



**BASELINE
SURVEY
REPORT FOR
THE VINES
PROJECT**

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List of Acronyms

Acronym	
AO	Agricultural Officer
BOU	Bank of Uganda
CAO	Chief Administrative Officer
CDO	Community Development Officer
COVID	Corona Virus Disease
CRS	Catholic Relief Services
DAO	District Agricultural Officer
DCO	District Commercial Officer
DPMO	District Production and Marketing Officer
EU	European Union
FFPr	Food For Progress
FFV	Fresh Fruits and Vegetables
FO	Farmer Organization
GoU	Government of Uganda
GPS	Global Positioning System
KII	Key Informant Interview
IGAs	Income Generating Activities
LC	Local Council
LG	Local Government
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MEAL	Monitoring, Evaluation, Accountability and Learning
MTIC	Ministry of Trade, Industry and Cooperatives
NAADS	National Agricultural Advisory Services
PMP	Performance Monitoring Plan
PPE	Personal Protective Equipment
RA	Research Assistant
RDC	Resident District Commissioner
RFCU	Rwenzori Farmers' Cooperative Union
SACCOS	Savings and Credit Cooperative Organization or Society
SILC	Savings and Internal Lending Communities
SME	Small and Medium Enterprise
SPS	Sanitary and Phyto-Sanitary
SPSS	Statistical Package for the Social Sciences
SVI	Sustainable Vanilla Initiative
SWOT	Strengths, Weaknesses, Opportunities and Threats
TNS	TechnoServe
TOC	Theory of Change
UGA	Uganda
UGX	Uganda Shillings
USD	United States Dollars
USDA	United States Department of Agriculture
VANEX	Uganda Vanilla Exporters Association
VIEF	Vanilla Innovation and Expansion Fund
VSA	Visual Soil Assessment

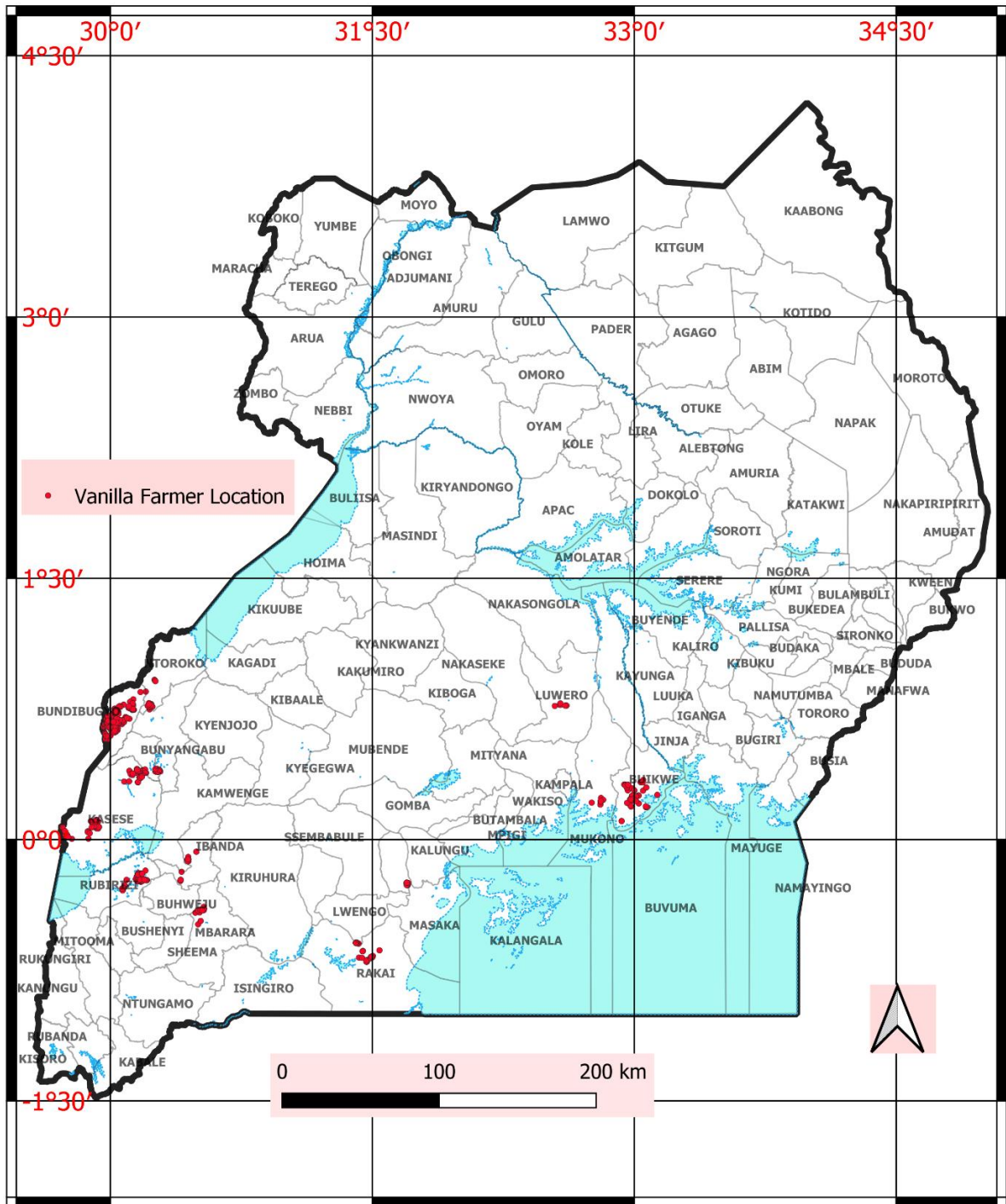


Figure 1: Distribution of respondents (vanilla farmers) for the VINES Project Baseline Survey

EXECUTIVE SUMMARY

The Vines Project (VINES), a five-year (2021-2025), United States Department of Agriculture (USDA) Food for Progress (FFPr) project, is implemented by Catholic Relief Services (CRS), TechnoServe (TNS), Frontier Co-op, Purdue University, and the Sustainable Vanilla Initiative (SVI) to make Uganda the world's next leading supplier of high-quality vanilla. VINES goal is to increase and improve the supply of high-quality vanilla by improving the productivity of vanilla-based agroforestry systems with 16,200 farmers (Strategic Objective 1); to enhance vanilla quality and compliance with food safety standards with 30 vanilla processing firms and expand global trade in vanilla to meet growing international demand.

To achieve the project goal, strategic objectives and intermediate results, CRS has established a Consortium of public and private partners, including leading international vanilla buyers such as Frontier Co-op, Virginia Dare, Ben & Jerry's, and Sustainable Vanilla Initiative (SVI) to upgrade the Ugandan vanilla, and establish it as a sustainable and solid foundation for consistent supply of significant volumes of high-quality vanilla. This consortium of market leaders and experts will be linked to 30 high potential Ugandan vanilla processing companies, organized as the Uganda Vanilla Exporters Association (VANEX).

CRS commissioned a survey to collect baseline data for the VINES project, in order to establish and verify initial baseline values for the full set of performance indicators as the starting comparison point for measuring progress against performance indicators, provide relevant and current contextual information, and to identify opportunities to adjust the project design, monitoring plan and targets, before project implementation starts, as needed.

The survey assessed Intermediate/foundation results' indicators under strategic objectives:

- (i) Increased agricultural productivity; and
- (ii) Expanded trade of Agricultural products; to serve as a guide for setting project targets, project implementation; and
- (iii) As a basis against which the level of attainment of the targets will be compared during annual progress reviews, mid-term and end-line evaluations.

The survey was conducted in 12 vanilla producing districts (5 and 7 districts in the Central and Western regions of Uganda, respectively). Baseline data was collected from a total of 581 respondents, of whom **419** vanilla producers responded to the ***Vanilla Producers' On-Farm Survey*** (Tool 1); and **162** responded to the ***Vanilla Producers' Household Survey*** (Tool 2). In addition, a total of forty-one (41) Key informants (KIs) were interviewed; 4 at the national level; 19 at district level; and 18 at sub-county level. Finally, the survey utilized secondary sources to inform baseline data on policy and contextual variables.

KEY FINDINGS

- 1) **Basic farmer characteristics:** A total of 419 farmers were interviewed of whom 19% were from the Central region and 81% from the Western region. About 85% of all vanilla farmers are male compared to 15% female. The mean size of household land under vanilla production was 0.47 hectares and the majority (97.6%) of the farmers owned their land.
- 2) **Vanilla production, yield and household incomes:** At the farm level, a total of 99,576 vines were reported to be under production in both seasons with an average yield of 0.22kgs/vine which is considered to be quite low. The average yield per vine was 169 gm in the main harvests and 96 gm in the fly harvests. The total production of green vanilla was 26,374 kg during the base year (2020/2021). However, the estimated volume lost to thefts in the garden was 4,314 kg (20% of the harvest) of which 2,741 kg (18% of the harvest) was in the main harvest; while 1,573 kg (23% of the harvest) was in the fly harvest. The average daily per capita expenditure (proxy for income) was USD 2.43 per day which is slightly higher than the national average of USD 2.24 per day.
- 3) **Land restoration and climate-risk management planning:** Only 3.5% of farmers had reached a functional level of land restoration and climate risk management. The majority (80%) of the farmers had a basic level of competency in planning for land restoration and climate-risk management, with only 2% at advanced level. There were no major differences in competencies between men and women or between regions. The main source of meteorological information was the Uganda National Meteorological Authority (UNMA) with radios, extension workers, mobile phones and peer farmers as the most common channels for accessing such information. Almost all vanilla farming communities attested to experiencing negative effects of climate change with implications on production, productivity and quality of vanilla, and consequently, the livelihood of households. Use of some essential information attained, for example through soil testing, was very low, partly due to limited access to facilities and services.
- 4) **Access to Vanilla market information to inform production decisions:** Most farmers (64%) accessed and utilized market information to inform production decisions. The main sources of market information were middlemen, radios and extension workers. Generally, there was a big information gap for vanilla farmers to access information on market prices, access to markets and competition. This gap was exploited by middlemen who became a source of information at the disadvantage of the farmers.
- 5) **Water resource management:** The majority (85%) of vanilla farmers had a basic level of competency in efficient water resource management. Although 75.1% of the farmers applied basic methods (like mulching) to keep moisture in the soil, less than half (47%) of all vanilla farmers implemented practices that ensured slowing down water off the slope; and only 29% of the farmers adopted practices to capture and store water. Most farmers relied on rainwater despite the already acknowledged effects of climate change like prolonged droughts and
- 6) unreliable rain patterns which, if not mitigated against, could result into a significant risk to attaining production targets of the VINES project.
- 7) **Irrigation practices:** Only 16% of vanilla farmers built and maintained water reservoirs and selected irrigation methods based on

their efficiency and accessibility; and practiced some kind of irrigation on their vanilla fields (mainly using rudimentary irrigation/manual methods such as use of labor and cans). Generally, farmers practice mainly mulching to conserve water. Sprinkler, micro and drip types of irrigation, which are recommended because of their efficiency and effectiveness, were not practiced.

- 8) **Integrated soil fertility management:** Majority (91%) of the farmers had a basic level of competency in integrated soil fertility management. The use and adoption of integrated soil fertility management practices was very low among vanilla farmers, with only 25% of the farmers adopting measures/practices to identify and improve nutrient needs of vanilla and other crops in their fields. A large proportion of farmers (56%) who use fertilizers, reported use of organic fertilizers. Most farmers had no requisite knowledge of appropriate techniques/practices in fertilizer preparation and application.
- 9) **Adoption of improved agronomic practices:** Most farmers (89%) reported to have adopted improved agronomic practices. In terms of harvesting practices, however, over half of the farmers reported losing 6.3% of the volume produced due to poor post-harvest handling practices.
- 10) **Farm operational and financial management Practices:** Only 19.8 % of the farmers had adopted the different financial management practices assessed. For example, only 8.5% of the farmers prepared a weekly budget; while 13.1% planned a budget; 13.9% identified times during the year when they will need loans; and only 14.1% Identified unnecessary expenses that could be avoided, and the money saved.
- 11) Many of the farmers (61%) accessed financing for their agricultural activities. Available sources for financial services majorly used by vanilla farmers were Savings and Credit Cooperative Organizations or Societies (SACCOs) and mobile money. While there was a strong urge by farmers to borrow wisely for investment in vanilla related productive activities, loan funds available were limited with an average of USD 421 per borrower. Informal savings and loan schemes were the most common choice for credit (for 70% of the responses); followed by formal financial institutions (67%); and formal savings and loans schemes (62%). Women as compared to men, are the most disadvantaged at household level with regard to accessing credit and decisions to borrow. These trends are likely to impact negatively on vanilla production if not addressed.
- 12) **Value-addition and post-production handling:** post-harvest handling losses significantly affect vanilla farmers and are disproportionately higher among female farmers. Only 31.6% of the vanilla farmers assessed, took actions to ensure good quality vanilla during post-harvest. Only two (2) processing firms observed the best

practices to meet the export quality standards in the previous year (2020). The problems of post-harvest losses and poor-quality vanilla if not addressed will significantly undermine Uganda's vanilla production and competitiveness in international markets.

- 13) **Market access and payment modalities:** A large proportion of farmers (33.5%) sold vanilla to other buyers (mainly individual

middlemen/traders) rather than selling directly to the main aggregators/exporters. About 19.8% sold to UVAN Ltd, 20.4% to ESCO Uganda Ltd and 11% to RFCU. In terms of volumes, a larger proportion of the vanilla farmers (27%) sold the largest volume of vanilla to "Other buyers/ Middlemen" compared to 16% to UVAN Ltd, 14% to ESCO Uganda Ltd, and to RCFU (8%). It was reported that prices offered by middlemen (others), was the main incentive for farmers choosing to deal consistently with the same buyer every season. This practice is partly attributed to market information gaps between the buyers and sellers which tends to disadvantage the farmers, hence calling for urgent remedial measures. Ninety-seven percent (97%) of farmers received their payment for green vanilla in cash with minimum use of non-cash methods. The average price was USD 9 per kg of green vanilla. Premium prices were offered to farmers depending on the quality of vanilla. Interventions that seek to continually improve earnings of farmers would be good incentives for farmers to adopt the desired best practices.

- 14) **Quality of inclusiveness of buyer-seller relations:** Based on assessment of the level and quality of inclusiveness within the four vanilla business models evaluated, both buyers and sellers scored moderately (55% of the maximum average scores) on the 6 key elements used to measure this indicator. The quality of inclusiveness was, however, lower for sellers (average score of 41%) compared to the buyers (70%). Such big gaps in the relationship between buyers and sellers in the vanilla supply chain, if not addressed, could significantly undermine productivity at farm level, efforts to deepen markets, incomes and enterprise profitability and the attainment of the overall objectives of the VINES project.
- 15) **Vanilla production and market trends:** The vanilla industry has one of the world's most volatile markets with huge price swings, making trade in world markets very unpredictable. Uganda has remained number 8 among the top 10 world vanilla producing countries in 2019 and 2020. Uganda's exports, however, are on a downward trend and quality problems if not addressed could undermine the potential of vanilla becoming a major export earner for the country.
- 16) **Marketing competencies and opportunities:** Vanilla producers in Uganda have not reached a functional level in agricultural marketing hence at the basic level. There is a need to build capacity of both buyers and sellers in the vanilla sector along all the four interrelated competencies assessed: Market Opportunities Prioritization, Effective Business Planning, Successful Business Implementation, and Periodic Business Performance Review competencies
- 17) **Farmer organization membership and collective marketing:** Most (57%) of the vanilla farmers were members of a farmer organization

(FO). The participation of women was much higher compared to that of men. While the FOs could be good and effective channels to deliver services to promote vanilla farmers along the project objectives, these organizations are weak and need support to build the requisite capacities.

- 18) **Policy and Regulatory Framework for Vanilla in Uganda:** Uganda does not have a vanilla specific policy or regulatory framework

for vanilla production and trade. While the National Agricultural Policy (NAP) 2013, provides a policy framework for agricultural commodities in general, under which vanilla falls, this presents a challenge in efforts to grow and transform the vanilla industry. Furthermore, for many years, there has been almost zero funding Government to support the sector. In addition, organizations for sector actors (VANEX – buyers and farmer organizations - producers) are generally weak at both national and district/community levels. There is need to take initiatives and support interventions to enable effective regulation of production and trade in vanilla in Uganda. This should also include support to ensure enforcement of administrative measures by Government and district local governments.

- 19) **Gender equity and equality:** Using A-WEAI indicators and other selected but related indicators, it was reported that there was a fair performance in terms of gender equity and equality at household level. Cases of gender-based violence were, however, reported and corroborated by the community leaders, and this could significantly undermine vanilla production in their localities.
- 20) **Child protection, labor and school attendance:** Increasing use of child labor in vanilla production was reported, with cases of hazardous child labor identified too, calling for urgent remedial interventions to eradicate this vice in the vanilla industry. Most of the households (99%) reported children of compulsory school-going age, regularly attending school prior to the lockdown. However, during the survey period, the country was under strict COVID-19 prevention measures with schools compelled to close.
- 21) **Household expenditure:** The average daily GDP per capita for vanilla farmers in Uganda was USD 2.43, which is slightly higher than the national average of USD 2.24 per day¹ for the year 2020.

CONCLUSIONS

- 1) **Vanilla production and yield:** Vanilla farming is dominated by smallholder males, while production and yields are still quite low at the farm level, and the average yield of 0.221kgs/vine is consistent with the 0.24kgs/vine projected at project design.
- 2) **Land restoration, water resource, soil fertility and climate-risk management:** Climate change effects are a reality; however, available weather forecasts have not been utilized by vanilla farmers to make decisions on adoption of mitigation practices. Adoption is also

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constrained by limited access and a high cost for technologies; as well as limited knowledge and skills.

- 3) **Extension services:** Coverage and intensity were low; adoption of improved agronomic practices was quite low, contributing to low production and productivity; and poor-quality beans. Financial literacy levels were also low and access to financial services is poor, which limits the level of investments.

¹SOURCE: World Bank Website; [GDP per capita \(current USD\) - Uganda | Data \(worldbank.org\)](https://data.worldbank.org/UY)

- 4) **Farmer organization membership and collective marketing:** Vanilla farmers' organizations are weak as reflected by the low participation (23%) in collective marketing. The participation of women was much higher compared to men.
- 5) **Post-harvest handling; value addition and market linkages:** Adoption of poor post-harvest handling practices leads to high losses due to poor quality; and hence, low product standards. This invariably translates into limited competitiveness in international markets and low incomes. However, vanilla farmers have access to local markets, though with limited choice of buyers as a result of variability in quality, reliability and sources of market information. Poor relations between sellers and buyers in the value chain also contribute to low incomes for farmers, and could undermine production and productivity at farm level.
- 6) **Marketing competencies:** The capacity of both buyers and sellers in the vanilla sector in relation to Market Opportunities Prioritization, Effective Business Planning, Successful Business Implementation, and Periodic Business Performance Review Competencies is low. Generally, the quality and reliability, as well as source of market information, varied widely.
- 7) **Supply chain development:** There are weak linkages between the supply chain actors. Only a few vanilla farmers (less than 20%) were aware of buyers' preferences.
- 8) **Policy and regulatory framework for vanilla in Uganda:** Operations in vanilla production and marketing are constrained by a lack of a relevant and specific policy or regulatory framework at national and community levels.
- 9) **Gender equity and equality:** There are mixed feelings on gender equity and equality at household and community levels.
- 10) **Child protection, labor and school attendance:** Although currently 99% of school-going age children are in school, there is a high risk of increased child labor due to increasing household poverty, coupled with increased scarcity of labor in the vanilla producing areas.
- 11) **Household expenditure:** The welfare of vanilla farmers is better than that of the average Ugandan as shown by the average daily GDP per capita of USD 2.43 and USD 2.24 respectively, for the year 2020.

RECOMMENDATIONS

- 1) To improve production, productivity, quality and marketable volumes of vanilla, the project should design capacity development for improved access to and adoption of productivity-enhancing technologies; vanilla-specific agronomic practices; post-harvest management and quality control knowledge, skills and practices; and farming as a business.
- 2) Increase farmer access to financial resources, with an emphasis on internal savings, in order to build a capital base for investment in productivity-enhancing technologies, practices and services.

- 3) Improve access to market information services for timely and quality market information through market studies, collating, packaging and disseminating information. This calls for harmonization with current Government frameworks and programmes as well as other development initiatives.
- 4) Support supply chain development through formation of, operationalization and development of platforms where key stakeholders in the vanilla value chain will provide an avenue for networking and partnership development for information exchange and market linkages.
- 5) Farmer institutional development involving farmer mobilization, sensitization, organization and strengthening should be a continuous process. Farmer institutions should include community level farmers' groups which aggregate at sub-county, district or regional levels, and an apex body at the national level.
- 6) Provide technical support for formulation and enforcement of an effective policy and regulatory framework for production and trade in vanilla in Uganda, at both national and community levels. Development and enacting of such laws, ordinances and byelaws should be followed by instruments and infrastructure for enforcement.
- 7) The project should promote the application of the Gender Transformative Approach (GTA) to improve participation of women in the project activities.
- 8) The VINES project should develop and implement an effective communication and stakeholder engagement strategy to support the different pillars of the project.
- 9) Measures to ensure child protection and minimization of all forms of child labor such as ordinances, byelaws and sensitization should be instituted with the involvement of communities and leadership at all levels.
- 10) The VINES project should review the project design documents and address recommendations resulting from analysis of baseline questions and their implications regarding project relevancy, implementation and sustainability. Some of the proposed measures are immediate while other can be addressed during mid-term review.

SECTION A: SURVEY CONTEXT AND DESIGN

This section of the report gives the contextual background of the VINES project, its goals and objectives, and the theory of change (ToC) as defined in the project monitoring plan (PMP). It describes the approach, design and execution of the survey. It also provides a summary of the report layout.

CHAPTER ONE: INTRODUCTION

1.1 Project Background and Purpose

The Vines Project (VINES), a five-year (2021-2025), USD 13 million, United States Department of Agriculture Food for Progress (USDA FFPr) project, is implemented by Catholic Relief Services (CRS), TechnoServe (TNS), Frontier Co-op, Purdue University, and the Sustainable Vanilla Initiative (SVI) aimed at making Uganda the world's next leading supplier of high-quality vanilla.

VINES goal is to increase and improve the supply of high-quality vanilla by improving the productivity of vanilla-based agroforestry systems with 16,200 farmers (Strategic Objective 1); and to enhance vanilla quality and compliance with food safety standards with 30 vanilla processing firms (Strategic Objective 2); and to expand global trade in vanilla to meet growing international demand.

The VINES project aims to double average vanilla yields from 0.24 to 0.50 kg/vine, increase average farm production from 65kg to 150kg, improve vanilla quality and safety, deepen market linkages by creating a branding and marketing strategy for Ugandan vanilla that will generate the essential “market pull” to enable Uganda increase annual exports of cured vanilla from 50 metric tonnes to 350+ metric tonnes. This will directly transform the lives of 16,200 farmers, 356 self-employed service and input providers, and 480 processors' employees; and will generate 16,176 new on-farm seasonal and permanent processing jobs to reach 32,856 vanilla stakeholders; providing international buyers with a new origin that will help to stabilize the extreme price volatility that has plagued the global market for this unique spice.

The VINES Project Theory of Change (ToC): The overall theory of change postulates that **IF** (1) Vanilla farmers sustainably increase their production by planting more vanilla, a access sustainable advisory services that enable farmers to use appropriate inputs, apply climate smart agroforestry systems to raise productivity per vine and diversify their income using mixed-cropping systems that restores land and mitigates climate risks, **THEN** vanilla **farmers will sustainably increase productivity while managing risk** (*Results Framework #1, Component 1*); and **IF** (2) vanilla farmers can protect mature beans, a limit the risk of theft, build effective business relationships with

processors, who procure mature beans, based on quality premiums, and vanilla processors can use traceable supply chains, and certified processing methods, that provide high vanillin content cured vanilla that is compliant with modern international food safety regulations; **THEN a safe, clean and pure vanilla supply** will be offered to international markets (*Results Framework #2, Component 2*); and **IF** (3) Industry institutions can deliver critical services such as capacity building and financial services to vanilla market actors, create a common value proposition for the sector, articulated through a national brand, processors build long-lasting relationships with international buyers in high value markets; **THEN** vanilla supply chain actors will **strengthen market conditions** (*Results Framework #2, Component 3*); and **IF** (4) Government of Uganda (GoU) regulates trading practices that protect farmers from theft, safeguards working conditions, especially for children, and enforces harvesting dates to promote quality (*Foundational Results*); **THEN** the supply of high-quality vanilla will be increased, vanilla quality will be enhanced for compliance with food safety standards, and the global trade of vanilla will be expanded to meet growing international demand.

