For example, according to nature Lock if green gram is not handled properly, it will develop algae. The Dairy firms were stronger on this and indicated that if have poor quality cans at processing/if cans are not well washed, or if store cans and milk in dirty places, then foreign materials and bacterial can enter the milk causing diseases. They indicated that milk is a very sensitive product and that if not clean it will go bad very quickly (in less than 24 hrs). Nodes never reported this happening; with for example Kangari Dairy indicating this has never happened since started dealing with them, as they check the milk from time to time at the reception. On freshness of product, they look at eroded packages, expiry dates, and date of manufacture, A customer in Kangari dairy indicated they do this for example to avoid spoilage of the milk which would result in financial losses and risk of losing supply tender with the schools. One customer in Wakulima dairy said they check for thickness of yoghurt, freshness and colour and tats of milk gives an indication its fresh

Only 2 of the 15 customers interviewed indicated they would not pay more on safe food that is free from contamination. To them the price was more to do with the brand and packaging, and slightly on quality.

1.9.2.7 Customers' reasons for the need for hygiene in the nodes

Customers have various reasons as to why they feel the need to have hygiene in the nodes and their services (Annex 5). These for the different nodes includes good reputation from customers and protection of customers from diseases; personal nature and drive; the need to keep environment clean; food safety concern-to customers including children; customers' requirements and demands; retention of customers; knowledge; ensure good and consistent taste; and good reputation from customers;

1.9.2.8 Customers' incentives that trigger them to integrate hygiene

The following were the reported incentives by customers that would trigger them (customers) to practice hygiene

Table 0-11: Incentives by customers to trigger hygiene integration

Incentive	Details from the nodes	How to pilot the incentives
Realisation of good health/ Avoidance of diseases	• The realisation of good health through ability to have less diseases-was cited as the main incentive • In most nodes it was reported that customers are mainly driven by the need to avoid instances of diseases/illness or infections that may result from unclean/unhygienic products	• Sensitise on effects of good hygiene to customers and the need to demand for the same • Sensitise on types of diseases from poor hygiene- including food contamination or effects of poor hygiene • Awareness creation on hygiene risks from agricultural produce and products including disease, contamination and associated costs • For example, with collaboration with Dairy Board of Kenya, develop adverts/sensitise the public on the new guidelines for handling and sales of milk in line with the reforms in the sector. Need for capacity development of the management
Ability to generate sustained or improved revenues	• Several customers also supply to their own customers. They indicated hygiene gives them ability to retain and attract customers and this leads to increase their revenues	• Strengthen the customers side (customers of customers) to demand for more hygiene and assess change in levels of adherence • Hygiene sensitisation so as to demand quality/hygienic products/produce from markets or SMEs • Assess the levels of change- change in revenues and relate with hygiene practice adherence

Traders

Some of the disease identified by the market traders included typhoid (4.5% of the mentions), cholera (13.6%), food poisoning (9.1%), constipation (4.5%), Diarrhoea (18.1%), stomach-ache (18.1%), coughing (4.5%), flue (9.1%), vomiting (13.6%) and cancer (4.9%). All the traders in the market node were aware of hygiene regulations at their workplace

All traders in the two markets indicated they were aware; of hygiene regulations at workplace, that the local authority makes visits to monitor hygiene and sales depended on appearance -safety of product and stall. None reported that they were asked to pay bribes if they do not adhere to regulations and non-also reported that hygiene /health test was a requirement for credit application. In Kagio market 40% of traders indicated they had no access to tap with running water, toilet, or hand washing facility, but in Rongai market all indicated they had access, though from the private run toilet.

According to the traders the regulations requirement for market includes, must clean the work area/stall before opening for the day's business; all wastes are collected at various transfer stations within the market by 7.00 a.m. for collection by county government cleaners. It is the responsibility of the trader to drop the waste to the collection bins if by 7.00am it will not have been delivered at the transfer station; allow for impromptu inspections by county government inspection team; wearing of masks; cleaning market stalls every morning before opening; use of clean item/equipment for always selling produce and that clean water should always be used in washing the food stuffs. The food stuff should always be kept at a clean location and that there is need to comply with local by-laws i.e., undergo medical check-up once every year. There was also requirement to pay for use of the market; washing hands with water and soap after visit to a toilet or changing nappies for mothers; ensuring have dust coats and aprons (women) and safe disposal of waste and no washing of legs and head or agricultural produce at the washing point. It was reported that enforcement of regulations was by the committees and the county government with either making on average daily visits to the stalls. The consequence of noncompliance includes not being allowed by the committee to trade on that day and if it is beyond the committee officials, the county enforcement officer takes action, by taking you to courts. The committee also at times reprimand the workers.

According to the traders, customers prefer and are attracted to clean looking fresh produce and environment, and some indicated that their loyal customers loudly appreciated their efforts to maintain a clean environment and good personal hygiene standards. The traders indicated that trader must wear clean clothes. It was reported that for example customers check whether the cereals are clean and well dried to avoid aflatoxin cases.