The VINES project implementation strategy: The VINES project implementation strategy is comprised of two self-reinforcing approaches: (1) **targeted interventions with high potential processors** focused on addressing challenges of production, food safety, and market linkages; and (2) **sector-wide interventions** that seek to support the broader set of actors, and address key issues such as industry consolidation, better handling practices, and strengthening the policy environment. These approaches will be interwoven throughout six project activities, ensuring targeted production interventions are paired with comprehensive sector level trainings and reform.

Targeted processor supply chain approach: Typically, vanilla supply chains in Uganda are managed by “anchor” vanilla processing companies, each of whom support a discreet supply chain (Figure 3). The anchor processors buy green vanilla from local traders and hundreds of farmers. The processors then cure the vanilla and sell to their international partners, who support exports/imports of cured vanilla to overseas markets such as the US. The international partners undertake further value-addition of the vanilla and market a range of vanilla products, including foods, flavors, drinks, and cosmetics to the American food industry and to millions of customers worldwide.

Sector-wide support approach: VINES will also provide sector-wide technical assistance to a broader set of vanilla stakeholders. This approach will focus on critical pre-competitive areas such as (1) increasing access to quality inputs; (2) building the capacity of extension agents and micro-entrepreneurs; (3) sector coordination through VANEX; (4) brand building to increase long-term customer demand; and (5) strengthening Government policy to support sector discipline, security, and growth.

To achieve the project goal, strategic objectives and intermediate results, CRS has established a consortium of public and private partners, including leading international vanilla buyers such as Frontier Co-op, Virginia Dare SVI to upgrade the Uganda vanilla industry and establish it as a sustainable and solid foundation for consistent supply of significant volumes of high-quality vanilla.

This consortium of market leaders and experts will be linked to high-potential Ugandan vanilla processing companies and the Ugandan Vanilla Exporters Association (VANEX), to build their capacity and strengthen market linkages. CRS and VANEX have established strong working relationships with the Government of Uganda (GoU) and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), and will continue to build on these relationships to complement VINES activities to revitalize vanilla growing in existing areas and support its production in new areas.

1.2 Evaluation Plan and Objectives

The VINES project Evaluation Plan (EP) aims to contribute to project performance by ensuring the achievement of the project results, strategic objectives, and goal. The plan is guided by the USDA Monitoring and Evaluation (M&E) Policy, including the Code of Federal Regulations (CFR), section 1499.12 that apply to the US Department of Agriculture, and specifically the Food for Progress (FFPr) Program, and is compliant with the International Food Assistance Division (IFAD) Monitoring and Evaluation Policy; it also follows CRS Monitoring, Evaluation, Accountability and Learning (MEAL) Policies and Procedures (MPPs) that reflect good practices for gender-responsive MEAL and the integration of accountability and learning into this process.

The project's evaluation process involves three phases: A baseline assessment, a midterm, and a final evaluation. CRS therefor commissioned IMPACT Associates an independent consulting firm to lead the **VINES project baseline assessment** to assess and report on the situation before the beginning of project implementation.

The objectives of the baseline survey were to:

- i. Establish and verify initial baseline values for the full set of performance indicators as the starting comparison point for measuring progress over the life of the project;
- ii. Provide relevant and current contextual information to ensure the validity of the critical assumptions stated in the project Theory of Change (TOC) for interpretation of midterm and final evaluation findings; and
- iii. Identify, as appropriate, opportunities to adjust the project design, monitoring plan and targets before project implementation starts.

In addition, the baseline assessment sought to respond to the evaluation criteria and specific questions.

The survey conducted a pre-program (implementation) measurement of the status of the vanilla farms and their performance, including production,

processing and marketing practices. The survey assessed Intermediate foundation results' indicators under the project strategic objectives as follows:

- (i) Increased agricultural productivity; and
- (ii) Expanded trade of agricultural products; to serve as a guide for setting the project targets, project implementation, and as a basis against which the level of attainment of the targets will be compared during annual reviews, midline and endline evaluations.

1.3 Report Outlay

The report is presented in two sections, with six chapters that describe the process and results of the Vines project baseline survey. Section A containing two chapters presents the Survey context and design and Section B containing three chapters presents survey findings. Chapter 1 introduces the baseline survey with a background to the Project, objectives of the survey and the report outlay. Chapter 2 presents the survey methodology, which comprises of the survey design, data analysis and survey limitations. Chapters 3 presents analysis of baseline questions, Chapter 5 and 6 present the findings and discussion of the results, conclusions and recommendations arising from the results of the survey.

CHAPTER TWO: BASELINE DESIGN, METHODS AND LIMITATIONS

2.1 Survey Design

2.1.1 Survey scope and coverage

The survey area comprised the vanilla-growing districts in different regions of the country (i.e., Central and Western regions) categorized as high and medium producing districts. Five districts were sampled from the Central region while seven were sampled from the Western region.

2.1.2 Sample computation and allocation

A. Selection of vanilla farmers at household level

Baseline data was collected from a total of 419 vanilla producers who responded to the Vanilla Producers' On-Farm Survey (Tool 1); and 162 of them also responded to the Vanilla Producers' Household Survey (Tool 2). Vanilla farmers were sampled from the targeted 12 vanilla producing districts (7 high producing districts and 5 medium producing districts) from vanilla farmer lists provided by private sector partners, using fractional interval systematic sampling, to ensure that farmers were represented in the sample by their rough proportions in the underlying population, while ensuring that they had equal probabilities of selection into the sample, thus eliminating the need to use sample weights at the analysis stage (Table 1).

The total sample size needed for Tools 1 and 2 was calculated using equation (2) in McConnell and Vera-Hernandez (2015) for continuous samples, using the standard 80% power and 5% significance level. The sample size for Tool 1 fulfilled the requirements of the special survey that will be conducted to address the selected learning questions. As the special survey sought to detect statistical differences of volumes sold per farmer between supply chains; to detect a difference of 34 kg (10% of the final evaluation target of 335 kg increase in green vanilla production for each of the project's 16,200 farmers) in FFPr Standard Indicator #19, at least 123 farmers were surveyed using a standard deviation of 93 kg/ farmer from RFCU and ESCO Uganda Ltd records. Given that there are 3 supply chains, the recommended sample size was $123 \times 3 = 369$ producers. This estimated sample size was more than adequate to detect changes in all project indicators collected by Tool 1 for the performance evaluation between baseline survey and end-line evaluation.

This sample size of 369 was increased by 20%, giving a total of 444 vanilla producers to be surveyed at baseline. This accounted for data that could become unusable due to error or attrition, and for vanilla producers who were sampled and dropped out during the life of the project, given that the evaluation approach requires panel data.

As Tool 2 does not feed into the special survey, the sample size for it was determined from the largest sample needed to detect a statistical change among the 4 indicators calculated using data collected from it. Thus, to detect a difference from USD 1.50 to USD 2.80 in daily, per capita expenditures, 123 producer households were surveyed. This assumed a standard deviation of USD 3.87 (Zereyesus *et al.* 2017). The sample of respondents for each tool was

divided proportionately to the respective total sample size of the districts. The specific vanilla farmers selected for Tool 2 were sampled from the list of sampled farmers using the systematic sampling technique with a random start. The Consultant received sampled locations and vanilla farmers from CRS.

Table 1: Sampled districts and number of respondents by district

	No. OF RESPONDENTS						Response rate per region (%)
	Tool 1		Tool 2		Totals		
	Target	Actual	Target	Actual	Target	Actual	
CENTRAL							
Buikwe	30	41	12	10	42	51	
Bukomansimbi	10	11	4	2	14	13	
Luweero	7	6	3	3	10	9	
Mukono	7	6	3	2	10	8	
Rakai	18	21	7	7	25	28	
Total Central	72	85	29	24	101	109	108%
WESTERN							
Bundibugyo	175	153	67	70	242	223	
Bunyangabu	18	19	7	4	25	23	
Ibanda	11	12	4	5	15	17	
Kasese	76	67	29	24	105	91	
Mbarara	12	13	5	7	17	20	
Ntoroko	14	10	5	6	19	16	
Rubirizi	66	60	25	22	91	82	
Total Western	372	334	142	138	514	472	91.8%
TOTAL	444	419	171	162	615	581	94.0%

B. Selection of SME survey respondents

There were ten (10) supply chain partners and participating processing firms selected as SME respondents. Out of the 10 SMEs that responded to the SME survey, four (4) of them also responded to the link methodology scorecard tool. These were the processors that had been selected for the first round of the Vanilla Innovation and Expansion Fund (VIEF).

C. Selection of key informants (KIs)

The consultant identified key informants (KIs) at national, district, sub-county and community levels. A total of forty-one (41) KIs were interviewed; 4 at the national level; 19 at district level and 18 at sub-county level. At national level, they included representation from Ministry of Agriculture, Animal Industries

and Fisheries (MAAIF), National Agricultural Advisory Services (NAADS), CRS and TNS. At district, sub-county and parish levels, the key informants included political and technical leaders, as well as relevant private sector actors (like private extension service providers) as shown in Table 2. Key informants (KIs) were drawn from the national level and the surveyed districts.

Table 2: Key informant categories at different levels

Level of Engagement	Organization/Agency	Key Informants
National	MAAIF	Senior Agricultural officer/Beverage Crops
	CRS + Partners	CRS TNS
	NAADS	Technical Services Manager
	Private Extension Service Providers	Private Extension Worker
District	Technical team	Chief Administrative Officer (CAO) District Production and Marketing Officer (DPMO) District Agricultural Officer (DAO)
	Political leadership	Local Council (LC) V Chairperson Secretary for Production
	Financial institutions	Commercial Bank Micro-Finance Institution
Sub-county	Technical team	Sub-county Chief Agricultural Officer
	Political leadership	LC III Chairperson Councilor (1)

2.2 Survey Execution and Methodology

2.2.1 Literature review

Key documents related to CRS, the Vines Project, vanilla farming, processing and trade were reviewed, and major issues summarized. The documents included, but were not limited to: project design documents, relevant Government of Uganda policy documents: National Agricultural Policy; Uganda National Agricultural Extension Policy; Uganda National Agricultural Extension Strategy; project technical and financial progress reports (Quarterly & Annual); review reports; and technical and financial audit reports. This was in addition to project documents; Vines Project proposal; Vines Project - Results Framework; Vines project - Performance Indicators; CRS UGA VINES FFPr Evaluation Plan; CRS UGA VINES FFPr Performance Monitoring Plan;

USDA-FAS Food Assistance Evaluation Policy; CRS Checklist for Reviewing USDA Evaluation Reports; and CRS MEAL Guidance under COVID-19.

2.2.2 Training of data collection team

An experienced field team of 28 Research Assistants (RAs) and 4 Field Supervisors were selected from the resource pool available to the consultant. The recruitment process of RAs primarily targeted qualified individuals residing in/near the sampled districts, who were fluent in the local languages. The selected field team was trained in Kampala in a central event that took five days of training (Pictures 1-3) and one day of field practice. They also served as the final user testing for the data collection tools. During the training, the RAs became familiar with the survey objectives and focus, and gained technical knowledge on vanilla farming, processing and marketing, as well as on agroforestry systems' production practices. They were also trained in data collection techniques and in the use of the digital data collection tools. Emphasis was put on research ethics, accuracy, completeness and the importance of enhancing participatory approaches in data collection. Field tests for all data collection tools were conducted in Wakiso District, which is a vanilla-growing district outside the sampled districts.

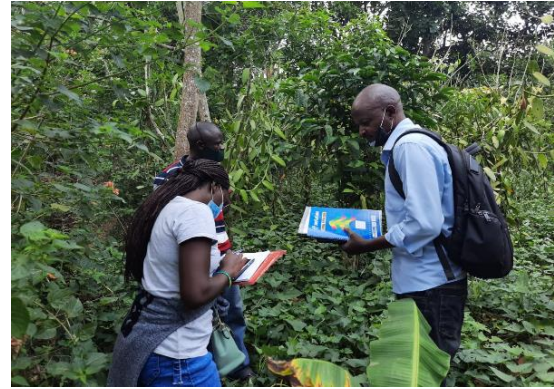
Baseline Evaluation of the CRS Uganda VINES Project



A pretest of the draft tools and their application was conducted in Kakiri Sub-County, Wakiso District (which was outside the sampled district). The data collection tools were refined based on the experiences and lessons from the pre-testing.



Picture 2: Pre-test meeting of the research team in Kakiri, Wakiso District



Picture 3: Conducting an interview with a vanilla farmer during pre-test in Kakiri, Wakiso District

2.2.3 Field deployment in the context of Corona Virus Disease (COVID)

The baseline survey was conducted during a period when Uganda was still under a health threat of COVID-19. To effectively manage the challenges presented by COVID, the consultant in consultation with CRS developed standard operating procedures to minimize related risks to field personnel, respondents and communities in the survey area. Using the *CRS Guidance on MEAL in the Context of COVID-19 (Version 2 - June 10, 2020)*, the necessary safety measures were put in place to ensure successful implementation of the survey. All the enumerators were tested for COVID-19 prior to deployment. All field staff were provided with Personal Protective Equipment (PPE) kits and sanitizers. In addition to the above guidelines, continuous risk assessment was undertaken, and measures implemented to ensure compliance with guidelines and directives by the Government of Uganda through the Ministry of Health. The field staff training also included a session on COVID-19 prevention measures and a PPE pack was provided to all participants for use while training and during fieldwork.

2.2.4 Sampling and data collection methods

The survey employed both quantitative and qualitative evaluation methods. The quantitative methods were mainly used to estimate baseline benchmarks of performance indicators, while the qualitative methods were employed to elaborate and explain quantitative findings and describe the current project implementation context. Data was collected through various methods using different tools. The consultant reviewed and customized the data collection tools which were approved by the Client before use. The following approaches and tools were used:

- i. Vanilla producers' on-farm survey:** A total of 419 vanilla producers were interviewed using a vanilla producers' on-farm survey tool (*Tool 1*). The tool evaluated the indicators related to vanilla producers' competencies, production, yield, production costs, sales and profit.
- ii. Vanilla producers' household survey:** A total of 162 vanilla farming households were interviewed using a vanilla producers' household survey tool (*Tool 2*). This tool was designed to collect data for the indicators related to vanilla farmers' household consumption expenditures as a proxy for income, gender equity and equality by using the Abbreviated Women Empowerment in Agriculture Index (A-WEIA), and child labor in vanilla production.

The vanilla producers on-farm survey and household survey tools were uploaded on the CommCare mobile platform, leveraging digital systems to improve speed, efficiency and accuracy, and to reduce loss of information.
- iii. Small and medium enterprises (SMEs) survey:** The SMEs were interviewed independently to ensure privacy. The consultant engaged with ten project private partners to present the security management and security protocols that were used for ensuring that their sensitive business information will be protected. This was essential to gain their confidence to share the needed data to evaluate the baseline indicators that depend on data collected from them. An interview guide (*Tool 4*) and a form (*Form 1*) to review participating processing firms' business records were also used.
- iv. Link Methodology Scorecard:** The Link Methodology Scorecard is designed to assess value chain actors' relations and enable the program to evaluate the quality and inclusiveness of buyer-seller trading relations. This scorecard was developed through *facilitated group discussions* and *semi-structured interviews* with supply chain actors. A tool was administered to the identified respondents (*Tool 5*). Four companies were interviewed, including:
 - a. Rwenzori Farmers' Cooperative Union (RFCU) - a cooperative union with more than 1,200 vanilla farmers;
 - b. Gourmet Gardens (GG) - vanilla processing firm;
 - c. Enimiro Uganda - vanilla processing firm; and
 - d. Touton S.A. – a coffee exporter that is expanding its business to include vanilla
- v. Context and policy analysis:** This comprised Key Informant/In-depth Interviews (KIIs) with 41 key informants (KIs) using a KII guide/checklist (*Tool 6*).

- vi. Digital voice recorders, photographs and note-taking during interviews.**
- vii. GIS mapping:** Modern GPS devices with inbuilt compasses and cameras were used at each vanilla establishment to capture GPS coordinates and digital photographs.

2.2.5 Survey response rates

Table 1 shows response rates, where of the 444 vanilla farming households targeted, 419 were responsive and were interviewed, which yielded a response rate of 94%. The survey findings in the subsequent sections are therefore based on 419 farming households.

2.2.6 Data Quality Control

The following quality assurance measures to enhance accuracy and reliability of the findings were applied.

- i. Training and orientation of the field team to acquaint them with data collection tools through theory, testing and field practice.
- ii. Use of a dedicated coordinator to ensure effective planning and coordination with CRS and MAAIF, relevant district and sub-county LG staff and communities.
- iii. Deployment of an experienced multi-disciplinary team with the required competencies and proven experience in undertaking studies and related consultancies.
- iv. Ethical considerations: Due care was taken to ensure that informed consent was obtained from all respondents before interviews were conducted as well as assurance of confidentiality. The consent was recorded as a pre-requisite before conducting the interview.

2.2.7 Coordination modalities

To ensure effective field supervision and smooth coordination, the consultant deployed the whole field team to undertake data collection at the same time. The field team constituted field supervisors to guide and supervise the RAs. The field supervisors ensured effective coordination with CRS, relevant district and sub-county Local Government (LG) staff and communities. In addition to quality assurance, the consultant ensured that the necessary appointments with the relevant respondents were made, allowing for time for preparations.

2.3 Data Analysis and Reporting

2.3.1 Data Analysis

The quantitative data captured in the questionnaires was analyzed using STATA computer packages to meet the objectives of the survey. Qualitative data was analyzed with the aid of NVIVO statistical package. Data was disaggregated as indicated in the Performance Monitoring Plan (PMP) and

resulting tables included standard errors and 95% confidence intervals of the indicator estimates, and basic statistical analysis of indicator values by:

- 1) **Level of production and experience:**
 - a. High-producing farmers (>50 kg),
 - b. Upcoming farmers (≤50 kg), and
 - c. New farmers that are expected to join the project during the project implementation years 2-4 in subsequent cohorts² (3 strata);
- 2) **Type of supply chain:** (i) Rwenzori Farmers' Cooperative Union (RFCU), (ii) ESCO, (iii) UVAN; and
- 3) **Geography:** High producing districts and medium producing districts (2 strata). During data collection it was, however, found out that a larger portion of buyers could not identify the supply chain they fell under, plus lack of cooperation from some of the main buyers as earlier mentioned. To avoid distortions in the findings, therefore, during analysis, disaggregation was not done based on supply chains.

2.3.2 Reporting

The following applied to observations, findings and remarks in the report:

- i. The reference point for the baseline survey was the period of the last two harvests (Fly: December 2020/January 2021 and Main: June/July 2021). The results are, therefore, reported for the same period.
- ii. The exchange rate used for reporting is 1 USD = UGX 3,661 (**Source:** BOU Av. Exchange rate 2020).

2.4 Survey Limitations and Mitigation Measures

Although the survey was largely successful, it had some limitations and measures taken to address them and they include:

- i. **COVID – 19 pandemic limitations:** While the survey was ongoing, the COVID-19 pandemic was raging in the country. This attracted stringent control measures including restrictions on
- ii. movement and social distancing, among others. These measures called for halting the exercise for about six weeks, which translated into loss of time and required additional funds to accommodate GoU restrictions on travel and coordination.
- iii. **Design of data collection forms in Commcare App:** In our opinion, the design of the forms was not user-friendly, because it designs had no option for editing the responses in the field, which could have helped the field supervisors to correct any errors in the field, before submission. As a result, a lot of time was spent on data cleaning.
- iv. **Sampling:** By the time the survey started, there was attrition among farmers in the predetermined sample. For example, some of selected

² Farmers who fall in this stratum will not be included in the baseline as they will only start joining the project in year 2 of project implementation, but at the VINES project level, the sample of these farmers will be added to the baseline sample as they join the project.

farmers had abandoned vanilla production while others could not be traced because names of respondents were misspelt or incorrect, and phone numbers were wrong or inaccessible. To address this anomaly, the missing names were replaced with other names on the lists of farmers provided by the client, which led to delays in identifying and locating respondents. These challenges could be attributed to possible errors in the databases provided by processors.

- v. **Unavailability of respondents:** Because of delays due to COVID, data collection extended into the rainy season. As a result, farmer mobilization became difficult because many were engaged in preparing their gardens and were, therefore, not readily available for interviews.
- vi. **Mistrust and low level of cooperation from participating SMEs:** Vanilla processors control their data very closely. As a result, most SMEs were not willing to fully disclose information regarding volumes of vanilla bought, processed or exported, buyers and export values. This was partly attributed to mistrust among the actors in the absence of a strong national sector association to unite and coordinate actors. Apart from RFCU, most actors declined to respond or gave incomplete information, considering it confidential. Questions were clarified and follow-up to confirm the data and information was made. It is recommended that with continued engagement with the private sector players (SMEs), the VINES project should be able to gradually gain the confidence of all actors and update the project indicator table.
- vii. **Poor records:** Most farmers in Uganda do not keep records and, therefore, in many cases, survey data relied mainly on individual memory, which may not be reliable for estimates based on respondents' recall in their responses to questions related to production, incomes, expenditures on labor, inputs, and workdays of labor for different practices (i.e. pruning, mulching, harvesting). **Accessibility:** The rainy season rendered some roads impassable, making it difficult to access the respondents, especially in hilly areas of Kasese and Bundibugyo districts.
- viii. **Non-responsive respondents:** while the survey design targeted 30 SMEs, the client availed a list of 23 SMEs from which only 10 were responsive. In addition, apart from RFCU, all other identified SMEs did not respond to questions on sales and export values. Also, as a result of this constraint, baseline data on indicators 25, 26, 27 and 28 that relate to SMEs was not collected and, in many cases, what was given was found incomplete and/or unreliable. Hence, the consultants opted to use secondary data where available.

CHAPTER THREE: ANALYSIS OF EVALUATION QUESTIONS

The baseline evaluation design as elaborated in the Terms of Reference (ToRs) presented a number of baseline questions to be evaluated as part of the baseline assessment. Informed by the baseline survey findings, in this section the evaluation team presents an analysis of the evaluation questions, and the implications of the findings against a set criteria and recommended actions.

3.0 Baseline Evaluation Questions and Implications

The baseline questions were categorized into 3 evaluation criteria areas:

- (a) Project relevance;
- (b) Project implementation; and
- (c) Sustainability and Impact.

Based on the baseline findings, the consultant made a technical evaluation on each of the above three areas hereof presented below:

3.1 Project Relevance

The Baseline assessment attempted to examine the relevance of the VINES project, looking at the extent to which the VINES project design **addresses the needs of Uganda's vanilla sector** and those of the different actors involved in the value chain. The following design elements were, therefore, assessed: problem analysis; theory of change and assumptions; and project strategic design.

1. Problem Analysis: at the project design, challenges of the sector were identified, and needs determined. The major challenges were categorized into four (4) areas and these included:

i. Productivity and Risk Management

Main needs identified at project design stage and to be addressed by the project were: (a) improving farm security to avert thefts; (b) overcoming low farm production and productivity (from 65kg to 130kg and at least 0.5 kg per vine per year); (c) addressing boom and bust cycles with modern advisory services (d) improving farm planning and management knowledge and skills; (e) improving soil and water shade management; (f) promoting resilience through diversified agroforestry production systems; (g) strengthening farmers' financial and business skills (h) improving access to vines for planting (and other inputs); (i) expanding access to resources for women involved in vanilla production; and (j) reducing the risks of child labor in the vanilla sector.

Needs identified during the baseline study: The baseline findings generally affirmed the prevalence of the needs in Uganda's vanilla sector

identified at project design. In addition, farmers identified the need for: (a) timely access to quality planting materials; (b) acquisition of knowledge and skills in vanilla-specific agronomic practices; (c) access to financial services; (d) gender equity and equality; (e) and opportunities for youth.

Project activities designed to address the needs: The design of the VINES project is relevant to the sector needs based on evidence. Project activities including: capacity building through FLCs, promoting improved agriculture techniques and technologies, strengthening MSMEs across the vanilla supply chain (especially input suppliers, youth and women), promoting provision of extension services via processor-linked extension agents, improving farm management (financial services and operations) across the supply chain, and promoting SILCs with measures for sustainability are all quite relevant in addressing the identified needs. In addition, the project design introduced the Gender Transformative Approach (GTA) which is intended to improve participation of women in the project activities, hence address the gender gaps.

The study, however, design neither conducted a detailed value chain analysis of the vanilla sector, nor did it conduct a mapping of the related sectors/sub-sectors (e.g., bananas, coffee or cocoa promoted for diversification). As such, not all actors in the vanilla value chain were assessed to capture their characteristics, functions, challenges and needs to inform the design. Similarly, under this baseline, there was no broad interface with support service providers such as agro-input dealers; nor a comprehensive mapping of other actors involved in different functions in the value chain (e.g., middlemen, transporters, facilitators etc.). The LINK methodology, which could have captured a detailed sector value chain analysis was, however, only applied to map out selected elements of the sector; and relations between buyers and sellers within selected business models³.

Potential modifications: The following suggestions are intended to modify the project activities with a view of making them more receptive to the identified needs.

- a) ***Vanilla value chain Analysis and Mapping of Related Sectors:***
A detailed value chain analysis and mapping of vanilla value chain and related sectors (coffee, bananas, PSPs) should be designed and

³ By design the Link methodology applies 4 tools: 1) Value Chain Mapping, 2) Business Model Canvas, 3) The New Business Model Principles, and 4) The Prototype Cycle. At design and baseline, however, neither was comprehensive mapping of actors done, nor was analysis of the related sectors undertaken.

carried out prior to mid-term evaluation. The mapping of related sectors as part of this exercise is justified by the fact that strategic design of the VINES intervention is partly premised on production diversity at farmer level, leveraging on complimentary sectors and systems (e.g., coffee traceability and the extension service system).

- b) **Use of FLCs to deliver extension services** as a methodology is a pragmatic measure responsive to the serious vanilla-specific extension need; vanilla not being a national priority crop is neglected and underserved. The model is, however, silent on use of demonstration of practices, yet it is one of the recommended methodologies in Uganda's agricultural extension service reforms (under the Single Spine System). Baseline data indicated that this strategy would be appropriate and effective for smallholder farmers who dominate vanilla production in Uganda, hence a need to review project design activities related to capacity building to include vanilla farming field demonstrations.
- c) **Harmonization with government frameworks:** Extension services for SHFs remain a public good, albeit under-resourced. The project design relies heavily on private service providers working through the private sector (vanilla processors). FLCs by design were placed principally as dependent on the private sector (processors). The projects should be cognizant of the current extension services framework. FLCs should be closely linked to the Public Extension System for sustainability; with a focal person at the LG level and a desk officer at MAAIF.
- d) **Mapping of processors;** The VINES project design is targeting specific pre-selected processors which may be misleading; suitability and willingness to partner on the project are both dynamic factors. Lessons from the baseline showed that VINES undertook a preliminary mapping of processors through the first round of the Vanilla Innovation and Expansion Fund. Based on this, the project on boarded three processors, none of which were identified during the proposal development stage. It is, therefore, recommended that an activity to take stock of available processors, assessing them for suitability and willingness to participate in the project, should be considered at mid-term review.
- e) **Extension services curriculum:** In the project's activities, farmers services were segmented according to the range in production levels of different vanilla farmers in Uganda.

Categorizing extension services by segments of farmers however, assumes that the higher the level of production the more technically competent the farmer; yet baseline data found no evidence of this. According to available data, each segment of farmers needs all

categories of extension services, that is: Agronomic skills; building their social cohesion; and business and financial skills. Farmers in all categories would therefore, benefit from the entire training curriculum. The extension services curriculum should be **uniform** to serve all categories of farmers.

- f) **Supplementary source of livelihoods:** Since the crop takes 3 years to start bearing fruit, promoting annual crops would generate income and ensure sustained livelihoods for the target farmers in the first three years. Coffee is good for mixed farming, but not suitable for improving income streams for the short and medium terms. Baseline findings identified an array of annual crops such as maize (between vanilla and banana/coffee rows), beans, and matooke, which are a good fit for mixing with the vanilla crop. In addition, other high value annual crops such tomatoes and cabbages could be planted in the boundaries of vanilla growing fields. These would all serve as alternative sources of income in the interim as vanilla farmers wait on the vanilla crop. In addition, integration of SILC/VSLAs (common to communities) would also add value as it offers vanilla farmers an opportunity to access finance, but also prospects of setting up independent IGAs as income supplements.
- g) **Gender equity and youth participation:** The baseline revealed that there are fewer women or youth proprietors of MSMEs than men. Key limitations for effective participation of youth and women (MSMEs) in the vanilla sector were identified at the baseline stage, which include: Decision-making and control of household incomes limitations, GBV, imbalances in gender labor relations and access to and ownership of land. In addition, there were some A-WEAI indicators which at baseline level were low (group membership and access to credit), hence the need to revisit the design to ensure support reaches these marginalized groups.

Possible solutions to these challenges are:

- i. Introducing a “Youth vanilla growing program,” especially for college graduates to attract them into vanilla growing as a business. The program should have a package of incentives, such as term loans recovery through deductions from each youth’s sales every year. This approach worked very well with smallholder tea growers in the 1960s/1970s
- ii. Introduce, for the women and the youth, other low-cost non-land using IGAs, such as rearing indigenous chicken, which, if well managed, can generate substantial incomes through sale of local eggs, whose prices are generally higher than eggs from exotic chicken;

- iii. Introduce a program for promoting arts and crafts, especially for girls and women. The items should be of good design and well crafted.

2. Promote safe, clean and pure vanilla

The main needs identified at project design stage and to be addressed by the VINES project were; (a) protecting vanilla beans against premature harvesting; (b) improving post-harvest quality (c) ensuring compliance with international food safety standards; and (d) integrating traceability systems to improve food safety. These interventions shall be done with the involvement of processors and exporters to enable them to articulate the challenges they find with Ugandan vanilla in curing and on export markets.

Needs identified during the baseline study: The baseline findings generally affirmed the prevalence of the above needs regarding vanilla quality (safe, clean and pure vanilla) identified at project design. In relation to improving the post-harvest quality of vanilla, farmers reported the need for extension services to impart knowledge and skills required to achieve quality products. Furthermore, post-harvest management of vanilla was of significant interest to processors, and as such, related interventions ought to involve processors.

Project activities designed to address the needs: The project design seeks to address vanilla theft which most farmers identified as the leading challenge to vanilla production in Uganda. Theft is also considered by processors as a major factor that undermines the quality of vanilla. VINEs project has devised a number of strategic interventions (FR 2.4.2) to address this constraint and they include: (i) improving policy and regulatory framework both at central and local government levels; (ii) creating community surveillance committees; and (iii) increasing government resource allocation to the vanilla sector.

Required modifications: While the strategies to address the concern about vanilla quality are relevant, it was noted that most of the proposed measures are likely to face major implementation challenges such as:

- a) **Long delays in the legislative process** is a limitation, which is likely to negatively affect the attainment of the desired goal of enactment and enforcement of ordinances at LG level. By developing and implementing an elaborate communication and stakeholder engagement strategy, VINES project should be able to enlist support and cooperation across the board, which will minimize possible delays in the legislative processes. The strategy shall target LGs' political and technical leaders, community leaders and influencers, vanilla farmers and the general community, promote VINES projects in general and advocate for support of decision-makers.
- b) **Investment in security of the vanilla gardens:** It is envisaged that farmers shall be supported to invest in security (IR 1.2.3). While this

could be attained in the short to medium terms, absence of a strong regulatory framework could only pile further costs on farmers hence undermining profitability of the enterprises. This will translate into a disincentive for further investment in the enterprise. It is proposed that the VINES project could adopt, promote and strengthen a community surveillance model that according to survey findings, has been tested and proved potentially effective in some vanilla growing districts. Such initiatives by the project to strengthen the model could include training of Local Defence Units (LDUs)/Community Policing Units in every vanilla-growing parish, and initially providing the necessary tools and financial resources with a gradual sustainable existing plan.

- c) **Enforcement of ordinances:** Creation of community surveillance committees was considered a good measure to address some safety and quality related concerns. However, based on evidence from the baseline study, this was not found effective without support for enforcement of the enacted laws and ordinances. It is recommended, therefore, that LGs be supported with capacity building for enforcement as a supplementary measure for ensuring safe, clean and pure vanilla. With strong collaboration with the private sector (through VANEX), such support could include; provision of appropriate training and tools/equipment; and implementation of communication and awareness/ education campaigns to enhance compliance and enforcement of regulations. VINES should consider partnering with LGs (at district and sub-county levels) in areas where vanilla is grown; engage with councilors at each level and design ways of enforcing the ordinances.

3. Strengthen market conditions

The main needs identified at project design stage were: (a) Improving farmer organization (especially small holder farmers) to realize the full economic benefits of negotiating sales of bulk produce; (b) strengthening direct trade business models to secure vanilla markets; (c) promoting third-party certification to increase returns to farmers and differentiate production; (d) Institutional Support, especially to MAAIF) in order to enhance development of relevant policies and regulations to enhance implementation of vanilla quality improvement measures, and address the menace of vanilla thefts.

Needs identified during the baseline study: The baseline findings generally affirmed the prevalence of the above needs identified at project design. Farmers further emphasized the need to promote collective access to markets and to minimize possible exploitation by middlemen.

Project activities designed to address the needs included: (i) promoting savings and internal lending communities (SILCs); (ii) improving vanilla post-harvest, processing and packaging at farm and processor/exporter levels); (iii)

supporting MSMEs with emphasis on women and youth micro-entrepreneurs; (iv) improving market information services through Farmer-Buyer Information Exchange Platforms.

Required modifications: Generally, the sector needs regarding strengthening market conditions identified in the VINES project design were relevant to the related challenges. There were, however, some design elements that could be revisited. They include:

- a) **Value-addition infrastructure:** In addition to capacity building to impart knowledge and skills to improve post-harvest processing (PHH) and packaging, community infrastructure for PHH is required. This should include strengthening farmer societies/ cooperatives with skills and technology to undertake some PHH as value-addition functions. Such interventions would enable the farmers to earn more income arising from value-addition.
- b) **Intensive Farmer Institutional Development:** Deliberate efforts to strengthen the capacity of farmer organizations at different levels to effectively participate in the entire value chain will be paramount. FID is a continuous process that requires continued engagement of several stakeholders in the value chain at both community and LG levels. The project design was, however, not elaborated in regard to skills transfer and strengthening farmer organisations, to be able carry-on core support services especially under RI 3.1 and 3.2; and for continuity beyond the project life.
- c) **Partnership development and collaboration:** The problem analysis appreciates that the sector organizations like VANEX were weak requiring intervention for organizational and institutional capacity building by the project. In addition, the project design intends to engage and support Government in creating an enabling regulatory framework for the vanilla sector. The planned project strategies and activities (Activity 6) as well as the results framework (Result framework # 4) are rather silent on establishing partnerships and collaborations with other relevant/ influential private sector organizations (like PSFU) to lobby and advocate for necessary policy and regulatory reforms for an enabling environment for the vanilla sector.
- d) **Market information services:** Whereas promotion of Farmer-Buyer Information Exchange Platforms was planned for, it is not very clear how the project will get involved. It is important to identify the key players and clearly spell out their roles for effective platforms. For sustainability, the VINES project should collaborate with VANEX and take a centre role in the creation of district/regional platforms to coordinate market information. By localizing such services, the project will enable involvement of LG and local service providers, and ease information exchange through use of local languages. At the project

operational level, such interventions should be integrated/ harmonized with the proposed communication and stakeholder engagement strategy.

- e) **Research-extension interface:** VINES project by design shall support vanilla research in collaboration with MAAIF (Activity 6.3), a strategy which some experts assert needs to link research to extension services as a key pillar for successful implementation of agricultural extension services (EPRC 2016)⁴. The FLCs under the Vines Project by design were placed principally dependent on the private sector (processors) which is again consistent with a pillar in the single spine extension system promoted by Government. It was noted, however, that there were no specific activities mentioned in the VINES results framework to demonstrate strategies that link research to extension service delivery. It is proposed, therefore, that implementation modalities of the FLCs be revisited to capture research-extension linkages and should be closely linked to the public extension system for sustainability; with a focal person at the LG level and a desk officer at MAAIF. We note, however, that for the success of such measures, it is assumed that Government shall enhance capacity of MAAIF to continually undertake the necessary vanilla research; and LGs to provide extension services.

- f) **Implementation arrangements with the mother ministry:** It was observed that the project design documents state the modalities to coordinate and implement some of VINES project activities with the Directorate of Crop Resources (MAAIF), but with no mention of mechanisms/ specific activities to engage the Directorate of Agricultural Extension Services (DAES) which could undermine the smooth implementation and sustainability of the VINES' extension interventions. Some of the activities could include but not limited to: training of DAES personnel, developing vanilla extension manual and simplified guidelines for service providers, and joint training of extension service providers; as well as joint monitoring and reviews of related interventions. It is recommended, therefore, that VINES project review activities regarding capacity building should emphasize capacity strengthening for the DAES. Promotion of an improved policy and regulatory framework (Activity 6), based on evidence, may also contribute to addressing the above concerns.

3.2 Theory of Change and Assumptions

The overall theory of change is well elaborated under the VINES project results framework. The results framework (RF) is structured into four (4) main components namely:

⁴ EPRC 2016: *Uganda's Agricultural Extension Systems: How appropriate is the Single Spine Structure?* Research Report No. 16. by Mildred Barungi, Madina Guloba and Annet Adong - Economic Policy and Research Centre (EPRC)

Result Stream 1: ***Farmers will sustainably increase productivity while managing risk (Component 1);***

Result Stream 2: ***Promote safe, clean and pure vanilla supply offered to International Markets (Component 2)***

Result Stream 3: ***Strengthen market conditions (Component 3)***

Results Stream 4: ***Strengthen the policy environment (Foundational results)***

Each of result frameworks was premised on a number of logical assumptions based on the evaluators' analysis, issues of significant interest were noted in relation to assumption for components 1 and 4 as summarized below⁵:

Result Stream 1: ***Farmers will sustainably increase productivity while managing risk*** (Component 1)

The Logical assumptions under this result stream are:

- i. *That farmers with access to dedicated advisory services and inputs will implement best practices for vanilla-based agroforestry systems, and raise their productivity, and that fee-for-service agents and micro-entrepreneurs will be sustainable beyond the project;*
- ii. *That the use of FLCs, is an active approach to adult learning, more effective in terms of farmers adopting technologies, compared with demonstration sites where learning was passive;*
- iii. *That Savings and Internal Loans Communities (SILC) provide crucial financial capabilities that allows farmers to save, reinvest in their farming businesses and responsibly access loans, while building social cohesion for collective marketing. SILC also empowers women socially, financially and business wise so that they can earn more from their farms; and*
- iv. *That farmers who diversify their crops gain through multiple income streams if the price of one product, such as coffee, falls due to market shocks, they can rely on other products. Multiple income streams make them more resilient than farmers who are reliant on incomes from one crop.*

COMMENTS

- a) Interventions to enhance access to financial services through SILCs is a tested model in Uganda and CRS has significant experience implementing similar programs in the country with significant success. Baseline findings showed that SACCOs were the most common source of credit for 38% of vanilla farmers in Uganda. Various studies on performance of SILCs in Uganda (most referred to as SACCOs), however, identified governance and institutional weaknesses as major concerns

⁵ The logical assumptions are summarized and, in some cases, paraphrased by the evaluators. Result streams /Assumptions where there was no significant comment have are omitted.

that undermine their performance and long-term survival (IFAD 2012)⁶. The assumptions related to implementation of the SILC model under the VINES project are silent regarding this risk. Consequently, the project implementation plan and strategic activities to implement the SILC model indicate that over 1,030 farmer groups shall be formed for purposes of delivering financial services to farmers and micro-entrepreneurs.

- b) Planned interventions and activities under Activity 1.3.1 and 1.3.2 rather focused on capacity building of the farmers and PSPs but provided no specific activities to support governance and institutional strengthening of SILCs. It is recommended, therefore, that the assumption be reviewed to address risks related to weak governance and institutional sustainability.

Results Stream 4: ***Strengthen the policy environment (Foundational results)***

The logical assumption under this results stream was; *that if support is provided to the GoU and MAAIF to develop policies and a legal framework to improve discipline in the trade of vanilla, this will be implemented by the GoU and local authorities, aimed at improving vanilla quality.*

COMMENT:

- a) Evidence from the baseline survey identified numerous constraints to implementing effective regulations at local government (4.4.4) and central government levels for industry regulation (4.5.1). Among the major drawbacks mentioned by KIIs interviewed was bureaucracy in the legislation processes for policies and ratification of ordinances for LGs. This kind of situation affects most sectors and programs by Government and development partners in Uganda. The above assumption was, however, rather silent on this matter, yet it could present a significant risk to the successful implementation of the project necessitating review.
- b) Lessons from other strategic sectors in Uganda where private sector plays leading roles, collaborations/partnerships and membership to strong apex organizations has delivered results regarding causing necessary policy reforms and regulations. In Uganda such influential organizations include: Private Sector Foundation of Uganda (PSFU) and Uganda Manufacturers Association.

Private Sector Foundation Uganda (PSFU) is Uganda's apex body for the private sector, founded in 1995 with over 200 business associations, corporate bodies and the major public sector agencies that support private sector growth. The key mandate of PSFU includes:

- (a) Research and advocacy on policy issues that affect private enterprise;

⁶ IFAD 2012: *Area-Based Agricultural Modernization Programme Project Performance Assessment*. February 2012 Report No. 2540-UG Document of the International Fund for Agricultural Development.

(b) Maintain institutionalized dialogue with Government on behalf of the private sector in Uganda;

(c) Review of business legislation and regulation to make it more efficient for private sector operations; and

(d) Business development support for SMEs i.e., product development, standards improvement, market access, technology acquisition and application, skills training.

It is, therefore, recommended that VINES project reviews strategies under Results Framework # 4, to include activities geared at enhancing partnerships and collaborations with other organizations in Uganda engaged in advocacy to strengthen and help drive the project's enabling policy and regulatory environment workstream.

3.3 Project Implementation

Risks or challenges that may impact delivery of the project goal, strategic objectives and intermediate results were identified and are well-articulated in the project documents. In addition, some actions were taken to mitigate against these risks or challenges:

B1: Risks or challenges that may impact delivery of the project goal, strategic objectives and intermediate results and mitigation actions

A number of risks and challenges were identified at design stage and indeed, the VINES project design incorporated strategies to mitigate the effects of delivery of project goals, objectives and intended results. Based on the baseline findings, however, some additional risks were identified requiring specific mitigation as below:

Risk 1: Bureaucratic delays in legislation and regulations undermine efforts to create an enabling policy and regulatory framework for the vanilla sector

Based on evidence from the survey, there were significant delays in enacting ordinances at local government level and where this was done, the necessary ratification by the central government was reportedly difficult to attain by most LGs assessed. In addition, due to various institutional and capacity weaknesses, the legislative and policy development process in Government is very slow, which could undermine efforts to create an enabling environment (national vanilla law and ordinances at LG).

Proposed mitigation measures:

- i. The existing laws should suffice for the effective implementation of the VINES project hence no need to pursue the national vanilla law but rather focus on **strengthening institutions in regulation and compliance, especially at LG level, as earlier discussed.**

- ii. **Develop and implement a robust communication & stakeholder engagement strategy for the VINES project.** The communication strategy shall enable intensive sensitization, stakeholder engagements (sectoral, central government and LG levels, communities etc.) with simplified plan of operations and activities; share targets, clarify roles, share experiences etc.
- iii. **Establish partnerships and collaborations with influential private sector apex organizations** (e.g., PSFU) to enhance advocacy on policy and regulatory reforms.

Risk 2: Organizational and institutional weaknesses of SILCs/SACCOs could undermine the implementation and sustainability of interventions to enhance financial services. SACCOs lack a specific focus on the needs of women and youth, leading to potential negative effects on these vulnerable groups, and significant negative effects on women and youths engaged in vanilla value chain. This baseline, however, did not undertake in-depth diagnosis of institutional capacity of the participating/ potential SACCOs as such specific institutional weaknesses are not presented.

Proposed mitigation measures

- i. **The VINES project should undertake a rapid institutional capacity assessment of participating and potential SILCs to inform strategies to address the above risk.**
- ii. **Integration of women and youth in the SILC model and linkages should be emphasized as a means to strengthen model sustainability.** Specific activities for capacity building of SILCs aimed at their long-term survival and financial services products targeted for women and youth should be developed and added in the result framework (under Activity 5).

Risk 3: Rampant vanilla price fluctuations amidst some weaknesses in the project diversification strategy could undermine the resilience of the vanilla sector

While various strategies and activities were proposed to address this challenge under RF 3, the strategies did not articulate clearly the modalities for strengthening vanilla farmer groups at different levels, and diversification strategies for resilience at farmers' level were not grounded on a detailed mapping of the related value chains.

Proposed mitigation measures

- i. Strengthening of farmer organizations and their involvement in implementation be emphasized. Through related stakeholder engagements, innovative ideas and solutions would be generated and nurtured to enhance resilience of the vanilla sector.
- ii. Mapping of some of the major related value chains to be supported under the VINES project, especially those identified and verified from baseline data; such as coffee, bananas, beans and other annual crops.

Planned interventions that are likely to be the most critical and/or effective in achieving the programme's intermediate results and strategic objectives

Activity 1: All considered critical

Activity 2.2: Planting material propagation and distribution. Based on baseline findings, most vanilla farmers highlighted limited access to quality planting materials; other farm inputs, planting materials for tutor and shade trees; and manure as a major hindrance to growth.

Activity 5: Capacity building of SILCs for long-term sustainability and delivery of services that target women and youth

Activity 6.1 Drafting of the national vanilla law as recommended earlier (under Risk 1); this result intervention should be revisited, possibly dropped and replaced with more practical interventions.

B3: Project interventions with potential negative impacts or unintended consequences

Intervention: Increase the scale and density of vanilla plantations.

Negative impacts or unintended consequences

Farmers may abandon other crops including food production to focus on vanilla as a cash crop, which may result in a food insecurity threat. The project should work with LGs and extension workers to consistently promote crop diversity and other measures that promote food security.

Intervention: Harvesting Ripe Vanilla

Negative impacts or unintended consequences

- a) Farmers may choose to adopt the harvest season dates promoted (by Government and sector organizations), which could be disruptive to farmers whose vanilla flowered and matured earlier than the stated harvest date, and who could also be adversely affected by complying with the harvest date and lose income. This could also motivate farmers to harvest unready vanilla to gain from the seasonal ready market, hence compromise the quality of vanilla. Intensive and continuous education and training of farmers about the importance of timeliness in activities will go a long way in minimizing this risk.
- b) Good quality and good prices due to the above interventions could cause an unintended increase in thefts and GBV at farmer level.

3.4 Sustainability and Impact

Sustainability relates to whether the positive outcomes of the project at purpose level are likely to continue after external funding by CRS ends; and also, whether it's longer-term impact on the wider development process can also be sustained at the level of the sector, region or country. In a wider sense, sustainability looks at socio-economic, technical and cross cutting issues of gender equity, and the environment.

Exit strategies

1. FLCs should be managed by the private sector with linkages public sector programs for continuity and sustainability;
2. Projects should deliberately promote inclusion of targeted beneficiaries with other Government programs (at national and LG levels) e.g. Youth empowerment programs, the parish model and financial intermediaries/institutions, hence linking project beneficiaries to new networks for sustainability;
3. Project activities should be geared more towards supporting farmers and local MSMEs rather than being primarily targeting the processors and buyers. While there is need for more support to farmers as enterprises, emphasizing this would appear as a key departure from the current project design, hence proposed for further assessment at mid-term review. However, the project should consider improving access to financial services for the farmers. This will enable them to access productivity-enhancing technologies and practices;
4. Build strong farmers' institutions (at national and district levels) with capacity to engage in the market; and
5. Support enactment of laws, ordinances and bye-laws and enforcement mechanisms to regulate the activities in the vanilla sub-sector

Potential barriers to sustained gains

1. Weak sector regulations and low capacity for enforcement;
2. Weak farmer institutions;
3. Low financial capacity of SMEs for investment in the enterprise; and
4. Unpredictable weather conditions.