1.9.2.9 Traders' reasons for the need for hygiene in their nodes and their services

The reasons why traders feel the need to have hygiene in their nodes are as indicated in Annex 5. These for the different nodes includes own upbringing; fear of having stall closed; access customer, expand and retain customers' base; commercial gains; access organised/ better paying markets/customers; having of appropriate facilities; to jointly participate with other traders; own and customers safety concerns; adherence to regulations; concern for a clean environment; and to fill the gap left by the County government

1.9.2.10Traders' incentives that trigger them to integrate hygiene

The following were the reported incentives by traders that would trigger them (traders) to practice hygiene

Table 0-12: Incentives by traders to trigger hygiene integration

Incentive	Details from the nodes	How to pilot the incentives
Improved and sustained levels of business- e.g., attracting customers.	• Farmers reported to attract more customers if the stalls looked hygiene. They indicated they can retain customers due to cleanliness and hygiene. The fear of losing customers came out as one of the drivers	• Strengthen the customers side to demand for more hygiene; for example, develop and advertise standard produce handling procedures for the market aimed at sensitising the customers on the level of hygiene that should be expected at the market. This is mainly through public sensitisation through Information, Education Communication (IEC) materials on consumer rights/product quality • Enhancement of water supply and installation of a washing area for produce • Sensitisation on the possible losses for not integrating hygiene measures • Assess the change in revenues and change in adherence
Enforcement on adherence	• The enforcement organisations Public Health department in the Counties and the committee were said to visit/inspect the nodes frequently to enforce hygiene.	• Prevail upon the regulators to make frequent visits and enforce as per the law • Development and introduction of specific bye laws/penalties that strengthen the committees in markets enforcing hygiene if traders do not adhere • Create awareness on byelaws, hygiene and penalties. • Assess the change in adherence and also document the change in enforcement
Commercial gains-having sustained or have improved revenues	• With ability to retain and attract customers due to their hygiene, the traders reported that this enables them to realise more revenues. Majority of traders are driven by the realisation/promise of earning more. Ensuring	• Strengthen the traders' customers side to demand for more hygiene • Sensitisation on the importance/business value of integrating hygiene- including potential commercial value, market access, expansion of customer base

	simple measures as cleaning (including sorting and grading) the product one sells, cleanliness of the stalls, proper display of products and packaging, personal hygiene/cleanliness attracts more customers therefore resulting to higher revenues/sales. Further, clean /hygienic products may attract higher prices meaning better profits	• Assess the change in adherence and document the change in revenues
Losing business/ Having stalls closed	• In both the markets the fact that traders are forced/prevailed upon not to open makes them be incentivised to ensure hygiene, by for example cleaning their stalls. Because of rules and regulations put in place either by the market committees, county government public officers or regulators such as KDB (in the case of milk), traders know/fear that non-compliance with the set hygiene standards may lead to closure of the business for any length of time; thus the loss of stocks, and the business revenues	• Development and introduction of bye laws that strengthen the committees in markets enforcing hygiene -on business closer • Sensitisation on existing laws and regulations • Assess the change in hygiene adherence/ practice and document losses in business/closure of stalls due to not, e.g. cleaning stalls
Access /Availability of appropriate hygiene supplies and facilities	• It was reported that when traders are provided with the right infrastructure, they are more likely to enhance hygiene. In most cases, a proper environment acts as an incentive. For example, water and a place to wash produce would encourage traders to ensure cleanliness most of the times. In the same manner, a well-constructed, easy to clean floor surface in the market would encourage traders to always keep the floor safe	• Push the committees and traders to demand for better facilities at the market • Support for infrastructure (facilities) and supplies e.g., produce washing areas • Assess the change due to the facilities and document also the change in technology/ supplies

Service Providers

The services providers indicated being aware of Cholera (20%), typhoid (20%), vomiting (10%), Diarrhea (40%), others (10%). The service providers interviewed were providing toilet services, both as private players or under the county government. The Kamirithu disabled service providers indicated they were operating at just the breakeven point, and the revenues were just enough to meet costs. The public toilet indicated not breaking even and indicated the charge of Kshs 5 was too low. In Kirinyaga, the toilet was not break even, with revenues reported to be Kshs 150-300 per day.


Kamirithu members during the interview

Kamirithu Disabled used own saving to start the toilet service business, the toilets were in very bad condition, there was no electricity and they had it connected. The business started in 2012. Before the toilets were owned by ECOTAT, then ACK, then Kamirithu. Have 3 tanks, 6000lts, 3500 ltrs and 2000lts. Have a toilet that has 3 female, 3 male toilets and urinal. They charge 10sh per visit. Collects during markets days the following (6 am-10 am -Kshs 300, 10 am-1pm-800, 1pm-5pm-600 and 5pm-9pm-1500. Day-time its managed by ladies and at night by men. Non-market days the day collections are about Kshs 1300-day time and 800 at night. They pay for water about 7,000 p.m. Also, they pay electricity. During day-time 4 workers are paid 400 per day. At night two workers operate the premises. They use 560 sh per week on soap, Jik of Kshs 250 per day, perfume of Kshs 160 per day, dettol of 200sh per 1.5-day, sanitiser and glycerine of 400sh for 3 days, destainer of 600sh per week, tissues 37 tissue market days and 13 tissues non market days (bale is has 40 tissues and sells for 880 shs as they use high quality)

1.9.2.11 Service Providers' reasons for the need for hygiene in their services

Services providers and mainly those in the markets indicated they have the reasons indicated in Annex 5. These includes revenue motive; moral and care of disadvantage community; to support the effort of committee; safety of service/facilities users- traders and customers; and job satisfaction and income motive

1.9.2.12 Service Providers' incentives that trigger them to integrate hygiene

The following were the reported incentives by service providers that would trigger them (service providers) to practice hygiene.

Table 0-13: Incentives by service providers to trigger hygiene integration

Incentive	Details from the nodes	How to pilot the incentives
Improved and sustained levels of business.	• Kamirithu Disabled who runs the private washrooms for Rongai market indicated that their ensuring hygiene had made them get customers even from outside the markets. This is unlike the public toilets in both markets that can't attract users due to low levels of hygiene	• Prevail the demand side (users of toilets) to demand for better hygiene • Sensitise the service providers on benefits of improved hygiene levels • Improve hygiene in public run toilets and assess the change in business level
Enforcement on adherence	• The enforcement organisations Public Health department in the Counties and the committee were said to visit/inspect the nodes frequently to enforce hygiene.	• Prevail upon the regulators to make frequent visits and enforce as per the law • Assess the change in hygiene levels and document the visits by enforcers
Improved revenues	• The private toilet indicated their revenues are better than the public toilet, the indicated the drive to make more revenues make them have improved hygiene. The private service provider in Limuru charges more (Kshs 10) compared to Public/ committee toilet (Kshs, 5) and gets more revenues due to the better hygiene in the former • One of the hindrances to revenue generation and therefore the ability by service providers to offer hygiene services is the mode of charging; for example, the Kagio private run toilets were able to only generate 150-300/day despite the high population in the markets. It was indicated that the traders are not willing to pay the toilet charges	• Sensitise the demand (traders and public to demand for better hygiene • Pilot lower charges and charges per day instead of per visit • Sensitise traders and users of nodes on need to pay for services • Sensitise the services providers on benefits of improved hygiene- and assess the change in practice and also changes in revenues

	(as they would visit the facilities several times in a day, hence paying what they considered to high) and prefer to seek help from hotels and building around the market. They proposed payment more affordable charges.	
Health problems complains by customers	• The private toilet/washrooms at Rongai market indicated that given that disabled users are at danger of contaminating their hands and body through unhygienic toilets and given that the operators are also disabled makes them ensure cleanliness. The act on complains on health effects	• Sensitise disabled community on type of diseases they can get and effects of unhygienic condition and for them to demand hygienic facilities • Sensitise customers (especially disabled) to demand for improved services • Assess the change adherence and document the change in health problems

Conclusion And Recommendation

1.10 Conclusion

The study objectives were to assess, characterise, and document the costs of integrating and/or not integrating hygiene into agricultural value chains (AVCs) as well as the incentives for triggering AVC actors (policy makers, business owners/managers, employees, market traders, consumers and service providers) to integrate and practice hygiene in milk collection and processing firms, aggregation/transportation firms, potatoes and cereals processing centres and local retail markets.

Key hygiene costs were based on both investment and operations and maintenance (o&m) costs for facilities such as toilets, hand washing facilities, food products handling and transportation equipment, faecal waste management facilities, solid waste management facilities, grey water management facilities and other related facilities/infrastructure/investments. The analysis noted that different nodes had high requirement in specific aspects but lower on other aspects. For example, markets required higher investments for toilets and hand washing facilities, while agro-processors and aggregation/transportation SMEs required higher investments in technologies for food handling and disposal of dust. Both the food processing and milk nodes also indicated they would require more investment on systems that would in-build hygiene in their processes such Hazard Analysis Critical Control Point (HACCP).

With regard to operations and maintenance, all firms noted an increased requirement for toiletries, running water, soaps and detergents especially during the covid -19 periods. Some SMEs also required additional labour to support hygiene activities, including cleaners and supervisors.