COMMENTS

- a) Use of modern information communication and technology (ICT) solutions has recently been recognized among the main facilitators for economic prosperity and project implementation and sustainability. ICT offers a range of fundamental and methodological contributions that empower sustainability through various tools and more generic
- b) models⁷. With the introduction of ICT, traditional agriculture in India has been reformed and transformed "...contributing to significant improvements in agricultural productivity and sustainability. Empowering farmers with the right information at the right time and place is essential for improving the efficiency and viability of small and marginal holdings"⁸. The demand and growing uptake of ICT innovations in Uganda's agricultural sector has been documented

⁷Darine Ameyed 2018: How ICT an Accelerate Implementation of the Sustainable Development Goals; Engineering for Change, November 2018.

⁸ Singh S, Ahlawat S, Sanwal S. 2017: Role of ICT in Agriculture: Policy Implications. Orient. J. Comp.Sci.andTechnol;10(3). Available from: <http://www.computerjournal.org/?p=6704>

indicating great potential in contributing to agricultural development (UCC/RCDF 2019)⁹.

- c) This baseline survey, however, by design, did not assess in detail stakeholders' information needs and the ICT status of the vanilla sector in general. It is proposed, therefore, that the scope of the communication and stakeholder strategy be broadened to capture this important missing link or be addressed at mid-term review.
- d) Based on the above, some of the recommended strategies for ICT integration frameworks for agriculture in Uganda, which have been found relevant/potentially applicable to the VINES project include: The establishment of an extension service providers ICT platform, delivering agricultural digital content through free media slots (e.g. national radio programs by Government, local FM radios, community radios); and integrating ICT in various business processes along the vanilla value chain.
- e) ICT has many roles to perform for agricultural development starting from a decision support system to farmers, to market access and trading; and in enhancing empowerment of communities as summarized in BOX 1¹⁰.

3.4.1 Exit strategy to address sustainability Issues

Exit strategy refers to the mechanism put in place by VINES to ensure that its services will be continued when the project funding comes to an end. The consultant examined sustainability of the VINES project along the following areas:

A. Ownership of objectives and achievements

For project objectives and achievements to be sustainable, the beneficiaries should own the outcomes of the project. This has a relationship with the consultations at project inception through the project continuum, so that

beneficiaries see project as their own. Issues of concern are: Entry points and participation of beneficiaries, as well as liaising with other development partners, NGOs, farmer intermediary organizations (cooperatives and associations) and local governments involved in Uganda's vanilla industry. Their participation and understanding of CRS interventions are important for the continuation of project activities. Under the decentralization structure, government development programmes, especially in the agriculture sector, are implemented at sub-county level.

⁹ UCC-RCDF: *State Of Information Communications Technology (Ict) For Agricultural Innovations In Uganda 2019*. Researchers: Prof. Jude T. Lubega and Dr. Drake Patrick Mirembe on behalf of Rural Communications Development Fund (RCDF), Uganda Communication Commission (UCC).

¹⁰ Singh S., Ahlawat S., Sanwal S. 2017: Adapted and paraphrased by the evaluators.

COMMENTS:

- a) Baseline findings showed that CRS was engaging and working with LGs during project inception and design. The depth of engagement however seemed to be limited to top political and technical leaders at district level. There was no evidence that community leaders (at sub-county level or below) were involved.
- b) By design, the FLCs model seeks to promote the primary beneficiaries and communities (through the decentralized local governments) with farmers taking lead on FLC activities; the FLCs are hosted, and farmer-owned. In addition, FLCs are aimed at enhancing skills in good agronomic practices and testing innovations by farmers for replication in their own farms, which should enhance project sustainability.

B. Policy support and regulatory framework for the vanilla Industry

One of CRS's interventions is to support a policy and regulatory framework. Overall, the Uganda has a conducive policy and legal framework for the agricultural sector. However, the vanilla sector has not been prioritized by Government as a cash crop. As discussed earlier this presented significant bottleneck in project implementation and sustainability in the absence of Government support and a conducive policy and regulatory framework for the vanilla sector in Uganda.

C Financial sustainability

This refers to the financial ability of the programme beneficiaries to afford the products or services after the CRS project comes to an end. Farmers continue to need support in various areas (such as in extension, market linkages, and in building capacity of farmer organizations). The VINES project design has in our opinion put in place effective measure by design to ensure financial sustainability (subject to assumption). With project interventions targeting to support private processors and SMEs, it was envisaged (assumed) that the private sector shall attract investments and resources to sustain growth in the sector and enable farmers to adopt fee-for service modalities to access services. In addition, while working with Government to develop a robust vanilla policy, it is also envisaged that public resources shall in the medium and long terms be injected in the sector to ensure sustainability.

D. Technological sustainability

Technological sustainability refers to the sustainability of the technologies, methods, tools and knowledge used under CRS implementation, and their continuation after the programme ends. The project has embedded continuous capacity building through FLC and local private service providers for sustainability.

SECTION B: FINDINGS

This section provides the findings of the baseline status based on analysis of data collected using the various survey tools. Findings are organized by strategic objectives and intermediate results. In addition, several analysis tables, figures and matrices summarizing findings on specific indicators are attached as annexes. Finally, a Performance Indicator Table provides the projected baseline values, the actual values (findings), the standard error and confidence level for each indicator of PMP assessed in this survey (See **Appendix I**).

CHAPTER FOUR: INCREASE AGRICULTURAL PRODUCTIVITY

4.1 Improved Quality of Land and Water Resources (IR 1.1)

VINES aims at contributing towards land restoration by focusing on improving the quality of land and water resources on vanilla fields through:

- 1) The application of selected natural resource management (NRM) practices that have proved their effectiveness in restoring land; and
- 2) The selection of crops and practices based on climate information, to contribute to climate change mitigation to a possible extent, and to support farmers to adapt to climate change.

This section is organized around the five (5) NRM competencies that the project aims to strengthen among participating vanilla farmers:

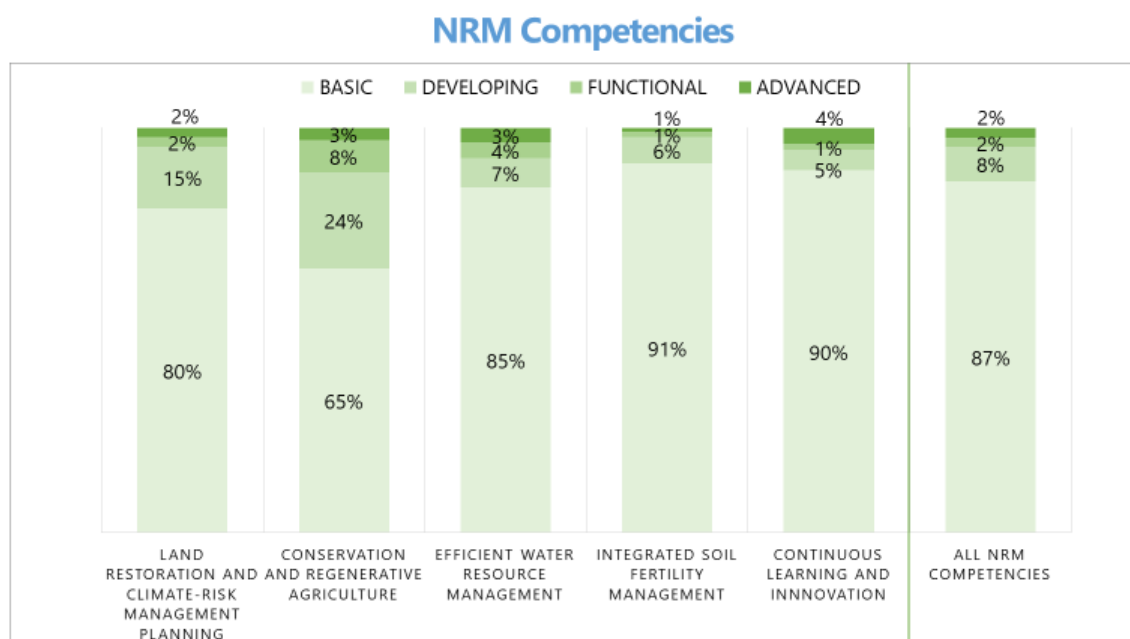
- 1) Planning for land restoration and climate-risk management;
- 2) Conservation and regenerative agriculture;
- 3) Integrated soil fertility management;
- 4) Efficient management of water resources; and
- 5) Continuous learning and innovation.

Given its importance, a more detailed analysis is conducted on the standards for the three behavioral evidence areas in the *Planning for Land Restoration and Climate-risk Management* competency that focuses on the long-term, medium-term and short-term decisions that farmers need to make, based on different types of climate information (Gottret et. al, 2020).

The above analysis provides the baseline snapshot on the practices and technologies that vanilla farmers are already using to promote climate-risk reduction and/or natural resources management, and the number of hectares that are already under these practices.

Overall, the majority (87%) of the vanilla farmers had achieved the basic level of competency showing a deficiency. Eight percent were in the developing phase, while only 5% had reached the functional and advanced phases (Figure 2).

Figure 2: Percentage of vanilla farmers by level of the natural resources management competencies and by behavior at baseline (2021, N=413)



4.1.1 Competency 1: Land restoration and climate-risk management planning

Indicator 19. Number of farmers who have reached at least a functional level of "land restoration and climate-risk management" and of "vanilla-based agroforestry management" competencies as a result of USDA assistance (baseline value = 59)

This competency relates to the capacity of farmers for selecting crops and practices to restore their land and manage climate risks, and includes five behaviors:

- 1) Uses soil analysis or assessment data to plan land use and select practices;
- 2) Uses historical climate information trends, and climate forecasts to select crops and practices;
- 3) Selects crops based on nutritional needs and market information;
- 4) Plans land use based on crops and practices selected; and
- 5) Evaluates results to learn and adapt practices. Each of these key behaviors includes a list of related behavioral evidence that an individual must display to demonstrate that they have mastered the competency.

These key behaviors are used to define the targets for capacity building, and the behavioral evidence to assess the competency. Based on whether farmers in the sample demonstrated the behavioral evidence for the five key behaviors of the *Land Restoration and Climate-Risk Management* competency, the competency level for each behavior was calculated by taking an average of the values for each behavior¹¹, and the overall level for the competency by taking an average of the level for each of the five key behaviors. Using the calculated average for each member in the sample, respondents were classified in four competency levels as shown in Table 3.

Table 3: Sampled districts and number of respondents by district

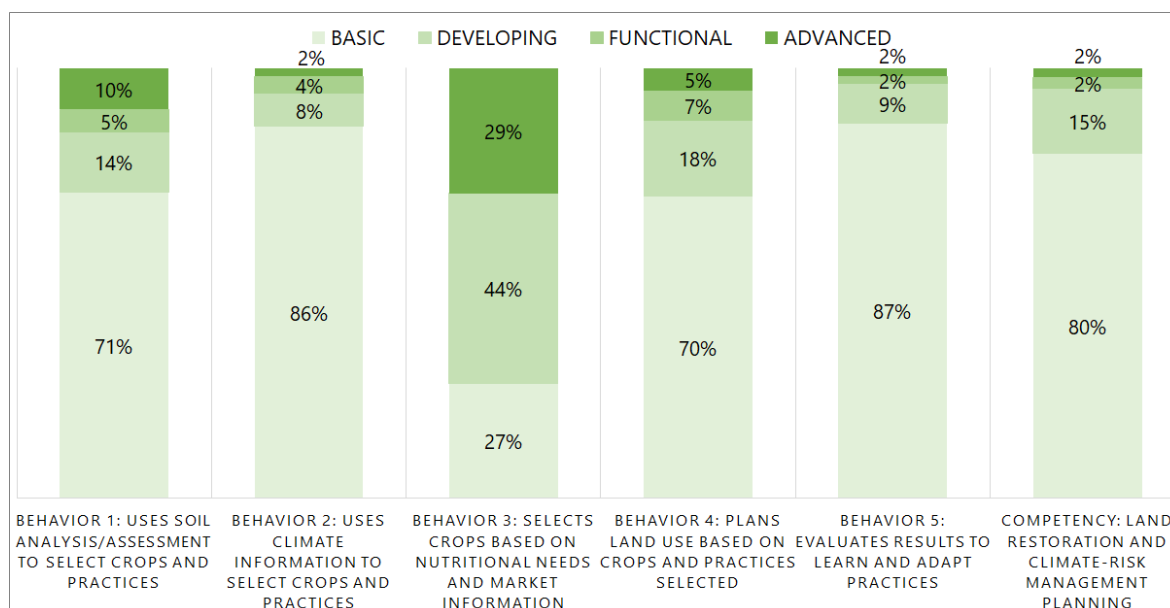
Competency level	Range	Description
Basic	0 - <40%	Demonstrates less than 40% of the behavioral evidence and needs intensive training.
Developing	40 - <60%	Demonstrates at least 40% but less than 60% of the behavioral evidence and needs further focused training and reinforcement.
Functional	60 - <75%	Demonstrates at least 60% but less than 75% of the behavioral evidence and can successfully do their job or run their business.
Advanced	75 - 100%	Demonstrates at least 75% of the behavioral evidence, serving as a role model to others.

Findings showed that 3.6% (59 farmers) of the farmers assessed were functionally competent in regard to Land restoration and climate risk management planning competency (3.4% functionally competent and advanced 0.24%).

The results show a deficiency in this competency as only 4% of the farmers have achieved a functional or advanced level of the competency (Figure 3). However, when this is disaggregated by key behavior, important differences can be observed. The behavior with the highest percentage (73%) of farmers who are at a functional or advanced level is behavior 3 (*selects crops based on nutritional needs and market information*), followed by behavior 1 (*uses soil analysis/assessment to select crops and practices*) with 15%. The behaviors with the lowest percentage of farmers who are at a functional or advanced level are behavior 2 (*uses climate information to select crops and practices*) with 6%, and behavior 5 (*evaluates results to learn and adapt practices*) with 4%.

¹¹ A value of 1 was given for “yes” and a value of 0 for “no”

Figure 3: Percentage of vanilla farmers by level of the land restoration and climate-risk management planning competency and by behavior at baseline (2021, N=413)



Regionally, more farmers (21%) in the Central region had reached a functional or advanced level of land restoration and climate risk management planning competencies compared to only 4% from Western Region.

A detailed analysis on the extent to which vanilla producers implemented each of the different actions that demonstrate their competency level by each of the five key behaviors for this competency is presented in the following sections.

Behaviors 1-3: Criteria to select crops to integrate in vanilla fields and cropping practices

The competency model includes three behaviors related to the criteria used to select crops to integrate in their vanilla fields and their cropping practices (behaviors 1-3 in Figure 3 above. The percentage of vanilla farmers interviewed that demonstrates each of the behavioral evidence related to these three behaviors is presented in Figure 3 below. The first five items (in cream) relate to the:

- (i) Suitability of the soil using soil analysis or visual soil assessment data;
- (ii) Production potential of their vanilla field; and
- (iii) Function in the production system.

Results show that at baseline, the majority of the farmers were not practicing most of the recommended behaviors to select crops to integrate in their vanilla fields, except one that involves selecting crops based on the production potential of their vanilla fields, which is practiced by 41% of the farmers.

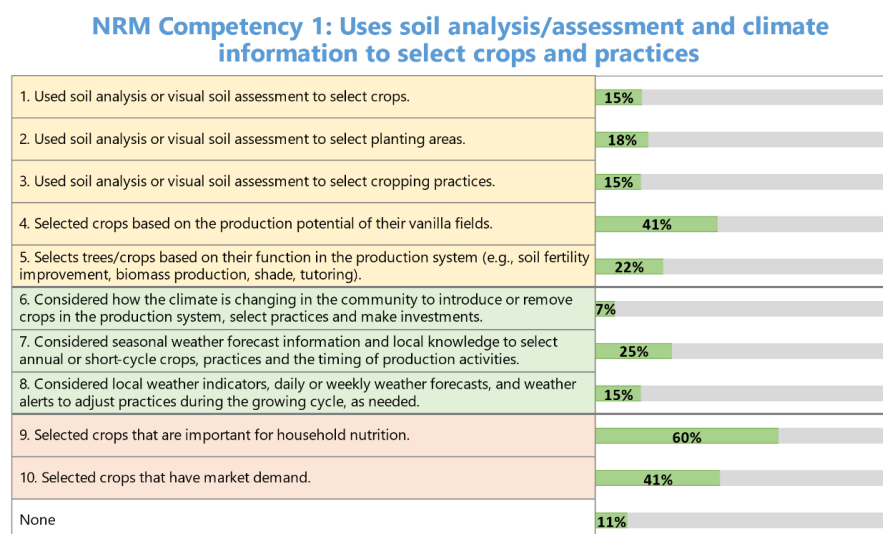
The next three behavioral evidence (in green) relate to the use of climate information to select crops and practices, showing that more vanilla farmers (25%) are using weather forecasts to make medium-term decisions related to the cropping cycles, while only 15% are adjusting their decisions in the short-term based on daily or weekly weather forecasts; and even less (7%) are making long-term decisions based on historical climate trends.

The other two behavioral evidence (in pink) relate to the selection of crops based on the importance of crops to household nutrition; and market demand, showing that fulfilling household nutritional needs is the most important criteria (60% of vanilla farmers), followed by market demand (42% of vanilla farmers). The results also showed that overall, 8% of the farmers did not demonstrate any of these behaviors while selecting crops to integrate in their vanilla fields and cropping practices.

Overall, the most important factor in selecting crops to integrate with vanilla was the potential contribution to household nutrition, followed by market demand, production potential of the field and quality of the soil in the field (Figure 4). About 60% of the farmers in both Western and Central regions, female and male; and in both levels of production, considered the nutritional value of the crops to determine what to integrate with vanilla. The nutritive value of the crop ranked highest overall (60%), across regions, in all genders and across areas of both high and medium levels of production. Forty-one percent (41%) of the farmers considered the market demand; 41% the production potential of the field, and 15% the nature of the soil. The least considered factor across all the categories was the climate changes with 7%

In the Western and Central regions, 17.4% and 8.4% respectively considered the quality of soil. In addition, 14.8% of females and 15.7% of males; and 17.3% and 5.2% in areas of high and medium levels of production, respectively considered the quality of soil in selecting crops to integrate with vanilla. Production potential was considered by more farmers in the Western region (41%) than in the Central region (37.4%); more females (44.3%) than males (39.6%) and more farmers in areas of high (41.2%) as compared to the medium (34.5%) levels of production.

Figure 4: Percentage of vanilla farmers who demonstrated actions that provide evidence of three key behaviors for the land restoration and climate-risk management planning competency related to the selection of crops and practices at baseline (2021, N=413)



On the other hand, market demand was considered by more farmers in the Central (47%) than in the Western region (40.4%); more males (42.7%) than females (36.1%); and more in areas of medium (48.3%) than in high (40.7%) levels of production.

Standards for Behavior 3: Planning to manage climate risk

Indicator 39. Number of Farmers Who Access Climate Information for Decision-Making (Baseline Value = 1083 Farmers)

Climate risk management requires farmers to access, interpret, analyze and make long, medium and short-term decisions related to which crops and/or varieties to plan and what practices to implement, this being the basis for climate-smart agriculture (CSA). To adopt CSA, farmers need climate-risk management behaviors described in the behavioral evidence 6-8 in Figure 4 above (Gottret et. al, 2020).

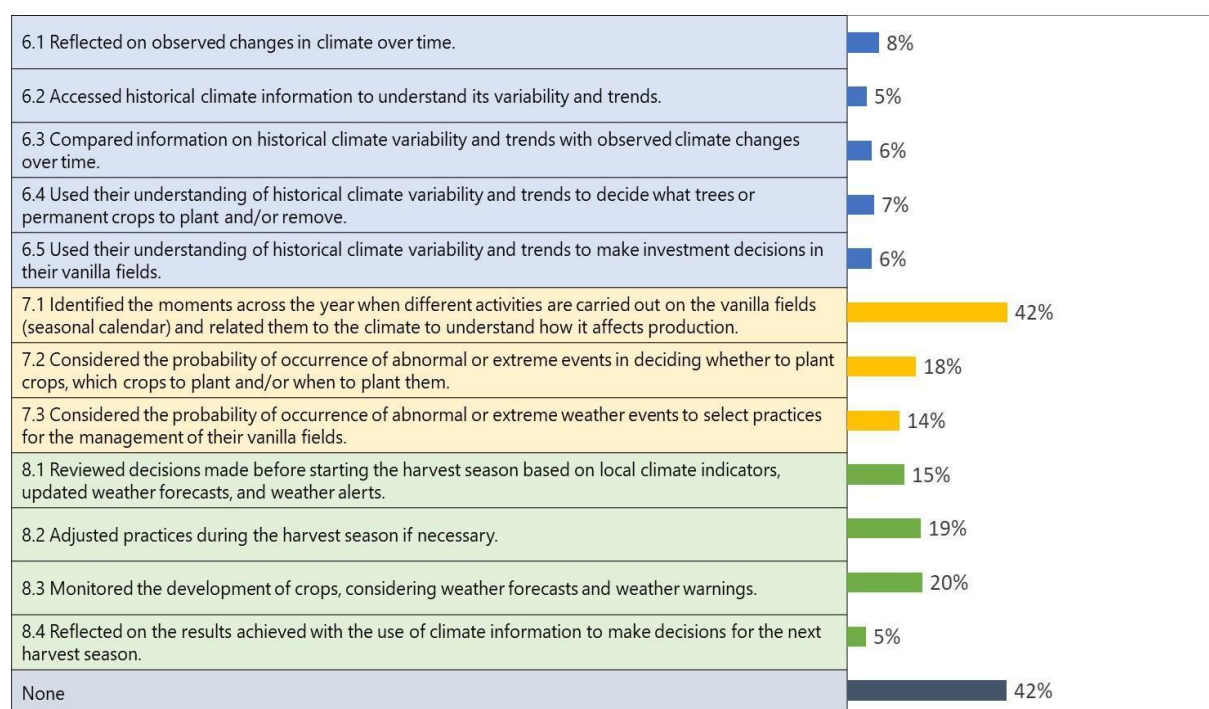
Behavioral evidence 6 refers to the long-term strategic decisions that farmers need to make and that have influence beyond one or several crop cycles such as selecting or changing perennial crops and/or varieties that require an initial investment of financial resources, and take time to start production, as well as selecting planting areas and designing intercropping systems. Figure 4 shows that 7% of the interviewed vanilla producers are accessing historical climate information and using it to assess climate variability and trends to make these long-term decisions (see standards 6.1-6.5 in grey). Findings showed that total number of farmers who accessed climate information for decision-making was 1083 farmers.

Behavioral evidence 7 refers to the medium-term decisions that farmers make related to the harvest season, and can be related to the selection and

scheduling of management practices, or the selection of annual or short-cycle crops or varieties of these crops to integrate in their vanilla fields. These decisions require the analysis of seasonal or sub-seasonal forecasts to understand the probability of occurrence of abnormal or extreme events during the harvest season. The findings in Figure 5 (standards 7.1-7.3 in yellow) show that 42% of farmers identified the moments across the year when different activities are carried out on the vanilla fields (seasonal calendar) and related them to the climate to understand how it affects production. On the other hand, only 18% considered the probability of occurrence of abnormal or

extreme events in deciding whether to plant crops, which crops to plant and/or when to plant them; and 14% considered the probability of occurrence of abnormal or extreme weather events to select practices for the management of their vanilla fields.

Figure 5: Percentage of Vanilla Farmers who demonstrated the standards for the behavioral evidence related to climate-risk management, baseline (2021, N=413)



Behavioral evidence 8 refers to the short-term decisions that farmers need to make once the harvest season has started and the annual or short-cycle crops have been planted to respond to daily or weekly weather forecasts or alerts. This may imply an adjustment in the timing of planned activities or adjustments to management practices. Findings in Figure 4 above relate to this behavioral evidence (standards 8.1-8.4 in green) show that only 15% of vanilla farmers are reviewing their decisions based on updated weather forecasts and alerts, or even their own local climate indicators; and only 19% and 20%, respectively, are adjusting their practices and monitoring the

development of their crops based on these forecasts. Moreover, only 5% are reflecting on the results achieved to learn and make decisions for the next harvest season.

Overall, 19% of the farmers used daily or weekly weather forecasts, local weather indicators or weather alerts to adjust their cropping practices. In the central and western regions, 50% and 30.4% used weather information, respectively. More male (43%) farmers used weather information compared to female (33%) farmers. More farmers used weather information in medium (35.1%) areas of production compared to high (30%) areas of production.

Considerations for using daily or weekly weather forecasts, local weather indicators or weather alerts to inform these decisions

To use daily or weekly weather forecasts, local weather indicators or weather alerts to inform these decisions, 43.7% of the farmers reviewed decisions made before starting the harvest season based on local climate indicators, updated weather forecasts, and weather alerts; 56.3% adjusted practices during the harvest season, if necessary; and 57.8% monitored the development of crops, considering weather forecasts and weather warnings.

Interviews with district and political leaders in the districts pointed out the same trend. They indicated that most farmers in their localities accessed meteorological information. They further reported that the main source of weather information was the Uganda National Meteorological Authority (UNMA) and the main channels of communication to farmers were radios, extension workers, mobile phones and fellow farmers as well, as articulated by a sub-county leader in Kasese district:

“... through a district program, the Senior Agricultural Officer receives the weather forecast from UNMA and shares with us on our social media page; then we share with farmers. We can also go on radio and talk about it.”
Agricultural Officer - Buhuhira Sub-county.

In addition, generally, leaders concurred that farmers do find the meteorological information provided useful but with a few undertones about unreliability of the information:

“Yes, they do; but sometimes because of the erratic behavior of weather, they sometimes miss seasons.” *CAO - Kasese District.*

“Some of them take it to be useful, but others sometimes do not because of increasing climate change issues which sometimes contradict the forecasts.”
DAO - Bunyangabo District.

Awareness about effects of climate change on vanilla production

Findings from interviews from the political and technical leaders in the surveyed districts indicated that there were a number of vanilla production related problems attributed to climate change effects; these largely focus on negative effects on production and productivity, increase in diseases and pests, and poor quality of vanilla. (See a summary extract of the mentioned effects in Box 1 below).

Some of the voices of the leaders in the vanilla producing districts expressed well the observed / perceived climate change effects on vanilla production:

“High prevalence rates of pests and diseases due to unpredictable weather and drying of some vanilla plants” *DAO - Rubirizi District.*

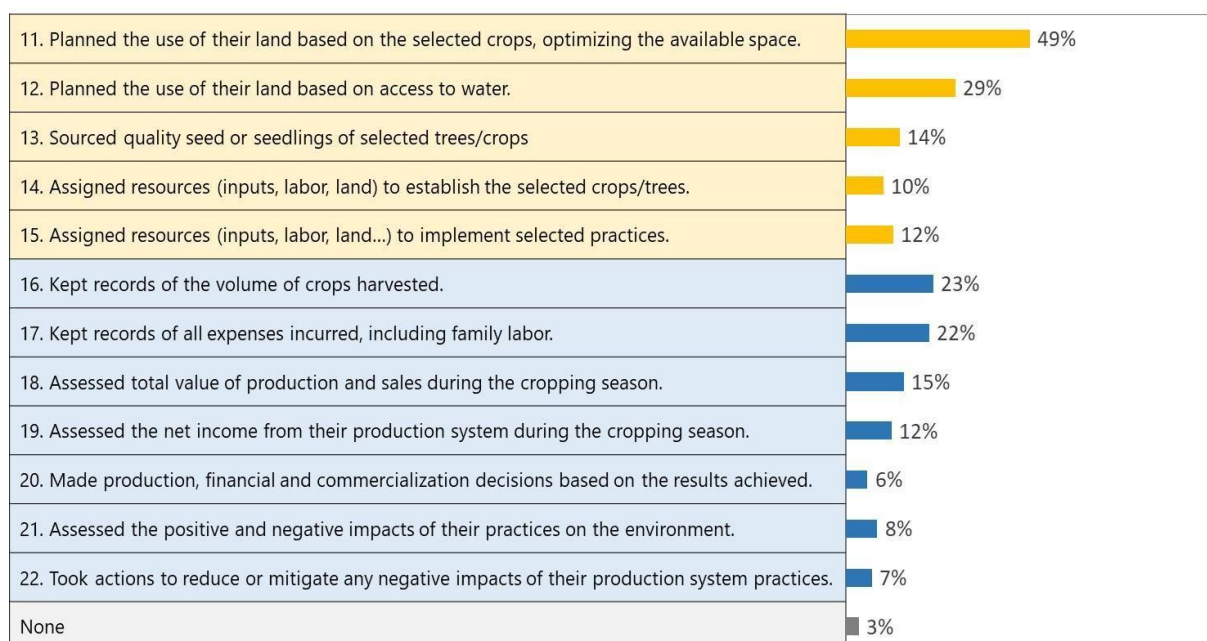
“Climate change, especially long droughts affect the quality of the crop. Yes, it affects all produce and could be responsible for the fungal disease that is lately affecting vanilla in some areas” *CAO - Kasese District.*

“It has led to the invasion of some pests. I think that pests are caused by the heavy rains we are getting between June-October. These pests attack the flowers. There is also flooding of the lowlands and landslides on the slopes which sweep away the gardens” *Private Extension Worker - Bundibugyo District.*

Behaviors 4-5: Land use planning and evaluation of results to learn and adapt

Once farmers have made strategic decisions on the crops to introduce in their vanilla fields and their cropping practices, the need to plan for the use of their land, optimizing the available space and securing access to water. They also need to source the needed inputs, especially quality seeds or seedlings of the selected crops or trees, and assign the needed resources to plant the selected crops and implement selected practices. Findings presented in Figure 5 relate to the behavior of *land use based on crops and practices selected* (behavioral evidence 11-15 in yellow) show that 49% of farmers planned their land use based on the selected crops, optimizing the available space, followed by 29% who also consider access to water when planning the use of their land. On the other hand, less farmers are sourcing quality seeds or seedlings to plant the selected crops or trees (14%); assigning resources to establish them (10%); and implementing selected practices (12%). As a result, 70% are in the “basic” level and 18% are in the “developing” level, with only 12% who are at a “functional” or “advanced” level (see Figure 4 above).

Figure 6: Percentage of vanilla farmers who demonstrated actions that provide evidence of two key behaviors for the land restoration and climate-risk management planning competency related to land use planning and evaluation of results to learn and adapt, baseline (2021, N=413)



More than half of the farmers considered optimization of space in the Central region (51%) compared to less than half of farmers in the Western region (48.2%). About 51% of the female and 48.3% of male farmers considered optimizing space. A smaller (48.2%) proportion of farmers in areas of high level of production considered optimization of space compared to 51.7% farmers in areas of medium level of production. Similarly, more males than females considered access to water (29.2% v. 27.9%) and the quality of soil (18.3% v 14.8%) in planning for land usage in vanilla fields. Access to water was considered by 37.9% and 27.6% of the farmers in areas of medium and high levels of production, respectively.

The survey results showed that 15.1% of vanilla farmers were guided by soil quality in selecting cropping practices, overall. Findings also show that 12.5% of the farmers assigned resources including land, labor and agro-inputs to implement the selected practices. There was a significant difference between the proportion of male (13.5%) and female (6.6%) farmers; and farmers in areas of high (11.1%) and medium (20.7%) levels of production who assigned resources to implement selected practices. Overall, about 28.5% of the farmers reported that they did not consider the quality of soil in planning land use or selecting cropping practices; did not consider access to water or optimizing space in planning land use; and did not assign any resources in implementing the selected practices.

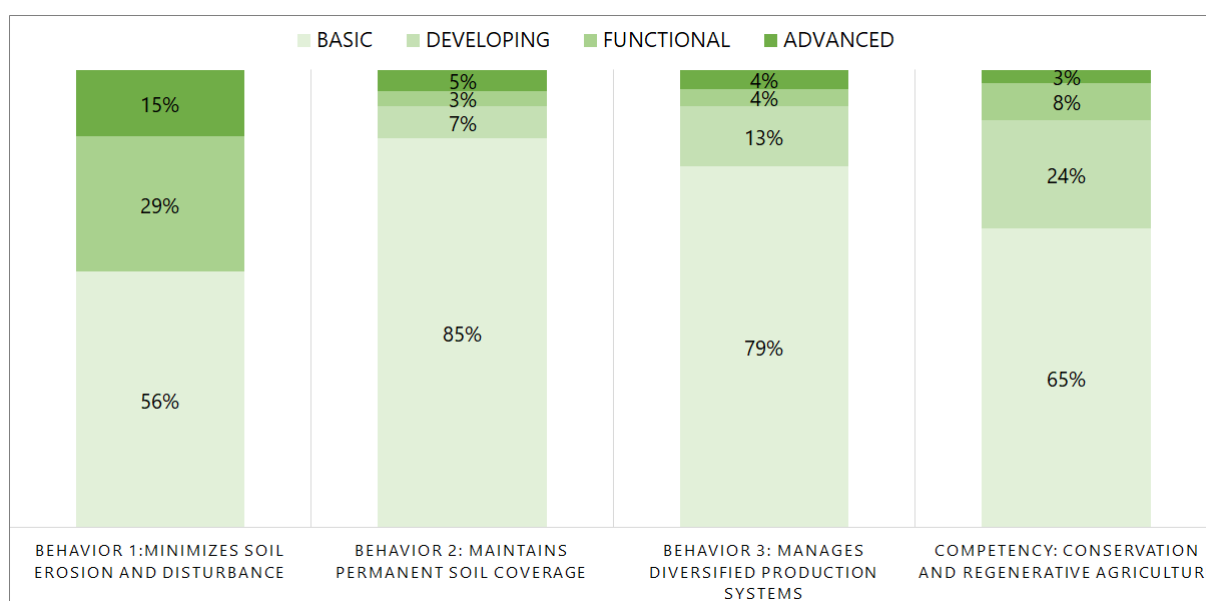
The fifth behavior for this competency is that farmers evaluate their ability to learn and adapt which involves keeping records, assessing relevant outcomes such as production, sales and net income, and making decisions for their next

harvest season based on these outcomes. In addition, they need to assess the positive and negative impact of their practices in the environment and take action to mitigate negative impacts. Findings presented in Figure 6 related to the behavior *evaluates results to learn and adapt practices* (behavioral evidence 16-22 in light blue) show that less than a quarter of farmers are keeping records of the volume of crops harvested (23%) and of their expenses (22%); and less are using these records to assess their production and sales (15%); net income (12%), and their impacts (negative and positive) on the environment. Furthermore, very few farmers are making decisions and acting based on their findings. As a result, 83% of farmers are at a “basic” level for this competency, 14% at a “developing” level, and only 5% have reached a “functional” or “advanced” level (see Figure 5 above).

4.1.2 NRM Competency 2: Conservation and regenerative agriculture

The percentage of farmers who have achieved the different levels of the three behaviors for the *conservation and regenerative agriculture* competency, and of the overall competency are presented in Figure 7. The results show that two thirds of vanilla farmers have a “basic” level of this competency, and additional 24% a “developing” level of the competency, and only 11% have achieved a functional or advanced level of the competency. When this is disaggregated by behavior, it can be observed that more farmers demonstrate the behavior of minimizing soil erosion and disturbance, and significantly less on the other two behaviors.

Figure 7: Percentage of vanilla farmers by level of the conservation and regenerative agriculture competency and by behavior at baseline (2021, N=413)



Behavior 1: Minimizes soil erosion and disturbance

The first behavior of the *conservation and regenerative agriculture* competency refers to using land preparation, weeding and planting methods that minimize soil erosion and disturbance. Findings related to the behavioral evidence for this behavior (1-3) show that overall, 59% of vanilla farmers are using weeding options that minimize soil disturbance, 47% land preparation methods that minimize soil disturbance, and 31% direct planting and seeding techniques (Figure 8). However, there are still 21% who are not showing any of the behavioral evidence to demonstrate this behavior.

Figure 8: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior minimizes soil erosion and disturbance of the conservation and regenerative competency, baseline (2021, N=413)

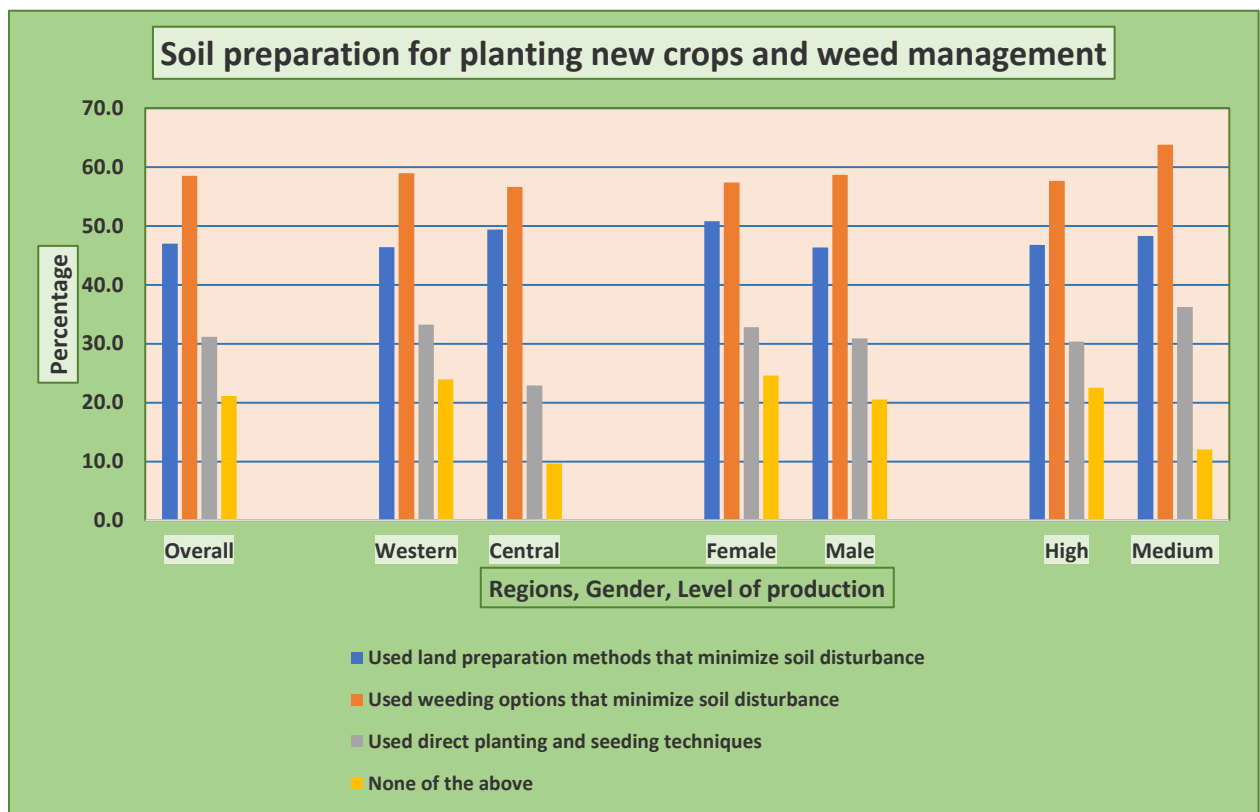
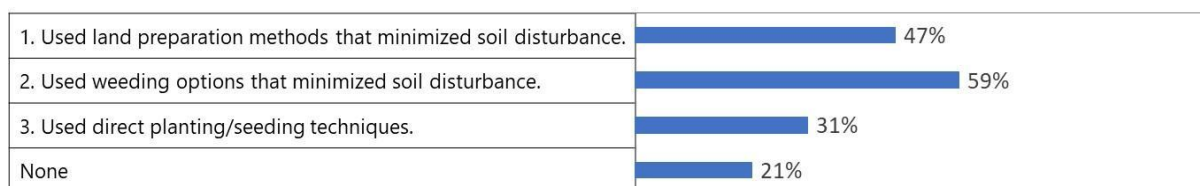


Figure 9 shows that across the regions, for female and male farmers and in both levels of production, using weeding options that minimize soil disturbance was the most common practice. Land preparation methods that minimize soil disturbance were more commonly used in Central than in Western. Female farmers used direct planting and seeding techniques more than male farmers.

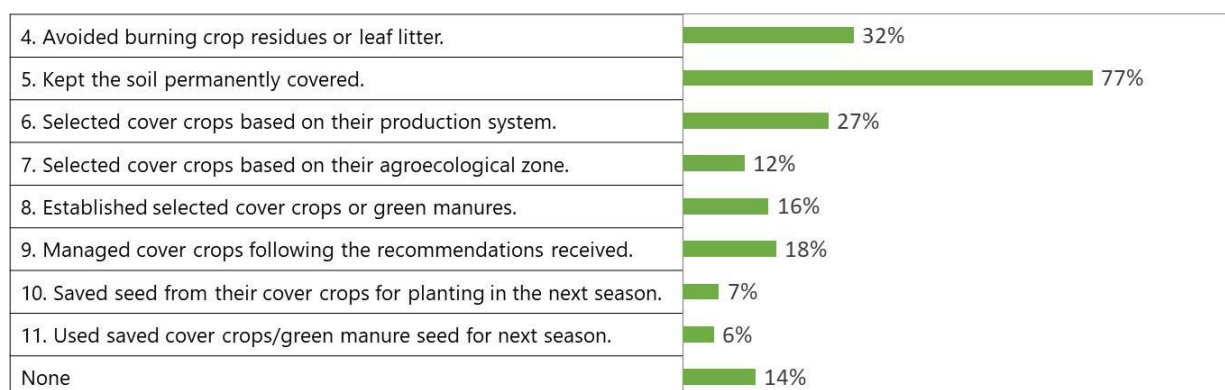
Figure 9: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior minimizes soil erosion and disturbance of the conservation and regenerative competency, disaggregated by region, sex and production level, baseline (2021, N=413)



Behavior 2: Maintains permanent soil coverage

The second behavior of the *conservation and regenerative agriculture* competency refers to maintaining permanent soil coverage by avoiding burning crop residues, keeping the soil permanently covered with mulch, crop residues, live plants or other materials, and/or planting and managing cover crops. Findings related to the behavioral evidence for this competence (4-11) show that keeping the soil permanently covered with mulch, crop residue, live plants, or other materials is practiced by most vanilla farmers (77%), followed by 32% avoiding burning crop residue, pruning residues or leaf litter (Figure 10). On the other hand, establishing and maintaining cover crops is practiced by less than 20% of vanilla farmers. In addition, 14% of the farmers did not demonstrate any evidence for the behavior.

Figure 10: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior maintains permanent soil coverage of the conservation and regenerative competency at baseline (2021, N=413)



While twice as many males (52%) as females (26%) avoided burning crop residue, pruning residues or leaf litter; more females (33% and 10%) than males (26% and 6%) selected cover crops and/or green manures based on the production system; and saved seed from their cover crops or green manure to plant in the next season, respectively, as shown in Table 4.

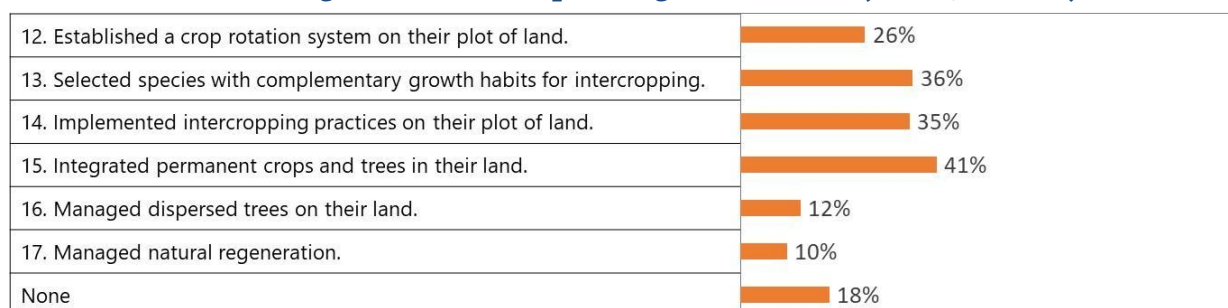
Table 4: Soil protection practices

Soil protection practices	Overall N = 413	Region		Gender		Level of production	
		Western	Central	Female	Male	High	Medium
Avoided burning crop residue, pruning residues or leaf litter	32.1	32.9	28.9	26.2	52.0	33.7	22.4
Kept the soil permanently covered with mulch, crop residue, live plants, or other materials	77.2	74.3	89.2	70.5	78.4	76.9	79.3
Selected cover crops and/or green manures based on the production system	27.3	26.4	31.3	32.8	26.4	26.7	31.0
Selected cover crops and/or green manures based on the agro ecological zone	11.5	9.0	21.7	11.5	11.5	11.1	13.8
Established selected cover crops or green manures	16.1	14.7	21.7	14.8	16.3	16.2	15.5
Managed cover crops or green manure	17.5	16.8	20.5	14.8	18.0	17.8	15.5
Saved seed from their cover crops or green manure to plant in the next season	6.7	4.2	16.9	9.8	6.2	6.1	10.3
Used saved cover crops or green manure seed for new plantings	5.8	4.2	12.1	9.8	5.1	5.0	10.3
None of the above	13.7	16.8	1.2	21.3	12.4	13.7	13.8

Behavior 3: Manages diversified production systems

The third behavior of the *conservation and regenerative agriculture* competency refers to managing diversified production systems by establishing crop rotation systems, implementing intercropping practices, integrating and managing permanent crops and trees, and/or managing natural regeneration (Figure 11). Findings related to the behavioral evidence for this behavior (12-17) show that the behavioral evidence that is demonstrated by more farmers relate to the integration of permanent crops and trees (41%), followed by the implementation of intercropping practices using species with complementary growth habits (35 and 36%, respectively). Fewer vanilla farmers are establishing crop rotation systems (26%); and fewer are managing dispersed trees (10%) and natural regeneration (12%). In addition, 18% are not demonstrating any of the behavioral evidence for this behavior.

Figure 11: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior maintains permanent soil coverage of the conservation and regenerative competency at baseline (2021, N=413)



Female farmers commonly practiced establishing a crop rotation system on their land, implementing intercropping practices on their plots of land, integrating permanent crops and trees on their land and managing dispersed trees on their land more than the male counterparts (Table 5). Selecting species with complementary growth habits for intercropping; implementing intercropping practices on their plots of land; integrating permanent crops and trees in their land, and managing dispersed trees on their land were more common in areas of medium level of production than in the high production areas.

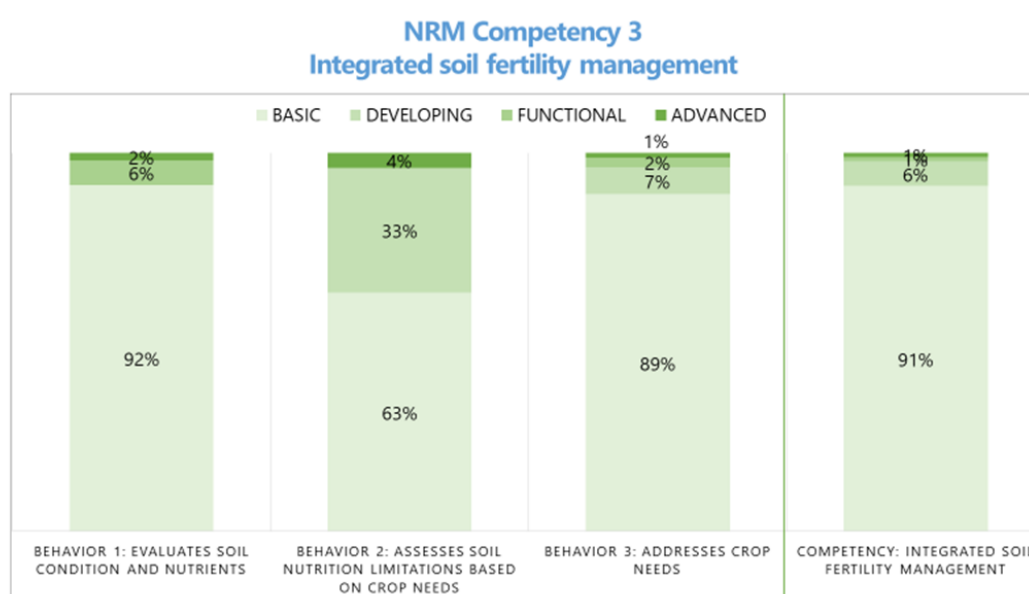
Table 5: Practices in combining diverse crops and/or trees

Practices applied to combine diverse crops and/or trees	Overall N = 745	Region		Gender		Level of production	
		Western	Central	F	M	High	Medium
Established a crop rotation system on their land	26	23	39	31	25	25	35
A. Selected species with complementary growth habits for intercropping	36	36	35	36	36	36	36
B. Implemented intercropping practices on their plots of land	35	33	43	36	35	34	45
C. Integrated permanent crops and trees in their land	41	40	47	49	40	40	47
D. Managed dispersed trees on their land	13	11	21	18	12	12	17
E. Managed natural regeneration	10	8	15	5	10	10	5
F. None of the above	19	22	4	21	18	20	10

4.1.3 NRM Competency 3: Integrated soil fertility management

The percentage of farmers who have achieved the different levels of the three behaviors for the integrated soil fertility management competency, and of the overall competency are presented in Figure 12. The results show that 91% of vanilla farmers have a “basic” level of this competency, and additional 6% a “developing” level of the competency, and only 3% have achieved a functional or advanced level of the competency. When this is disaggregated by behavior, it can be observed that more farmers demonstrate the behavior of assessing soil nutrition limitations based on crop needs, and significantly less the other two behaviors.