The study has also identified reasons that make the business owners and users of nodes to think about the need for hygiene in respective nodes; these reasons fall under nine categories: (1) commercial and revenue- that comprises of attracting market and customers, cost of investment, job retention, earning of salary by workers etc; (2) business reputation- the company image, being one of the best node etc; (3) environmental concern: (4) fulfilling of mandate- node serves the mandate it has been tasked to do (5) technology availability -technology to e.g. support clean, manage hygiene parameter etc; (6) human welfare-food safety concern including for the children, etc; (7) adherence to regulations and procedures; (8) skill and knowledge capacity/levels; and (9) Personal character and gratification- personal drive, need to be appreciated,

Food markets mainly lack reliable sources and storage facilities for running water while sustaining hygiene practice is seen more as an individual initiative rather than a communal one. The main barriers for traders to practice hygiene was lack of cooperation from fellow traders and lack of or inadequate facilities such as for hand washing and toilets. Lack of water and lack of or limited facilities and technology were the main limiting factors for workers to practice hygiene, with the former being unavailability of technology for cleaning of surfaces, removing dust etc.

The study has identified the main incentives that drive each of the key actors in each node to demand or invest in hygiene. These includes for:

Policy makers

- Realisation of effects of poor hygiene by policy makers; for example, the possibility of emergency of hygiene related problem e.g., COVID -19 or Cholera, with the latter having been reported in Kagio market a few years ago and which forced county to act.
- Increased awareness, on hygiene and its effects on county welfare and development, among legislators and policy makers
- Pressure from stakeholders- through complains by stakeholders- e.g., demonstrations and lobbying by traders, committees, trade associations etc.
- Mandate and overall development agenda- the mandate of Counties is to develop appropriate policies.
- Presence and availability of the right or supporting policies (from e.g. the national government) and laws to support the policies that would be developed and also from which to borrow and cascade laws and policies

- Knowledge and skills on policy development and initiation among the County MCAs and policy officers

Business owners

- Potential of improved and sustained levels of business- through reattaining and attracting customers- related to this is fear of losing customers.
- Enforcement of hygiene adherence- the need to adhere to regulations on hygiene.
- Revenue generation motive: ability to sustain or have improved revenues through for example attracting customers or accessing new markets
- Better reputation/better image/ recognition- that the business owners would want to be seen to be practicing hygiene -by their customers and other stakeholders.
- Cost of health services to businesses and overload in use of county hospitals and facilities- that poor hygiene is seen as a cost load to county and business especially when there is outbreak or diseased persons

Workers

- Generating better and sustaining revenue to be able to retain and earn salaries
- Enforcement on adherence- from internal enforcement by management
- Realisation of better or sustained salaries and rewards
- Penalties through e.g., losing job,
- Rewards -that schemes that reward hygiene practices by workers would act as incentives
- Access and availability of appropriate hygiene supplies and facilities

Customers

- Realisation of good health and avoidance of diseases
- Ability to generate sustained or improved revenues- as also customers have their own customers to whom they sell to

Traders

- Improved and sustained levels of business- e.g., attracting customers.,
- Enforcement n adherence by market committees or county government staffs
- Commercial gains-ability to sustain or have improved revenues through retained on increased customers
- Loss of business/having stalls closed and therefore losing business, and
- Access and availability of appropriate hygiene supplies and facilities

Service providers

- Improved and sustained levels of business- e.g., toilets attracting and retaining users and ability to attract more customers even from beyond the markets
- Enforcement on adherence by county government on toilet hygiene adherence
- Improved revenues- through improved customer base and better/higher payments
- Health problems complains by customers and especially for the disabled managed toilets, their fellow disabled customers who are not able to use facilities without a lot of touching of the surfaces

1.11 Recommendations

The study recommends undertaking piloting of proposed incentives through proposed piloting measures and implementation of the short- and long-term interventions; starting with short term intervention that are achievable (based on cost and existing systems) and which will activate hygiene integration immediately and lead to sustainability. The short term intervention relate to basic hygiene facilities such a wash hand stations; supply of adequate and clean water; capacity building on hygiene; having personnel to clean and enforce hygiene, signages installation; rehabilitating or putting up of new toilets and wash hand stations; having certification programmes such as HACCP and having and EMP and acquiring Environmental audit certificates; installing crucial food handling equipment and machinery such as for dust management, food mixing and aluminium milk cans; improving on working surfaces through putting tiles on floors; having washing area for produce among others listed in tables 1 to 9. The short-term interventions would

then be followed by the long term, which have higher costs but have wider long-term support to hygiene. They also relate with higher levels of nodes operations/activities. The long-term investment would be those with higher cost/financial implication and more planning, such as expansion of facilities; installation of machinery and equipment for further handling and processing such as for packaging or processing new products; installation of new processing building, washing bays, change rooms, and drainage; having quality-based pricing system; going for more better systems and facilities like installation of epoxy floors, having floor cleaning machines etc.

In the markets, focus need to be on hygiene facilities and improvements of structures to support installation and support operation of installed (existing and new) hygiene system and activities (facilities such as fencing, paving, supply of water, and points for washing produce.