Figure 12: Percentage of vanilla farmers by level of the integrated soil fertility management competency and by behavior at baseline (2021, N=413)



Behavior 1 and 2: Evaluates soil condition and nutrients to assess soil nutrition limitations based on crop needs

In order to identify the nutrient/fertilizer needs of vanilla and other crops in the vanilla fields, farmers used different methods. Figure 12 shows that overall, 31% identified soil nutrition limitations based on crop nutrition needs; 15% evaluated the condition of their soil condition using the visual soil assessment (VSA) method; 9% interpreted the results of the visual soil assessment and/or the soil analysis; 8% made crop nutrition decisions based on interpretation of soil analysis and/or VSA results; and 7% conducted soil sampling following the protocol established by the field or extension agent. However, 53% of the farmers did not use any of these methods.

Figure 13: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior “Evaluates soil condition and nutrients to assess soil nutrition limitations based on crop needs” competency at baseline (2021, N=413)

**NRM Competency 3: Integrated soil fertility management
Behavior 1 and 2: Evaluates soil condition and nutrients to assess soil
nutrition limitations based on crop needs**

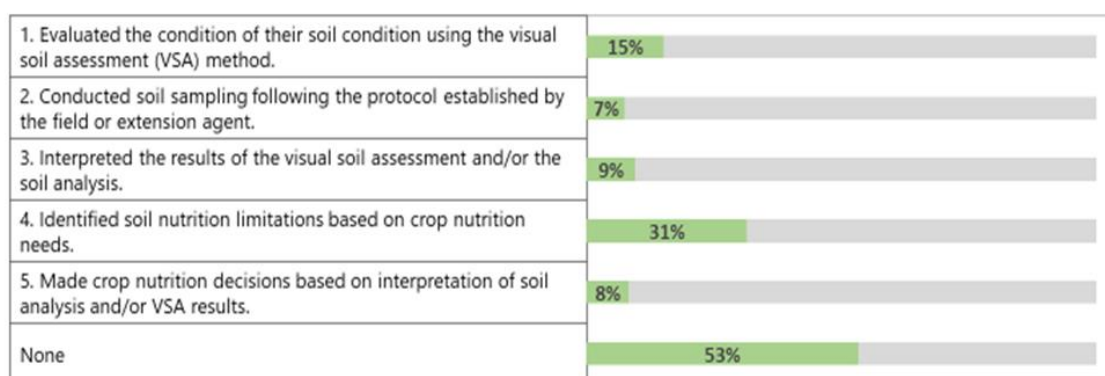


Table 6 further shows that all the methods, except interpreting the results of the visual soil assessment and/or the soil analysis, were practiced by more farmers in Western than in Central region. More female farmers (16%, 8%, 12%) reported that they evaluated their soil condition using the visual soil assessment (VSA) method; conducted soil sampling following the protocol established by the field or extension agent and interpreted the results of the visual soil assessment and/or the soil analysis more than male farmers (15%, 7%, 10%), respectively. Identifying soil nutrition limitations based on crop nutrition needs, making crop nutrition decisions based on interpretation of soil analysis and/or VSA results, and conducting soil sampling following the protocol established by the field or extension agent, were practiced more in the medium production areas than in the high production areas.

Table 6: Methods of identifying nutrient/fertilizer needs of vanilla and other crops

Methods	Region		Gender		Level of production	
	Western (n = 334)	Central (n = 83)	Female (n = 61)	Male (n = 356)	High (n = 359)	Medium (n = 58)
1. Evaluated the condition of their soil condition using the visual soil assessment (VSA) method	13.8	21.7	16.4	15.2	15.6	13.8
2. Conducted soil sampling following the protocol established by the field or extension agent	7.2	8.4	8.2	7.3	7.0	10.3
3. Interpreted the results of the visual soil assessment and/or the soil analysis	10.2	8.4	11.5	9.6	10.0	8.6
4. Identified soil nutrition limitations based on crop nutrition needs	28.4	39.8	23.0	32.0	29.5	37.9
5. Made crop nutrition decisions based on interpretation of soil analysis and/or VSA results	5.7	19.3	6.6	8.7	7.5	13.8
6. None of the above	57.0	32.5	60.7	52.5	55.4	43.1

The results in Table 6 show that 37.9%, 13.8% and 10.3% were in areas of medium production level as compared to 30%, 16% and 7% respectively, in areas of high level of production.

Behavior 3: Addresses crop nutrition needs by applying the right products, at the right dose, at the right place and time

Several measures were used to meet the nutrient/fertilizer needs of both vanilla and other crops, based on the identified crop needs. These ranged from applying specific inputs to using specific practices. Figure 14 shows the measures used to meet the nutrient/fertilizer needs. Most farmers (56%) applied organic fertilizers; inorganic fertilizers were used by only 4% while a combination of both was used by 4% of the vanilla farmers. Practices such as application of the right dose of selected products, application of selected products in the right place according to the crop, the nutrients applied and plot slope; and application of selected products at the right time, were observed by 9%, 14% and 15% of the farmers, respectively.

Figure 14: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior “Evaluates soil condition and nutrients to assess soil nutrition limitations based on crop needs” competency, baseline (2021, N=413)

NRM Competency 3: Integrated soil fertility management Behavior 3: Addresses crop nutrition needs by applying the right products, at the right dose, at the right place and time

6. Applied organic fertilizers to meet their crops' nutritional needs.	56%
7. Applied inorganic fertilizers to meet their crops' nutritional needs.	4%
8. Combined organic and inorganic sources to meet their crops' nutritional needs.	4%
9. Applied the right dose of the selected products based on identified crop needs.	9%
10. Applied selected products in the right place according to the crop, the nutrients applied and plot slope.	14%
11. Applied selected products at the right time based on crops needs.	15%
12. Selected and applied selected products to correct soil acidity if needed.	2%
None	37%

Table 7 shows that all identified practices are applied by a higher proportion of farmers in the Central region than in the Western region. Use of organic fertilizers was more popular than inorganic fertilizers across regions, gender and production levels. Application of both organic and inorganic fertilizers was more commonly done by males (57% and 4%) than females (49% and 2%). Selection and application of selected products to correct soil acidity was the least used measure.

Table 7: Measures to meet the nutrient/fertilizer needs of vanilla and other crops

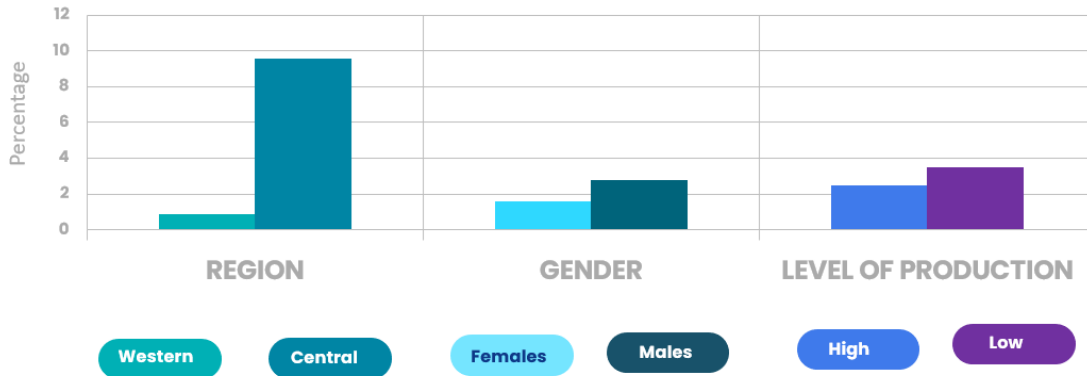
Measures to meet the nutrient/fertilizer needs	Region		Gender		Production level	
	Western (n = 334)	Central (n = 83)	Female (n = 61)	Male (n = 356)	High (n = 359)	Medium (n = 58)
6. Applied organic fertilizers	50.0	79.5	49.2	57.2	53.2	72.4
7. Applied inorganic fertilizers	1.2	14.4	1.6	4.2	3.1	8.6
8. Combined organic and inorganic fertilizers	2.7	10.8	1.6	4.8	3.3	10.3
9. Applied the right dose of the selected products	7.5	16.9	13.1	8.7	7.8	19.0
10. Applied selected products in the right place according to the crop, the nutrients applied and plot slope	10.8	24.1	8.2	14.3	12.5	19.0
11. Applied selected products at the right time	12.0	26.5	16.4	14.6	14.2	19.0
12. Selected and applied selected products to correct soil acidity	0.9	4.8	1.6	1.7	1.7	1.7
None of the above	44.0	10.8	49.2	35.4	39.6	24.1

A. Usage of inorganic fertilizers in vanilla fields

More farmers used inorganic fertilizers in the Central region (9.6%) than in the Western region (1%). Male vanilla farmers (3%) used inorganic fertilizers more than their female (2%) counterparts. In the high production areas, 3% of the farmers used inorganic fertilizers compared to 4% in the medium production areas (Fig 15).

Figure 15: Usage of inorganic fertilizers

Usage of inorganic fertilizers by region, gender and production level



B. Expenditure on inorganic fertilizers and transport costs

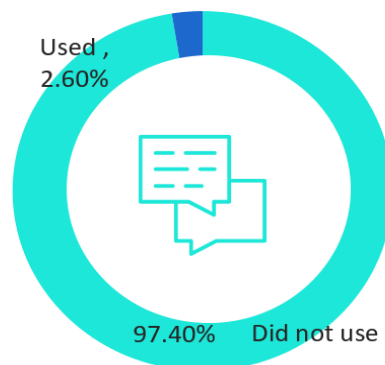
The cost of inorganic fertilizers was on average USD 6.8 with a standard deviation of USD 12 (Fig 16). The average cost was more than double in the Central region (USD 8.2) than in Western region (USD 3.1), similar to the cost of transporting the fertilizer.

Figure 16: Usage of inorganic fertilizers by region, gender and level of production

Use of Inorganic Fertilizers on Vanilla Fields

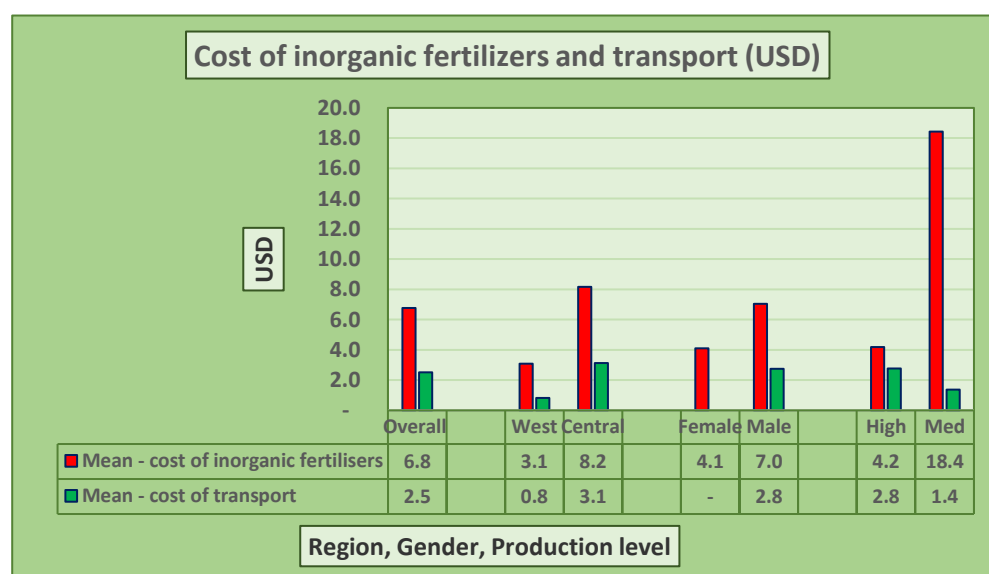
3/100 FARMERS

The survey results showed that only a minority (2.6%) of the farmers applied inorganic fertilizers on the vanilla fields



Male vanilla farmers spent more than the female farmers (USD 4.1), while areas of medium production level spent USD 18.4, which was four times as much as was spent in areas of high production (USD 4.2). The transport cost was reported to be higher in high production areas compared to medium production areas. The standard deviation of the cost of inorganic fertilizers was USD 12, and that of transporting fertilizers was USD 6, overall.

Figure 17: Average cost of inorganic fertilizers and transport (USD)

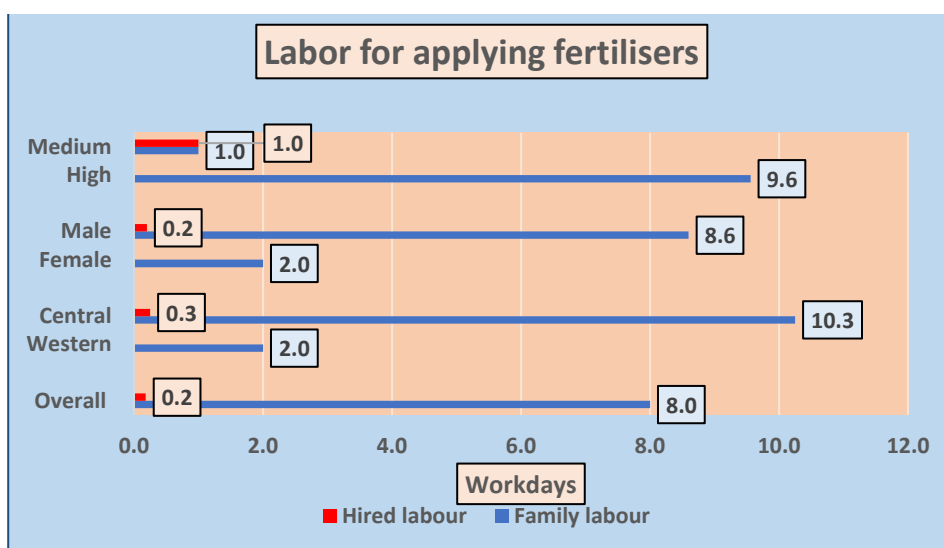


C. Workdays of family and hired labor used to apply inorganic fertilizers in vanilla fields

Vanilla farmers used more family labor than hired labor to apply inorganic fertilizers as shown in Fig 17. The mean number of days of family labor used, overall, was 8 compared to 0.2 days of hired labor. In the Western region, the farmers did not hire any labor to apply inorganic fertilizers. In the Central region, the farmers used 10.3 days of family labor on average to apply inorganic fertilizers. Male vanilla farmers (8.6) used more family labor days than the female farmers (2.0). The latter did not use any hired labor.

The results further show that the high production areas used eight times the family labor of what the medium production areas used, yet they did not hire any labor to apply inorganic fertilizers. The standard deviation of the workdays of family labor was higher in the Central region, for male farmers and in high production areas.

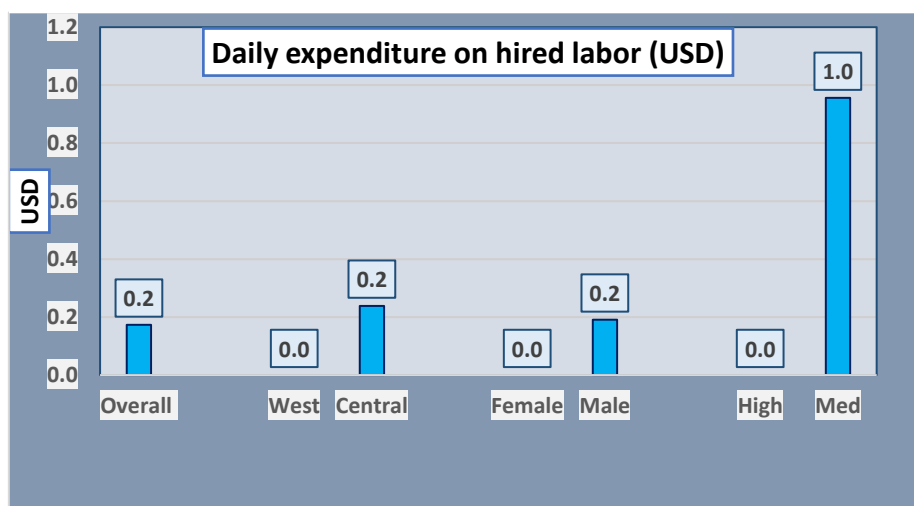
Figure 18: Workdays of family and hired labor used to apply inorganic fertilizers



D. Expenditure on hired labor (USD.)

The overall daily rate of hired labor was USD 0.2, similar to that in the Central region and for male vanilla farmers. The medium production areas incurred USD 1.0 daily on average as shown in Fig 19.

Figure 19: Daily expenditure on hired labor used to apply inorganic fertilizers (USD)



E. Organic manure/Compost application

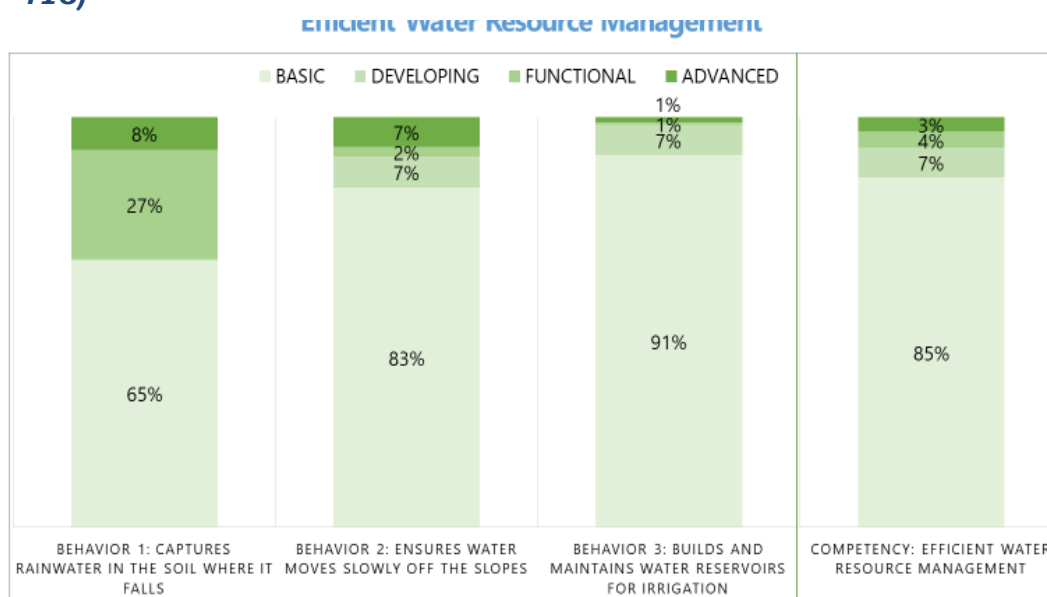
The survey results showed that 63% of the 413 farmers applied organic manure/compost to their vanilla fields. It cost USD 10 on average with a standard deviation of USD 48.6.

4.1.4 NRM Competency 4: Efficient water resources management

The percentage of farmers who have achieved the different levels of the three behaviors for the efficient water resources management competency, and of

the overall competency are presented in Figure 20. The results show that 85% of vanilla farmers have a “basic” level of this competency, and additional 7% a “developing” level of the competency, and only 8% have achieved a functional or advanced level of the competency. When this is disaggregated by behavior, it can be observed that more farmers demonstrate the behavior of building and maintaining water reservoirs for irrigation, and significantly less the other two behaviors.

Figure 20: Percentage of vanilla farmers by level of the efficient water resources management competency and by behavior at baseline (2021, N=413)



Behavior 1: Captures rainwater in the soil where it falls

Fig 21 shows that the majority (75%) of farmers kept the soil permanently covered with mulch, crop residues, living plants or other materials to keep moisture in the soil. About 30% of the farmers captured rainwater in the soil where it fell in structures such as zai holes/pits, half-moons/demi-lunes, box ridges while 20% broke hardened layers of soil to improve soil structure to increase water infiltration. Some farmers (17%) did not practice any of these measures.

Mulching the soil was practiced by almost all the farmers (95%) in the Central region as compared to 70% in the Western region. Very few females and males (about 20%) broke hardened soil layers to improve water infiltration.

Figure 21: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior captures rainwater in the soil where it falls competency at baseline (2021, N=413)

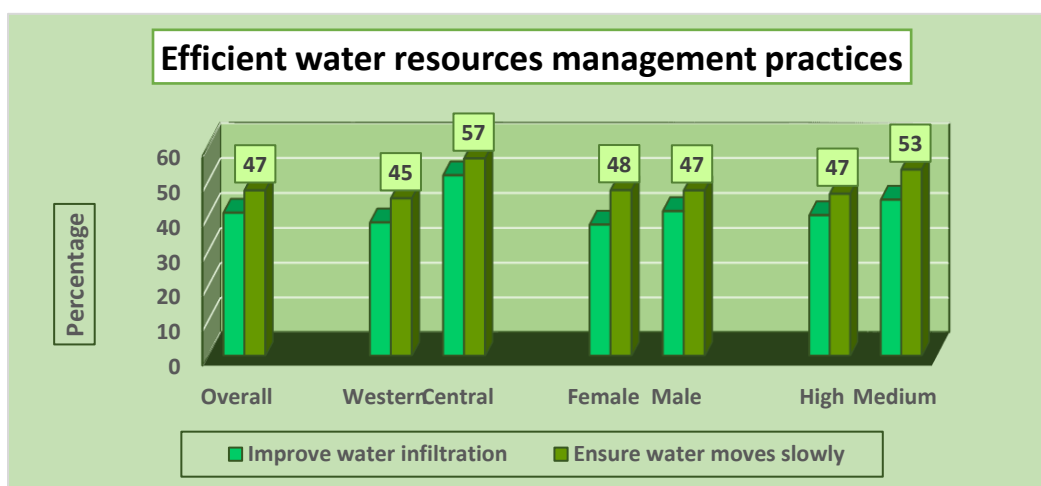
**NRM Competency 4: Efficient Water Resource Management
Behavior 1: Captures rainwater in the soil where it falls**

1. Captures rainwater in the soil where it falls (e.g., zai holes/pits, half-moons/demi-lunes, box ridges).	30%
2. Keeps the soil permanently covered with mulch, crop residue, living plants or other materials..	75%
3. Breaks hardened layers of soil to improve soil structure to increase water infiltration.	20%
None	17%

A. Practices to improve water infiltration and slowing down water

The survey results showed that more farmers implemented practices that ensured slowing down water off the slope (47%) than for improving water infiltration (41%). Fig 22 shows that more farmers implemented both practices in the Central than in the Western region. Female farmers practiced the former (48%) more than the later (38%). Forty-five percent (45%) and forty (40%) percent of the farmers improved infiltration of water; while 53% and 47% ensured water was slowed down on the slopes in medium and high production areas, respectively.

Figure 22:Water infiltration and slowing water down



Behavior 2: Ensures water moves slowly off slopes

Several practices were implemented to ensure that water moves slowly off the slopes in vanilla fields. Figure 23 shows the practices, which were implemented. The most common practice was building contour trenches along the slope (with or without infiltration pits) practiced by 40% of the farmers. This was followed by protecting contour trenches with vegetative cover, live barriers, or other materials (23%); planting vegetative cover or live barriers along the contour (18%); diverting runoff water to farmland and gardens during the rainy season (15%); planting crops in rows that are perpendicular to the slope (13%); and covering steep hillsides with trees or plants with strong roots (13%), in that order.

Figure 23: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior ensures water moves slowly off slopes competency at baseline (2021, N=413)

NRM Competency 4: Efficient Water Resource Management Behavior 2: Ensures water moves slowly off slopes

4. Built contour trenches along the slope (with or without infiltration pits).	40%
5. Planted vegetative cover or live barriers along the contour.	18%
6. Protected contour trenches with vegetative cover, live barriers, or other materials.	23%
7. Covered steep hillsides with trees or plants with strong roots.	13%
8. Planted crops in rows that are perpendicular to the slope.	13%
9. Diverted runoff water to farmland and gardens during the rainy season.	15%
None	44%

Building contours and protecting them was practiced more by females (42.6% and 23%) than by males (4.7% and 22.8%). For all the practices, there were more farmers implementing them in medium production areas than in the high production areas (Table 8).

Table 8: Practices to ensure water moves slowly off slopes

Practices to slow down water	Region		Gender		Level of production	
	Western	Central	Female	Male	High	Medium
Built contour trenches along the slope (with or without infiltration pits)	37.7	54.2	42.6	40.7	40.7	43.1
Planted vegetative cover or live barriers along the contour	16.5	22.9	16.4	18.0	17.8	17.2
Protected contour trenches with vegetative cover, live barriers, or other materials	18.3	41.0	23.0	22.8	21.5	31.0
Covered steep hillsides with trees or plants with strong roots	10.8	21.7	11.5	13.2	12.3	17.2
Planted crops in rows that are perpendicular to the slope	12.9	18.1	11.5	14.3	13.1	19.0
Diverted runoff water to farmland and gardens during the rainy season	12.9	21.7	14.8	14.6	13.9	19.0
None of the above	47.0	31.1	43.3	43.7	44.9	36.2

B. Expenditure on practices to improve water infiltration and slowing down water

Implementation of practices for water infiltration and slowing down water off the slopes were mainly carried out by the family. Overall, the mean workdays for families were 12.5 and 11.2 days for the two practices, respectively, compared to 4.8 and 4.3 days of hired labor (Table 9).

For both practices, male vanilla farmers used more family labor than the female counterparts. More family labor was used by the farmers in high production areas than those in medium production areas for both practices. The daily expenditure on hired labor was not significantly different, ranging from USD 0.7 and USD 1.1.

Table 9: Workdays and expenditure on improving water infiltration and slowing down water

Practice	Overall N = 356	Region		Gender		Level of production	
		Western	Central	Female	Male	High	Medium
Work days - Water infiltration practices							
Mean - family labor infiltration (n = 171)	12.5	12.9	11.5	7.6	13.3	13.0	10.1
Mean - hired labor infiltration (n = 171)	4.8	4.5	5.9	5.6	4.7	4.2	8.3
Work days - Practices to slow down water							
Mean - family labor (n = 198)	11.2	11.2	11.1	7.8	11.8	11.6	9.0
Mean - hired labor (n = 198)	4.3	3.8	5.9	4.1	4.4	3.5	8.8
Daily expenditure							
Mean cost - Water infiltration practices (USD.)	0.7	0.7	0.9	1.0	0.7	0.7	1.1
Mean cost - Practices to slow down water (USD.)	0.8	0.8	0.7	1.1	0.7	0.7	1.1

Behavior 3: Builds and maintains water reservoirs, and selects irrigation methods based on their efficiency and accessibility

Farmers used several practices to capture and store water. They also used the water for multiple purposes. The practices included building water reservoirs to capture and store excess runoff; protecting water reservoirs to reduce runoff; protecting water reservoirs to prevent contamination; and maintaining water reservoirs. Farmers also took measures to prevent mosquitoes from multiplying in water reservoirs; made joint decisions with their spouse/partner on the use of stored water; and selected irrigation methods based on their efficiency and accessibility. All these practices were adopted by less than 15% of the farmers, overall, as shown in Figure 24. The majority (71%) of the farmers did not practice any of them.

Figure 24: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior Builds and maintains water reservoirs, and selects irrigation methods based on their efficiency and accessibility competency at baseline (2021, N=413)

**NRM Competency 4: Efficient Water Resource Management
Behavior 3: Builds and maintains water reservoirs, and selects irrigation methods based on their efficiency and accessibility**

10. Built water reservoirs to capture and store excess runoff.	12%
11. Protected water reservoirs to reduce runoff.	10%
12. Protected water reservoirs to prevent contamination.	8%
13. Maintained water reservoirs.	11%
14. Took measures to prevent mosquitoes from multiplying in water reservoirs.	4%
15. Make joint decisions with their spouse/partner on the use of stored water.	6%
16. Selected irrigation methods based on their efficiency and accessibility.	4%
None	71%

Building water reservoirs (25.3%) was the most common practice in Central while protecting water reservoirs (10.2%) was common in the Western region (Table 10). Farmers in both high and medium production areas mostly built water reservoirs for capturing and storing water.

Table 10: Practices used in capturing and storing water for multiple purposes

Practices	Overall N = 417	Region		Gender		Production level	
		Western	Central	Female	Male	High	Medium
1. Built water reservoirs to capture and store excess runoff	12.2	9.0	25.3	11.5	12.4	11.4	17.2
2. Protected water reservoirs to reduce runoff	9.8	10.2	8.4	14.8	9.0	9.8	10.3
3. Protected water reservoirs to prevent contamination	7.9	8.1	7.2	13.1	7.0	7.8	8.6
4. Maintained water reservoirs	10.8	9.3	16.9	13.1	10.4	10.9	10.3
5. Took measures to prevent mosquitoes from multiplying in water reservoirs	4.8	5.1	3.6	4.9	4.8	4.7	5.2

Practices	Overall 1 N = 417	Region		Gender		Production level	
		Wester n	Centra l	Femal e	Mal e	Hig h	Mediu m
6. Make joint decisions with their spouse/partner on the use of stored water	6.7	5.7	10.8	8.2	6.5	6.7	6.9
7. Selected irrigation methods based on their efficiency and accessibility	3.6	3.3	4.8	6.6	3.1	2.5	10.3
8. None of the above	71.0	75.5	53.0	70.5	71.1	72.1	63.8

C. Irrigation of vanilla fields

Table 11 shows that 84% of the vanilla farmers did not practice any kind of irrigation on their vanilla fields. More farmers in the Central region (27%) irrigated than in the Western region (13%). Female (19%) farmers irrigated more than the male (15%) farmers; and medium (38%) production areas irrigated more than the high (12%) production areas.

Table 11: Irrigation practices and expenditure

	Overall N = 417	Region		Gender		Production level	
		Western n = 335	Central n = 83	Female n = 61	Male n = 356	High n = 359	Medium n = 58
Irrigated (% farmers)	15.8	13.2	26.5	19.7	15.2	12.3	37.9
% of vanilla field irrigated (N=587.7 acres)	17.6	5.9	11.7	2.7	14.9	8.5	9.1
Expenditure on irrigation (USD.)	20.1	9.9	33.1	13.1	21.9	18.4	22.8

In terms of acreage, 17.6% of the land under vanilla was irrigated. The Central region had the highest percentage of the vanilla field under irrigation (11.7%) compared to 5.9% in Western region. Although more female farmers reported to be irrigating their vanilla fields more than the male farmers, the proportion of their vanilla field irrigated (2.7%) was lower than that of male farmers (14.9%). This could be attributed to the small size of vanilla fields owned by women compared to men.

4.1.5 NRM Competency 5: Continuous learning and innovation

The percentage of farmers who have achieved the different levels of the three behaviors for the continuous learning and innovation competency, and of the overall competency are presented in Figure 25. The results show that 90% of vanilla farmers have a “basic” level of this competency, and additional 5% a “developing” level of the competency, and only 5% have achieved a functional or advanced level of the competency. When this is disaggregated by behavior, it can be observed that more farmers demonstrate the behavior of implementing and sharing solutions that work, and significantly less the other two behaviors.

Figure 25: Percentage of vanilla farmers by level of the continuous learning and innovation competency and by behavior at baseline (2021, N=413)

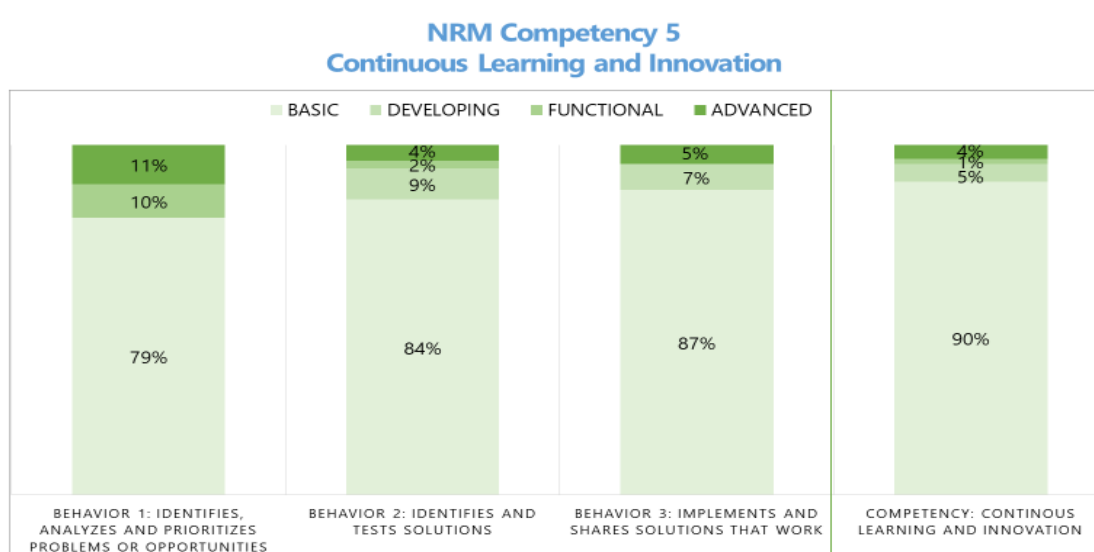
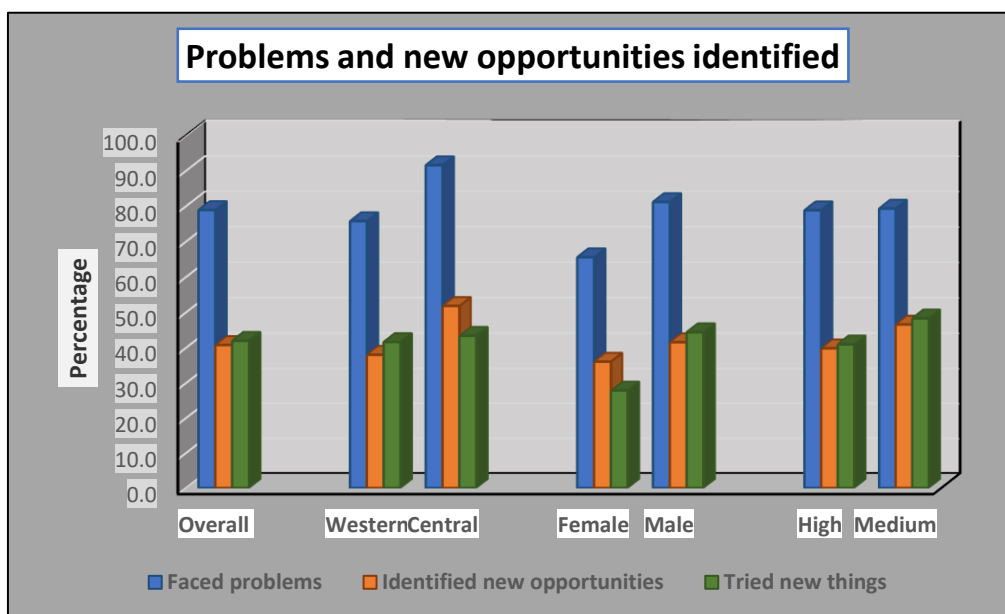


Fig 26 shows that 79% of the vanilla farmers faced problems in relation to vanilla production activities and/or the management of the vanilla fields; 41% identified new opportunities in relation to vanilla production activities and/or the management of vanilla fields; and 42% tried out new things to address identified problems or opportunities. In all groups of respondents, the proportion of farmers who identified new opportunities was about half of that which had faced problems.

Figure 26:Problems and opportunities identification



Behavior 1: Identifies, analyzes and prioritizes problems or opportunities

Several actions were taken to address problems faced and to exploit the opportunities identified by the farmers. Figure 27 shows different actions. About 30% of the farmers identified problems and opportunities for innovation while 21% analyzed them and 14% prioritized problems and/or opportunities for innovation.

Figure 27: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior “Identifies, analyzes and prioritizes problems or opportunities” competency at baseline (2021, N=413)

**NRM Competency 5: Continuous Learning and Innovation
Behavior 1: Identifies, analyzes and prioritizes problems or opportunities**

1. Identified problems and opportunities for innovation.	30%
2. Analyzed problems and opportunities for innovation.	21%
3. Prioritized problems and/or opportunities for innovation.	14%
None	65%

Behavior 2: Identifies and tests solutions to address problems or opportunities

Twenty eight percent (28%) of the farmers accessed information, including local knowledge, to identify solutions or innovations; 10% established trials to compare identified solutions with traditional practices; and 12% selected the most appropriate solutions that address identified problems or opportunities. The majority (64%) did not display any of these behaviors (Fig 28)

Figure 28: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior Identifies and tests solutions to address problems or opportunities competency, baseline (2021, N=413)

NRM Competency 5: Continuous Learning and Innovation Behavior 2: Identifies and tests solutions to address problems or opportunities

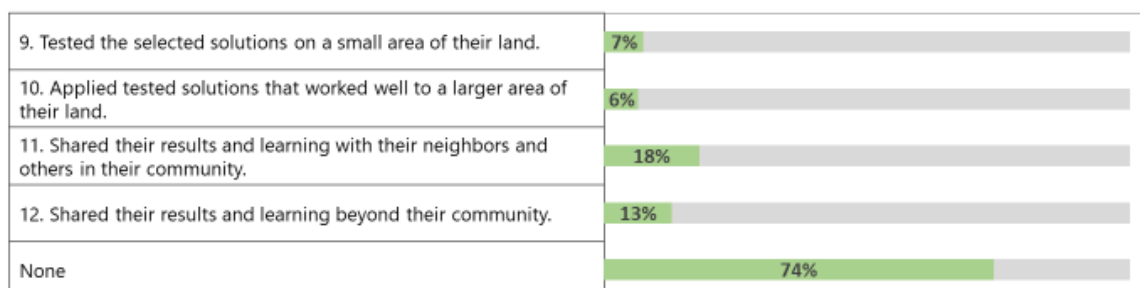
4. Accessed information, including local knowledge, to identify solutions or innovations.	28%
5. Established trials to compare identified solutions with traditional practices.	10%
6. Recorded observations of their comparisons between identified solutions and traditional practices.	7%
7. Evaluated the results of these comparisons to make decisions.	7%
8. Selected the most appropriate solutions that address identified problems or opportunities.	12%
None	64%

Behavior 3: Implements those solutions that work, and shares them within and beyond the community

To implement solutions that work and sharing them within and beyond the community, 18% of the farmers shared their results and learning with their neighbors and others in their community; while 13% shared their results and learning beyond their community. The majority (74%), however, did not share solutions that work (Figure 29).

Figure 29: Percentage of vanilla farmers who demonstrated actions that provide evidence of the behavior “Implements those solutions that work, and shares them within and beyond the community” competency at baseline (2021, N=413)

**NRM Competency 5: Continuous Learning and Innovation
Behavior 3: Implements those solutions that work, and shares them within and beyond the community**



Generally, more farmers in the Central region displayed the three behaviors as compared to those in the Western region.

Table 12: Actions taken to address identified problems and/or opportunities

Actions taken	Overall %	Region		Gender		Level of production	
		Western	Central	Female	Male	High	Medium
1. Identified problems and opportunities for innovation	29.5	28.4	33.7	26.2	30.1	30.4	24.1
2. Analyzed problems and opportunities for innovation	20.6	18.3	30.1	24.6	19.9	20.1	24.1
3. Prioritized problems and/or opportunities for innovation	13.7	12.6	18.1	11.5	14.0	13.7	13.8
4. Accessed information, including local knowledge,	27.3	24.9	37.4	16.4	29.2	26.2	34.5

Actions taken	Overall %	Region		Gender		Level of production	
		Western	Central	Female	Male	High	Medium
to identify solutions or innovations							
5. Established trials to compare identified solutions with traditional practices	9.6	6.6	21.7	6.6	10.1	8.6	15.5
6. Recorded observations from comparisons between identified solutions and traditional practices	6.7	3.6	19.3	3.3	7.3	6.1	10.3
7. Evaluated the results of these comparisons to make decisions	6.5	4.5	14.5	4.9	6.7	6.1	8.6
8. Selected the most appropriate solutions that address identified problems or opportunities	11.5	8.7	22.9	14.8	11.0	10.0	20.7
9. Tested the selected solutions on a small area of their land	7.2	5.1	15.7	8.2	7.0	6.4	12.1
10. Applied tested solutions	6.5	2.4	22.9	8.2	6.2	4.5	19.0

Actions taken	Overall %	Region		Gender		Level of production	
		Western	Central	Female	Male	High	Medium
that worked well to a larger area of their land							
11. Shared their results and learning with their neighbors and others in their community	18.2	16.5	25.3	14.8	18.8	17.6	22.4
12. Shared their results and learning beyond their community	13.2	10.5	24.1	14.8	12.9	12.5	17.2

4.2 Use of Agricultural Techniques and Technologies (IR 1.2)

4.2.1 Vanilla farmers surveyed

A total of four hundred seventeen (417) vanilla farmers were surveyed, the majority (86%) of whom were male. They were distributed in 12 districts as shown in Table 1.

4.2.2 Land tenure and costs

A. Land ownership

Of the surveyed vanilla farmers, 98% owned all the land on which they planted vanilla. Although the rest did not own all the land, the survey results showed that none of the farmers rented land for vanilla farming. The rest of the farmers either used family land or accessed it free of charge according to traditional land ownership and rights systems as explained by key informants. There were no major differences in land ownership between males and females, level of production and by region as indicated in Table 13.

Table 13: Land ownership by gender, region and level of production

Ownership of all land under vanilla		% of vanilla farmers
Overall		97.6
By gender	Female	98.2
	Male	97.5
By region	Western	97.5
	Central	97.6
By level of production	High	98.8
	Medium	97.3

B. Vanilla field characteristics

Vanilla field characteristics are shown in Table 14. The size of the vanilla field was reported to be an average 0.47 Ha and a standard deviation of 297,026 Ha. The number of vanilla vines planted on the field varied from 1 to 40,000 with an average of 436 vines. While the average number of vines under production was 207. The maximum was reported as 25,000 vines. There were vanilla fields that were less than a year old while the average was 6 years.

Table 14: Vanilla field characteristics

Characteristic	Mean	Std. Dev
Vanilla field size (Ha)	0.47	297,026
Vanilla vines in the field (No.)	436	1,878
Vanilla vines under production (No.)	207	1,162
Age of vanilla field (Years)	5.7	23.0

4.2.3 Land preparation

Of the 413 vanilla farmers surveyed, 59% prepared land for planting vanilla vines. This section presents findings on the amount of labor used in land preparation and the cost of labor hired in land preparations as summarized in Table 15 below.

Table 15: Land preparation by gender, region and level of production

Category	Disaggregation	Land preparation for vanilla planting					
		Workdays of family members (n = 242)		Workdays of hired labor (n = 242)		Average payment to hired labor per day (USD.)	
		Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Overall (N = 413)		34.2	61.8	8.6	24.3	0.83	1.71
Gender	Female	30.1	68.5	2.6	5.0	1.06	3.07
	Male	34.8	61.0	9.4	25.7	0.79	1.43
Region	Western	36.0	68.0	7.3	21.2	0.78	1.73
	Central	30.1	43.9	11.6	30.6	0.93	1.67
Level of production	High	35.5	63.2	7.2	20.5	0.79	1.72
	Medium	27.0	53.4	16.6	38.8	1.05	1.70

A. Labor used in preparing land for planting

Vanilla farmers used both family members and hired labor in preparing land for vanilla planting. Table 15 shows that overall, some farmers did not use family labor or hired labor while the maximum number of workdays was 360 and 200 with an average of 34.2 and 8.6, respectively. Across all categories, family members were engaged more than hired labor. Female vanilla farmers used 300 workdays of family members compared to only 15 workdays of hired labor. The same trend was followed for male farmers, across regions and across levels of production.

B. Cost of land preparation for planting

The cost of preparing land for planting using hired labor varied widely with a mean of USD 0.83 and standard deviation of USD 1.71. Female farmers (USD 1.06) spent more than what the male farmers spent (USD 0.79) per workday. At regional level, farmers in Central spent more (USD 0.93) than those in Western (USD 0.78). Areas of high level of production spent less (USD 0.79) than those in medium level of production as shown in Table 15.

4.2.4 Vanilla planting

A. Farmers who planted vines

Table 16 shows that, of the surveyed 413 vanilla farmers, 52% planted new vanilla vines during the reporting period. Of these the majority (88.4%) were male farmers. In the Western region, 65.1% planted vines and in the area of high level of production, 82.3% of the vanilla farmers planted vines during that period.

Table 16: Farmers who planted and number of vines planted

	Gender		Region		Level of production			
	No.	%	F	M	Western	Central	High	Medium
Number (Farmers)	215	52.0	11.6	88.4	65.1	34.9	82.3	17.7
Number (Vines)- Mean	194		74	209	112	345	215	93
Std dev (Vines)	1,365		92	1,451	167	2,302	1,503	113

B. Vines planted

Farmers planted a varied number of vanilla vines with a mean of 194. Male (209) vanilla farmers planted about thrice the number for females (74). Farmers in the Central region planted an average of 345 compared to 112 in the Western region (Table 16). Areas of high (215) production had more than double the number in medium (93) areas of production.

C. Area planted and cost of labor

The area planted was on average 0.5 Ha and standard deviation of 4.1 Ha. Table 17 shows that most farmers used family labor as reflected by the number of workdays (365) of family labor compared to 90 workdays of hired labor. The average cost of hired labor was reported to be USD 0.39 per workday.

Table 17: Vanilla vines planted, area; type and cost of labor

Variable	Values	
	Mean	Std. Dev
Area planted with these vines (Ha)	0.5	4.1
Workdays of family labor used in planting vines (No.)	15.5	43.0
Workdays of hired used in planting the vines (No.)	2.8	11.8
Cost of hired labor (USD per workday)	0.39	1.04

D. Number of vines purchased

The number of vines purchased varied between 50 and 362 with a mean of 212. The mean number of vines purchased was 50 for females and 237 for males. In Western region, the mean number of vines purchased was 113 and 362 in the Central region (Table 18). The mean number of vines purchased was lower in the medium (97) production areas than in high (248) production areas.

Table 18: Number of vines purchased, unit price (USD and transport cost (USD)

Category	Disaggregation	Number of vanilla vines purchased		Price paid per vine (USD)		Transport cost (USD)	
		Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Overall		212	1,028	0.72	0.58	5.43	10.83
By gender	Female	50	57	0.49	0.27	2.16	5.20
	Male	237	1,106	0.76	0.60	5.95	11.42
By region	Western	113	145	0.56	0.51	4.01	6.60
	Central	362	1,631	0.97	0.59	7.61	15.08
By level of production	High	248	1,181	0.58	0.50	4.89	7.97
	Medium	97	106	1.15	0.58	7.08	17.03

NOTE: There was a slight disparity between the mean number of vines planted in D above (194) and the mean number of vines purchased (212). This is largely because the number of farmers who planted was higher including farmers who never bought vines but acquired them from their gardens or free from friends; compared to those who purchased vines, hence affecting computation of averages.

E. Source and price of vanilla vine

The majority (98%) of vanilla farmers bought vanilla vines from fellow farmers while only 1% accessed them from the processors. The average cost of a vine was reported to be USD 0.72. The average price paid by females was USD 0.49 lower than that paid by males (USD 0.76). Table 18 shows that the price per vine was USD 0.56 in Western compared to USD 0.97 in Central region. The price was lower in areas of high (USD 0.58) level of production than in areas of medium (USD 1.15) level of production.

The above findings were closely related with qualitative data collected from the district technical and political leaders interviewed. Generally, the leaders confirmed that while farmers could access planting materials for vanilla, their availability was limited. For example, for farmers within the operational scope of RFCU, there were reports attesting to availability, supply reliability and quality as summarized by key informant:

On the other hand, leaders in many districts cited limitations for farmers to access vanilla planting materials as being: limited in supply due to seasonality of materials; regulatory restrictions limiting transportation of planting materials; and high prices.

F. Transport costs

Table 18 shows the cost incurred in transporting vanilla vines, disaggregated by gender, region and level of production. Transporting vanilla vines cost the farmers on average USD 5.43, with a standard deviation of USD 10.83. The results also, showed that farmers in medium level of production areas incurred higher costs (USD 7.08) as compared to the farmers in high level of production areas who incurred USD 4.89 on average. Farmers in the Central region incurred a higher transport cost (USD 7.61) compared to USD 4.01 spent by farmers in the Western region. The variations are attributed to volumes purchased, means of transport, distances covered and other factors such as condition of the roads depending on the climatic season.