In the businesses on agro-processing and the dairies installation need be those that will improve on existing processes that have impact on hygiene- e.g., installation of cyclones, mixers, pasteurisers etc.

Also, in both dairy and food processing, there is also need for installation of systems with enforceable procedures and processes that have inbuild hygiene activities- e.g., HACCP, quality-based pricing etc.

Ultimately, hygiene promotion needs to lead to realisation of elements/outputs that will build and support the drivers/the motivation factors to hygiene integration. These elements can build from or be incorporated in the system or activities introduced in the node. The study thus recommends supporting of the realisation of the different incentives to different actors through proposed piloting measure discussed below while also undertaking of the short- and long-term interventions.

The study also makes the following recommendations in relationship to the piloting of incentives

Policy makers' incentives piloting

- Sensitise community-stakeholders on likely diseases and impacts of non-hygienic conditions (share experiences) to push for policies even without emergency of diseases
- Increase understanding induction of policy makers (e.g., MCA) on hygiene
- Pushing, supporting, and sensitising organised groups (including market committees) to demand/lobby certain levels targeted hygiene and policies in the various nodes
- Capacity build members of county assemblies (MCAs) and departments head on hygiene to increase their lobbying and policies/ legislations development
- Sensitise various stakeholders on possible diseases and epidemics outbreaks and effects of poor hygiene in the various nodes
- Review mandates and job descriptions of those likely to influence hygiene integration and policy development. In Kirinyaga West Subcounty it was indicated about 60 staff are trained on food hygiene, but many have currently little role in policy development
- Sensitisation of existing laws at County and national level
- Supporting cascading of all relevant laws developed at the national level
- Induction or sensitisation of policy makers (MCA and departments head)

Business owners' incentives piloting

- Sensitise farmers and customers to demand for better hygiene
- Sensitise and prevail upon business owners to have inbuilt systems that lead to business opportunities such as HACCP
- Prevail upon segments of the markets/buyers to demand certain forms of processes (e.g. HACCP, quality based pricing etc)
- Prevail upon the regulators to make frequent visits and enforce as per the law
- Development and introduction of bye laws that strengthen the committees in markets enforcing hygiene
- Prevail upon regulatory authorities to demand certain forms of processes (e.g. HACCP, quality based pricing etc.)
- Encourage enterprise to go for certification such as HACCP
- Prevail or push demand side to ask for more hygienic products and services and even to embrace quality-based pricing
- Prevail upon businesses to have hygienic processes
- Introduction of levies at the markets and prevailing on the traders and users of markets on the need to pay for services
- Sensitisation on the importance/business value of integrating hygiene- including potential commercial value, market access, expansion of customer base
- Sensitise and prevail upon business owners to have inbuilt systems that leads to stakeholders recognising their hygiene integration- such as HACCP
- Prevail upon segments of the markets to demand certain forms of processes (e.g. HACCP, quality based pricing, NEMA auditing) all that have inbuild hygiene practices
- Promotional campaign to bring to various stakeholder the status of hygiene in the respective nodes
- Development of messages to emphasise on quality and hygiene available in the respective nodes
- Prevail upon communities push for justice and compensation by County in relationship to effects of poor hygiene facilities

Workers' incentives piloting

- Prevail the demand side to demand for better hygiene
- Sensitisation on the importance/business value of integrating hygiene- including potential commercial value, market access, expansion of customer base,
- Sensitisation on the possible losses for not integrating hygiene measures
- Prevail upon the enforcers to make frequent visits and enforce as per the law
- Sensitise and push business owners on the need to have rewards schemes that have assessment parameters related to hygiene.
- Strengthening or initiating company schemes that have penalties for non-adherence to hygiene and sensitising workers on the same
- Strengthening or initiating company schemes that have rewards for adherence to hygiene and sensitising workers on the same
- Development of parameters to assess and award marks on level of integration by workers and departments
- Sensitise and push workers to demand for better facilities and technologies
- Documentation of appropriate facilities, technology, and supplies for hygiene integration by workers
- Support for infrastructure upgrade – especially the hygiene facilities

Customers' incentives piloting

- Sensitise on effects of good hygiene to customers and the need to demand for the same
- Sensitise on types of diseases from poor hygiene- including food contamination or effects of poor hygiene
- Awareness creation on hygiene risks from agricultural produce and products including disease, contamination, and associated costs
- Strengthen the customers side to demand for more hygiene
- Hygiene sensitisation to demand quality/hygienic products/produce from markets or SMEs

Traders' incentives piloting

- Strengthen the customers side to demand for more hygiene
- Enhancement of water supply and installation of a washing area for produce
- Sensitisation on the possible losses for not integrating hygiene measures
- Prevail upon the regulators to make frequent visits and enforce hygiene adherence as per the law
- Development and introduction of specific bye laws/penalties that strengthen the committees in markets enforcing hygiene if traders do not adhere. Then create awareness on byelaws, hygiene, and penalties
- Sensitisation on the importance/business value of integrating hygiene- including potential commercial value, market access, expansion of customer base
- Sensitisation on existing laws and regulations
- Support for infrastructure upgrade – especially the case of hygiene facilities
- Push the committees and traders to demand for better facilities at the market

Service providers incentives piloting

- Prevail the demand side (users of toilets) to demand for better hygiene
- Prevail upon the regulators to make frequent visits and enforce as per the law
- Sensitise the demand (traders and public to demand for better hygiene
- Pilot lower charges and charges per day instead of per visit
- Sensitise traders and users of nodes on need to pay for services
- Sensitise disabled community on type of diseases they can get and effects of unhygienic condition and for them to demand hygienic facilities

Under all the incentives there is need to have a method/ means of assessing the piloting activities; for example, comparing the with and without situations and comparing the change in the incentive itself.

Annex 1: List of those Interviewed

NODE	NAME	POSITION	PHONE NUMBER/ID
Limuru Subcounty Policy stakeholders	Lucy Waweru	Agricultural Officer	+254715977689
	Pamela Kunyuga	Sub-County Environment office	+254723715214
	Samuel Mwangi W	Ward Administrator	+254722705242
	Jospeh N Gitita	Ward Agric Officer-Central Limuru	+254715977689
	Martin N Kinyanjui	Sub-County Enforcement Officer	+254724780904
Kirinyaga West Subcounty Policy stakeholders	Charles Wachira Mutugi	Administrator Kirinyaga West	+254722398219
	Patrick M Muriithi	Administrator-Kiini	+254723399751
	Gladys Githaka	Sub County water office	+254722361362
	Christopher Mugo	Trade Officer	+254727300177
	Francis Nganga	Agric Kirinyaga West	+254720612536
	Wambui Beatrice	Business representative	+254713491604
	John K Kamara	Livestock Kirinyaga West	+254721557942
	Joel Mundia	Public Health	+254720872807
Limuru Market	Joseph Ngugi Mwangi Julia Mugure Ndaba John Ndichu Karonji Paul Kuria Ndegwa David Mwai Njoroge Douglas Kuria Gikeri	Committee Secretary- Limuru Mkt Committee member Vice Chairman Chairman Vice secretary Committee member	+254741239115 +254726381568 +254725292984 +254725831391 +254712268768 +254714728510
	Sophia Wambui Kiambuthi	Worker	+254720339692
	Muturi Karanja	Worker	+254712706219
	Lucy Wambui	Trader-cereals	+254716620176
	Benedette Nyambura	Trader-cereals	+254725934673
	Ruth Wambui	Trader-Potatoes	+254716620176
	Grace Mumbi	Trader-Potatoes	+254719253194
	Mary Wangari Mbugua	Trader-vegetables	+254720379411
	Francis Ndirangu	Trader-cereals	+254721570827
	Ann gathoni	Customer	+254700398933
	John Githu	Customer	+254721406510
	Regina Wambui Wanjiku	Service Provider-toilet	+254729141167
	Elisabeth Njoki Ann gathoni	Service Providers toilets	+254705626018 +254720472457

Kagio Market	Simon Muritthi Kanja Simon Maina Wachinga Claudia Wangu Muciri Rosemary Kabura Njoroge Mary Nyawira Murithi	Chairman-Market Committee Committee Member - Cabbages section Committee Member-Potatoes section Committee Member-Tomatoes section Committee Member -Potatoes section	+254716027751 +254725683469 +254727878529 +254722521550 +254705164882
	Limuru Market-Agriculture Officer	Worker-Head of Enforcement	+254725414781
	Monica Muthika	Worker- Deputy head of County enforcement team	+254705908056
	Grace Muhoro	Worker-cleaner	+254728876925
	Charles Mwangi	Trader-cereals	*+254752399917*
	Ruth Njeri Mbugwa	Trader-cereals	*+254782958150*
	Robert Muingai	Trader-Potatoes	*+254720559191*
	Roseline Nyawira	Trader-Potatoes	*+254798438877*
	Irene Wanjira	Trader-cereals	+254*706542012*
	Tabith Wambui	Customer	+254721637659
	Onesmus Kamau Mathenge		+254710108052
	Jemimah Wanjiru	Service provider-cleaning	+254748608115
	Judy Wanjiru	Service provider-cleaning	+254728305771
SOPA Services Ltd	Pauline Kamau	Business Owner	+254721879051
	Festus Mwigai	Worker-Store keeper	+254707398470
	Benajmin kavali	Workers- Manager	+254726832698
	Henry Mwaura maina	Worker- Nutritionist	+254720890497
	George Gitau Kimani	Customer	+254721906726
Topical Ventures	Mr. Hiren Trivedi	Business Owner	+254722290860
	Joshua Mwangangi	Worker- cleaner	+254734608220
	Paul Muhabi Mutere	Worker- Miller	+254792775386
	James M. Bukachi	Worker- Loader	+254742440768
	Ruth Macharia Ganaane	Customer	+254722416779
Nature Lock	Nancy Wangui Mwangi Faith Weru	Business Owner-Production Manager Business Owner-Quality Manager	+254711730725 +254703935920
	Sospeter Githua	Worker-cleaner	+254717377560
	Ann Wanjiku	Worker	+254718106759
	Marie Njau	Worker	+254729682792
	David Njuguna Chege	Customer	+254712128784

	Jekim Mutethya	Customer	+254790915977
STAWI Foods and fruits	Erick Muthomi	Business Owner	+254720466910
	Roselyne Kangendo Kinyua	Worker-miller	+254725921983
	Joyce Ngina	Worker- miller	+254797422140
	Purity Musenya	Worker-agronomist	+254729352399
	Josphine Ngugi	Customer	+254718646624
Kangari United Dairy Coop society	James Kihara	Manager Kangari Dairy Coop	+254720773771
	Purity Wangari	Secretary Kangari dairy Coop	+254727095798
	Henry Thiongo	Treasurer Kangari Dairy Coop	+254725726076
	Mwaniki Jimnah M Kamau	Chairman Kangari Dairy Coop	+254715944833
	Didden Maina Njuguna	Worker-Assistant Plant Manager	+254718510320
	Nicholas Kirui	Worker-Quality assurance	+254757078373
	Sara Wanjiru	Worker-Store Keeper	+254729601190
	Kinuthia Warimue	Customer	+254724539251
	Rufus Mbugua Mwangi	Transporter service provider	+254768823785
Njabini dairy Coop Society	Paul Kahio, Peter Kibe, Joel Kuria, Reymond Maara, Jackob Nganga	Secretary -Njabini Dairy coop Society	+254720859169
	James Mwangi	Worker-Grader	+254111959835
	John Mbugua	Worker-processor	+254722675823
	Faith Wanja Mwangi	Worker- Clerk-Records entry	+25470468478
	Godfrey Wamithi	Customer	+254101492288
	Peter Karanja	Customer	+254710488380
	Peter Mwangi Mukomo	Customer	+254723394161
Mukurweini Wakulima Dairy	Peter Kamau Mathinji	CEO Mukurweini Wakulima Dairy	+254721966393 +254725117003
	Simon Wambugu Muchiri	Procurement & Extension Assistant	+254710371255 +254722291565
	Loise Wanjiku Mundia	Human Resource Manager	+254728037233
	David Githinji	Engineering/Safety	
	Charlse Langat	Quality Supervisor	
	Peter Ngunia Ngari	Worker-Procurement and extension.	+254703197975
	David Mwangi Kabi	Worker-Driver	+254721341794
	Charles Kanake	Worker-Quality Assurance	+254715570058
	Margart wairimju	Customer	+254715206061
	John Irungu	Customer	+254727368254

Annex 2: Number of Nodes and Days for Cost Assessment

Client	Qty	Number of sessions /days	Identified nodes- (Name and nature of business)	County, level and contacts
Milk collection & processing firms	2	2	Mukurweini Wakulima Dairy Kangari Dairy Cooperative Society Njabini Dairy Coperative society	Nyeri- higher level -Esther Livestock dept-Tel-0702684970/Wakulima Dairy operation manager-0720586805 Muranga- medium level- Wachira-NARIG Muranga-Tel-0727776878/Mbugua-Kangari Dairy Chairman-0715944833 Nyandarua -low level- Irene, Director of livestock-Tel.0720578026, Kibe-Secretary Njabini dairy- Tel 0720859169
Aggregation/ Transport firms	2	2	Topical Ventures Green grams SOPA Ltd – Off taker and also processing (Cereals – Maize)	Nairobi-Kyambi Kavali (CEO)-lower level- Tel 0721 950 504 Nairobi- -higher level -Pauline Kamau (CEO)-Tel 0722 879 051
Processing firms	2	2	Nature Lock - Vegetables Processor STAWI Fruits and Foods – cereals processor	Nairobi- higher level, and potato processing. Tei Mukunya (CEO)- Tel. 0722777717/0735555180 Nairobi- Lower level, and cereal processing- Eric Muthomi- Tel. 0720466910
Local Retail Markets	2	2	Kagio Market- Rongai (Limuru) Market-	Kirinyaga Lower level. Mukungo-Director Agriculture Tel, 0722945976/Simon-Chairman mkt-Tel 0716027751 Kiambu- higher level- Lucy- SCAO Limuru-Tel-0720820282/ Ndegwa-market chairman-Tel 0725831391
Total	**8**			

Annex 3: Categories of respondents, their targeted number, method used and days for incentives study per each unit

Client	Respondents on incentives study	Respondents /Client session	Method	Estimated days/client
Milk collection & processing firms	Business manager	1	SSI	1
	Employees	3	SSI	
	Consumers/Customers	2	KII	
Aggregation/ Transport firms	Business manager	1	SSI	1
	Employees	3	SSI	
	Consumers/Customers	2	KII	
Processing firms	Business manager	1	SSI	1
	Employees	3	SSI	
	Consumers/Customers	2	KII	
Local Retail Markets	Business manager	1	SSI	2
	Market traders	5	SSI	
	Employees	3	SSI	
	Consumers/Customers	2	KII	
	Service providers Water, sanitation and waste collection service providers	3	SSI	1
County	Policy makers (average 7 per county-2 counties)	7	FGD	1
Total respondents		**39**		**7 days**

Annex 4: Detailed Costing Table for all the Nodes

Flinal Detailed costing tables 7-3-2(

Annex 5: Drivers or Reasons from node actors for Hygiene integration

Drivers or reasons by various stakehol(

Annex 6: Filled Analytical Framework

FINAL SUBMITTED TO SNV Analytical fr

Annex 7: Cost Assessment Tool

Cost assessment tool 16-01-2022.doc

Annex 8: Incentive assessment tool- Policy makers

Incentives assessment tool 16-

Annex 9: Incentive assessment tool- Business owners

Incentives assessment tool 16-

Annex 10: Incentive assessment tool- Service providers

Incentives assessment tool 16-

Annex 11: Incentive assessment tool- Traders

Incentives assessment tool 16-

Annex 12: Incentive assessment tool -Employees

Incentives assessment tool 16-

Annex 13: Incentive assessment tool: Customers/ Consumers

Incentives assessment tool 16-

Annex 14: ToR

ToR for costs and incentives study in k

Annex 15: References

Asian Development Bank (2014). Economic costs of inadequate water and sanitation: South Tarawa, Kiribati. Mandaluyong City, Philippines: Asian Development Bank publication

Caplan, K. (2015). Private sector engagement in sanitation and hygiene: Exploring roles across the sanitation chain. Water Supply and Sanitation Collaborative council- WSSCC publication. Available at https://www.susana.org/en/knowledge-hub/resources-and-publications/ library/ details/2405. Accessed on 20th November, 2021

Climate Policy Initiative -CPI. (2015). Emerging solutions to drive private investment in climate resilience

Mills F, Willetts J., Evans B., Carrard N. and Kohlitz J. (2020). Costs, Climate and Contamination: Three Drivers for Citywide Sanitation Investment Decisions *Frontiers in Environ Science*. https://doi.org/10.3389/fenvs.2020.00130

Radin M, Jeuland M, Wang H, and Whittington D (2019). Benefit-cost analysis of community-led total sanitation: Incorporating results from recent evaluations. Guidelines for Benefit-Cost Analysis Project Working Paper No. 13

Ross I (2020). Summary Report on the economics of hygiene programmes. Available at https://resources.hygienehub.info/en/articles/4785437-summary-report-on-the-economics-of-hygiene-programmes. Accessed on 24th November, 2021

Simiyu S., Swilling M., Rheingans R.,and Cairncross S. (2017). Estimating the Cost and Payment for Sanitation in the Informal Settlements of Kisumu, Kenya: A Cross Sectional Study. International Journal of Environmental Research and Public Health vol 14 (49)

UNEP-(2016) Assessing possible incentives to encourage the private sector to invest in environmentally sound management

LIXIL Group Corporation -LGC and WaterAid (2016). The true cost of poor sanitation.

WHO (2013). The economics of social determinants of health and health inequalities: A resource book

IMPACT THAT MATTERS

SNV

About us

The COVID-19 Response and Resilience Initiative for Food Value Chains (CORE) ran from July 2020-December 2022. Initiated by the Netherlands Ministry of Foreign Affairs and led by SNV, it was set up by to strengthen responses to the COVID-19 pandemic across eight major SNV-implemented agriculture projects in Africa: BRIDGE, CRAFT, HortInvest, Horti-LIFE, TIDE, MODHEM+, PADANE and STAMP+.

Based on field-level demand, CORE selected four themes that capture key structural challenges highlighted by the pandemic across agri-food systems: farmer inputs and services; consumer-oriented strategies; environmental hygiene integration; and digitalisation for agriculture (D4Ag). Each theme contributes to the structural resilience of food value chains and agri-food systems to shocks and stresses.

This brief is published by SNV Netherlands Development Organisation under the COVID Response and Resilience Initiative (CORE - Africa)

Parkstraat 83
2514 JG The Hague
The Netherlands

Phone: + 31 70 3440 244
Email: info@snv.org
www.snv.org
twitter.com/SNVworld
facebook.com/SNVworld
linkedin.com/company/snv