4.2.5 Vanilla vines management practices

Evaluation of farmer competencies in vanilla vines management practices focused on the following 5 practices namely:

- a) preparation for planting vines;
- b) management of vanilla vines and tutors;
- c) Vanilla training, pruning, looping, shade tree pruning, weeding, and mulching;
- d) Pollination; and
- e) Pests and Disease control.

A. Preparation for planting vanilla vines

To prepare for planting vines, farmers carried out different activities and implemented varied practices. These included:

- a) Selecting a suitable site for planting with fertile soils (21%);
- b) Selecting well drained soils that prevent waterlogging (12%);
- c) Sourcing tutors/support trees, matching tutor purchases with vine purchases (18%); and
- d) Preparing land for the tutors (18%), among others.

Table 19: Actions taken in preparation for planting the vines

Actions/Practices	% of farmers
1. Selected a suitable site for planting, with fertile soils	20.9
2. Selected well drained soils that prevent waterlogging	11.6
3. Sourced tutors/support trees, matching tutor purchases with vine purchases	18.0
4. Prepared land for tutor/support tree planting	18.2
5. Planted tutors/support trees 4-5 months before planting the vanilla vines to ensure that they reach the needed thickness (5 cm) and height (about 6 ft) to allow proper growth of the vine	8.4
6. Sourced quality and disease-free vines of a length over 1 meter from mother gardens	9.1

7. Prepared mulch and organic manure to restore soil and water and support the planted vines	12.1
None of the above	1.5

Some farmers prepared mulch and organic manure to restore soil and water, and support the planted vines, yet some (1.5%) did not perform any of the identified practices. Table 19 shows the different practices and actions.

A. Management of vanilla vines and tutors/support trees

Mulching vanilla fields with dry grass and other materials dominated the practices carried out when managing vanilla vines and tutors/support trees as reported by 71% farmers, followed by training vines firmly (64%), and conducting hand weeding to ensure minimal soil disturbance (57%). Table 20 shows other practices associated with application of manure, pollination, pruning and looping. However, only less than 3% of the farmers did not apply for any of these practices.

Table 20: Practices applied to manage vanilla vines and tutors/support trees

Practices	% of farmers
1. Mulched the vanilla field with dry grass, crop residues and leaf litter towards the end of the rainy season; and pruned vines to maintain a maximum of 8 loops, removing old, diseased, weak, and damaged vines	71.2
2. Trained vines firmly on the tutors/support trees, to facilitate looping, pollination and harvesting	63.9
3. Conducted hand weeding ensuring minimal soil disturbance	56.7
4. Pruned the tutors/support trees to regulate the amount of shade and sun	37.2
5. Looped vines at two feet from the tutor during the rainy season	31.7
6. Covered looping area with a combination of soil and mulch	31.0
7. Produced organic manure using kitchen refuse/waste, crop residues and animal droppings	26.2
8. Applied organic manure/compost to the soil around the vine and intercrops during the rainy season	23.7
9. Pollinated 10-12 flowers per cluster	20.1
10. Limited the number of vanilla clusters to 10-20 per vine depending on soil and water conditions	11.4
11. Limited the number of beans per cluster to 8-12 for avoiding excessive bearing and stressing of the plant and increase in bean size	9.0
12. Used vermiculture (growing of earthworms) to produce high quality compost	2.2

Practices	% of farmers
13. None of the above	2.2

C. Vanilla trimming, pruning, looping, shade tree pruning, weeding, and mulching

Of the 413 farmers, 89% trained, looped, pruned vanilla and shade trees, weeded and mulched their vanilla fields. Table 21 shows that they used an average of 25.3 workdays of family labor and 5.1 workdays of hired labor for which the cost was USD 0.53 per workday. Pollination of vanilla flowers was done by 86.4% of the farmers using 54.9 workdays of family labor and 14.3 workdays of hired labor, which cost them USD 2.48.

D. Vanilla pollination

Table 21 shows that most commonly (72%), more respondents reported that adult men above 30 years of age are the ones who pollinate vanilla. This dominance of men in undertaking pollination is a reflection of gender imbalances in the ownership and access to land, hence fewer women owning vanilla gardens (*see a detailed presentation of gender equality and inequality*

Agronomic practice	% of farmers (n = 413)			Pay for hired labor per workday (USD)
	Yes	Family workdays	Hired workdays	
a) Farmers who trim, prune, or loop your vines, prune your shade trees, mulch or weed Vanilla fields.	89.4	25.3	5.1	0.53
b) Farmers that pollinate vanilla flowers.	86.4	54.9	14.3	2.48
c) Household member that usually pollinates:				
d) Adult men (30+ years)	72.4			
e) Adult women (30+ years)	23.1			
f) Young male adults (18-29)	23.7			
g) Young female adults (18-29)	6.5			
h) Male children	9.6			
i) Female children	3.7			

issues in 4.1.4) In all categories, more males pollinated than their female counterparts. While more male children (10%) than female children (4%) pollinated.

Table 21: Vanilla management agronomic practices

E. Pests and disease control

Pests and disease control was done by 59% of the farmers who used a number of practices. Table 22 shows that use of cultural practices to control pests and diseases was most common, reported by 40% of the farmers. Monitoring the fields to identify the presence of diseases, scouting the fields and ensuring timely weeding were the most common practices. The results show that these were practiced by 39%, 28% and 26%, respectively. Thirty-one percent (31%) of the farmers did not use any of the practices.

Table 22: Pests and disease control practices

Practices	% of farmers n = 245
1. Used cultural practices (hand picking, destroying pests where possible)	40.0
2. Monitored the vanilla fields to identify the presence of diseases	39.2
3. Scouted the vanilla fields for pests such as slugs, snails, and caterpillars	27.6
4. Ensured timely weeding as part of the pest and disease control method	25.7
5. Ensured timely pruning of vines, tutors/support trees, and shade trees as part of the pest and diseases control methods	21.3
6. Prevented vanilla diseases by using clean and good quality vines	17.9
7. Prevented vanilla diseases by avoiding waterlogging	9.4
8. Used botanical pesticides whenever possible	8.0
9. Applied pesticides only if pest and disease thresholds have been reached	4.6
10. None of the above	31.0

4.2.6 Vanilla harvesting

The harvesting period for the main harvest was April 2021 to September 2021. During the harvest, the majority (59%) of farmers harvested their vanilla in July 2021; 32% in June and the minority (3.7%) in May 2021. In the fly harvest, 42% of the farmers harvested their vanilla in December 2020; 30% in January 2021 and 17.9% in September 2020 (Table 23). Both harvests lasted six calendar months with the fourth month being the busiest.

Table 23: Harvesting period during for main and fly harvests

Main (n = 349)		Fly (n = 333)	
Period	% of farmers	Period	% of farmers
April 2021	5.0	September 2020	17.9

Main (n = 349)		Fly (n = 333)	
Period	% of farmers	Period	% of farmers
May 2021	3.7	October 2020	10.2
June 2021	32.3	November 2020	10.6
July 2021	58.7	December 2020	42.0
August 2021	8.0	January 2021	30.3
September 2021	8.7	February 2021	10.6

4.2.7 Green vanilla yield

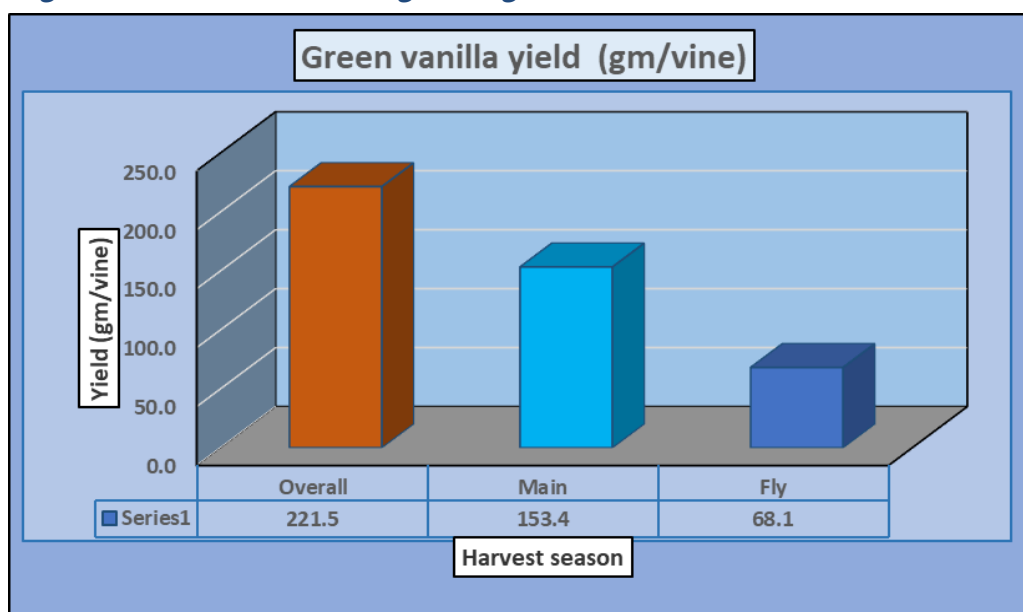
Indicator 1. Yield of Targeted Agricultural Commodities among Program Participants with USDA Assistance (Baseline Value = 0.221kg/Vine)

The number of vines under production was reported to be 99,576 and it was assumed to be uniform for both seasons. The total volume of vanilla harvested was 22,060 kg, with 15,273 kg in the main harvest and 6,787 kg in the fly season as shown in Table 24. The survey results showed that some vanilla was lost in the garden due to thefts. This was estimated to be 4,313 kg with 2,741 kg and 1,573 kg in the main and fly harvests, respectively.

Table 24: Vanilla harvested and loss to thefts by harvest period

	Harvest seasons		Total
	Main	Fly	
Vines under production	99,576	99,576	99,576
Vanilla harvested (kg)	15,273	6,787	22,060
Vanilla lost due to thefts (kg)- estimated	2,741	1,573	4,313
Sum of harvested and lost (kg)	18,014	8,360	26,374
Yield - less lost (gm/vine)	153.4	68.2	221.5
Yield - including lost (gm/vine)	169.2	95.7	264.9
% Vanilla lost (Estimated)	18%	23%	20%

The yield of green vanilla was 221.5 gm/vine, however, when vanilla lost due to thefts is considered, the production per vine increases to 264.9 gm/vine. The yield in the main harvest season was 153.4 gm/vine while that of the fly harvest season was 68.1 gm/vine as shown in Figure 30. The estimated amount of vanilla lost due to thefts was estimated at 43.1 gm/vine, which contributed to the reduction in yield per vine from 264gm/vine to 221.5gm/vine.

Figure 30: Green vanilla yield by harvest season

4.2.8 Adoption of improved agronomic practices

Indicator 10. Number of Hectares under Improved Management Practices or Technologies that Promote Improved Climate Risk Reduction and/or Natural Resources Management with USDA Assistance (Baseline Value = 2830)

Vanilla farmers adopted a number of recommended agronomic practices. The number of individuals in the agriculture system who reported to have applied improved management practices or technologies were 461 comprising 88%. The practices were applied to 608 Ha equivalent to 56% of the acreage under vanilla. The baseline value was computed as 2830Ha.

4.2.9 Challenges faced by vanilla farmers

Vanilla farmers faced several challenges as listed in Table 25. The top 11 challenges were common and equally important in both main and fly harvest periods. Vanilla theft ranked highest in both periods with 80% and 76% mentioning it as the most important challenge, followed by pests and diseases, which attack the crop.

Other challenges that ranked high were no pollination, flower abortion, unpredictable or erratic rainfall and drought. Others were lack of markets, low prices, fluctuation of both markets and prices; and high labor costs.

Table 25: Challenges faced by vanilla farmers by harvest period

Challenges	Main		Fly	
	% of farmers	Rank	% of farmers	Rank
Vanilla theft	80.3	1	76.0	1
Pest and diseases	62.3	2	55.6	2
No pollination	61.3	3	24.0	6
Flower abortion	59.7	4	53.8	3
Unpredictable or erratic rainfall	43.0	5	20.7	7
Drought	24.7	6	13.5	10
Lack of markets	23.3	7	17.9	8
Low prices	21.0	8	51.3	4
Price or market fluctuations	19.7	9	35.3	5
High labor costs	18.3	10	13.8	9
Illness	11.0	11	9.1	11
Accident	6.7	12	1.5	17
Death of a family member	6.7	13	2.6	14
Indebtedness	6.0	14	2.6	15
Limited access to inputs	6.0	15	3.6	13
Limited access to vanilla-specific extension services	1.7	16	4.4	12
Floods	1.7	17	2.6	16
None of the above	0.7		2.6	

4.3 Farm Operational and Financial Management (IR 1.3)

Indicator 20. Number of Farmers who have Reached at Least a Functional Level of Financial and Marketing Competencies as a Result of USDA Assistance (Baseline Value = 44)

This indicator evaluates the number of vanilla producers who have achieved at least a functional level of **financial competencies** reflected in:

- 1) **Effective Financial Management:** Managing finances to meet cash needs and save by identifying cash flows throughout the year, establishing financial goals, prioritizing expenses and following a budget;

Saving for a Purpose: Saving to achieve a set purpose by making and following a savings plan and setting aside surplus income to establish a fund to cover costs should an emergency arise; and

- 2) **Borrowing wisely:** Borrowing responsibly to meet cash needs by accessing loans based on repayment capacity, using loans for the intended purpose, and timely loan repayment

Findings showed that 44 vanilla producers achieved at least a functional level of Financial and Marketing competencies

4.3.1 Effective Financial Management

A. Management of finances

Farmers took on different ways of managing their finances. On average, only 20% of the farmers had adopted the different financial management practices assessed. The main ones shown in Table 26 included establishing financial goals, which was reported by 32% of the farmers, followed by identifying cash flows throughout the year (29%), prioritizing expenses (23%), registering incomes and expenses throughout the year (22%) and identifying times during the year when they could save (22%).

Table 26: Financial management practices

Practices	% of farmers
1. Established their financial goals	32.1
2. Identified their cash flow throughout the year	29.4
3. Prioritized expenses	23.4
4. Registered their income and expenses throughout the year	22.1
5. Identified times during the year when they could save	21.9
6. Identified unnecessary expenses that could be avoided, and the money saved	14.1
7. Identified times during the year when they will need loans	13.9
8. Followed their planned budget	13.1
9. Prepared a weekly budget	8.5
10. None of the above	33.1

4.3.2 Saving for a purpose

This section presents findings on the baseline status of two farmer practices regarding saving for a purpose:

A. Savings practices

Among the practices observed by farmers while saving incomes, were setting a purpose for saving (51.3%), identifying a place to save (37%), specifying the amount to save (34%) and saving the planned amount (29%). Other practices

included specifying the frequency of saving, saving more when there was a surplus, saving regularly and establishing an emergency fund. About 20% of the farmers, however, reported that they were not practicing any of these as shown in. Table 27 below

Table 27: Savings practices

Practice	% of farmers
1. Set a purpose for saving	51.3
2. Identified a place to save	37.0
3. Specified the amount to be saved	34.8
4. Saved the amount planned	29.0
5. Specified the frequency of their savings	19.7
6. Saved more when there is an income surplus	16.1
7. Saved regularly at the planned frequency	15.3
8. Established an emergency fund	8.3
9. None of the above	19.7

B. Source of financial services

The main sources of financial services were cited as banks, mobile money and Savings, Credit and Cooperative Organizations or Societies (SACCOS). The results in Fig 31 show that SACCOS were the most common source reported by 38% of the farmers, followed by mobile money by 26% and banks by 19%. Other sources, which were not specified, were used by 17% of the vanilla farmers.

Figure 31: Source of financial services

Source of Financial Services for Vanilla Farmers

38%

SACCO

Savings, Credit and Cooperative Organizations or Societies (SACCOS).

17%

Others



26%

Mobile Money

Mobile money refers to electronic financial services performed via a mobile phone. These include; "mobile banking", "mobile payments" and "mobile transfers".

19%

Banks

4.3.3 Borrow wisely

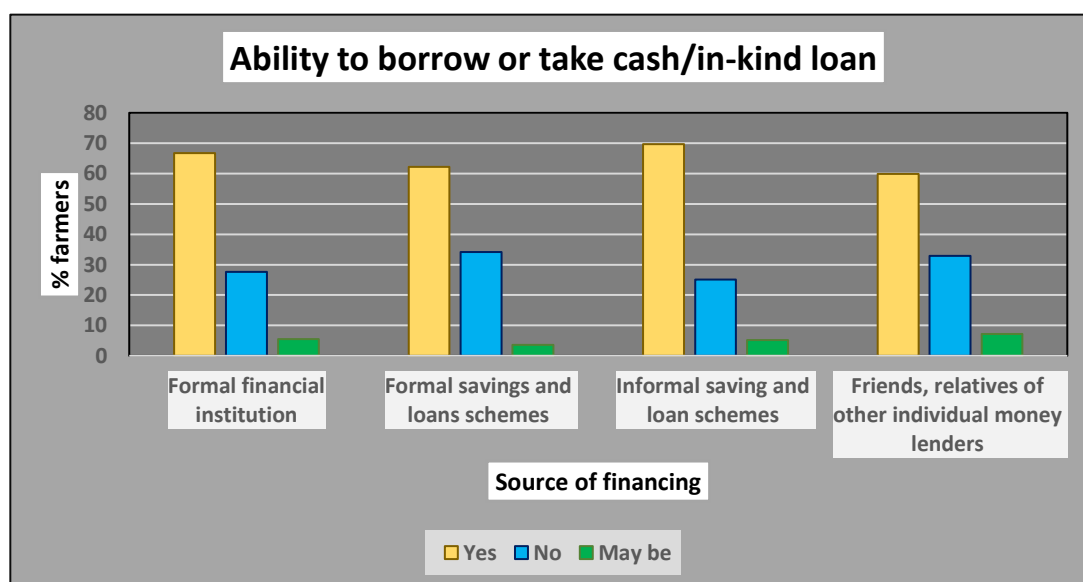
Indicator 16. Number of Individuals Accessing Agriculture-Related Financing as a Result of USDA Assistance (Baseline Value = 61)

Findings showed that 61 farmers (14.8%) reported that they accessed financing for their agriculture activities from formal financial institutions. The average amounts accessed in the Central region were USD 338.8 (standard deviation of USD 321.1) and USD 491.1 in the Western region (standard deviation of USD 706), with an overall average of USD 421.2 (standard deviation of USD 564).

A. Ability of household members to take a loan or borrow cash/in-kind

Fig 32 shows the ability of farmers and other household members to access cash/in-kind borrowing from different sources of financing. The financial institutions included formal financial institutions; formal and informal savings; loan schemes; and friends, relatives as well as other individual money lenders. Of the 307 respondents, more than 60% of farmers reported that their households were able to borrow from all the financial institutions.

Figure 32: Ability to borrow/take a cash or in-kind loan from a financial institution



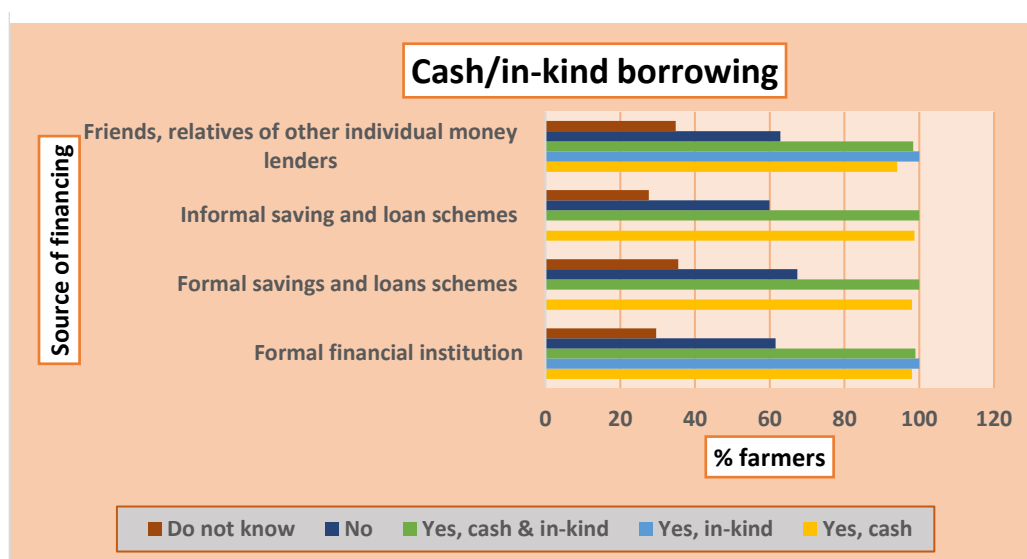
Informal savings and loans schemes were the most common choice reported by 70%, followed by formal financial institutions (67%), formal savings and loans schemes (62%); while friends and individual money lenders reported by 60%. Thirty-four percent of the farmers reported that none of the household members was able to borrow from formal savings and loans schemes; 33%

could not borrow from friends and individual money lenders; and 28% could not borrow from formal financial institutions.

B. Borrowing by household members

The survey results showed that some household members had borrowed cash or in-kind or both from different financial institutions. Fig 33 shows that all the 307 households and members had accessed in-kind loans from formal financial institutions and from friends, relatives and individual money lenders. On the other hand, in all the households, members had accessed a combination of cash and in-kind borrowing from formal and informal savings and loans schemes.

Figure 33: Borrowing cash/in-kind from a formal financial institution



More than 95% of the farmers reported that household members had borrowed cash from all the financial institutions; 99% had borrowed both cash and 98% in-kind from formal financial institutions and friends, relatives and individual money lenders. A substantial proportion of households had not borrowed, while less than 40% said they did not know if any household member had borrowed.

C. Decision-making on borrowing

Decision-makers on whether to borrow or not included the respondent (a female respondent), spouse, other household members and non-household members. The results showed the decision could be made by any of the individuals or by a combination of them. Table 28 shows that in all the households, the decision to borrow from a formal financial institution was most of the time made by the spouse and another household member. This combination did not make decisions on borrowing from any other source.

In all households, spouses made decisions on borrowing from informal savings and loans schemes as well as from friends, relatives and individual money lenders, but did not make a decision to borrow from formal savings and loans schemes. Female respondents made decisions on borrowing from all sources in more than 68 - 74% of the households.

Table 28: Decision-maker on choice to borrow from different sources of financing

Household member	Formal financial institution (%)	Formal savings & loan schemes (%)	Informal saving and loan schemes (%)	Friends, relatives of other individual money lenders (%)
Self	68.4	73.9	69.4	73.6
Spouse	99.7	0.0	100.0	100.0
Self and spouse	94.1	94.5	92.8	96.4
Another household member	60.6	67.8	60.6	63.5
Self and other household members	69.1	74.9	70.0	74.6
Self, spouse and other household members	95.8	96.1	94.5	97.1
Another household member and non-household members	0.0	0.0	60.9	0.0
Spouse and other household members	100.0	0.0	0.0	0.0
Self, another household member and non-household members	74.5	75.2	0.0	0.0
Self, spouse, another household member and other non-household members	97.4	94.8	0.0	0.0

Female respondents and the spouse made decisions to borrow from all the sources in more than 92% of the households. Another household member and non-household member were reported to make decisions on borrowing from Informal savings and loan schemes only, in 61% of the households.

D. Decision on the usage of the borrowed money or item

Decisions on how to use the borrowed money or item from all the sources were most made by spouses. In all the households, spouses made decisions on what to do with the money or item borrowed from all the sources except from informal saving and loan schemes for which they made the decision in almost all (99.7%) the households (Table 29).

Table 29: Decision-maker on how to use the money/item borrowed

Household member	Formal financial institution	Formal savings and loans schemes	Informal savings and loan schemes	Friends, relatives or other individual money lenders
Self	72.6	74.9	68.4	71.7
Spouse	100.0	100.0	99.7	100.0
Self and spouse	94.5	94.1	94.1	96.4
Another household member	62.5	67.8	60.6	63.2
Self and other household member	73.3	76.2	69.1	73.6
Self, spouse and other household member	96.1	0.0	95.8	72.0
Another household member and non-household member	0.0	0.0	0.0	0.0
Spouse and other household member	0.0	0.0	100.0	0.0
Self, another household member and non-household member	0.0	0.0	74.5	96.7
Self, spouse, another household member and other non-household member	0.0	0.0	97.4	0.0

Decisions on what to do with what was borrowed from informal savings and loan schemes were made by the spouse and other household members, and respondent, spouse, household member and non-household member. The combination of another household member and non-household member did not make decisions on money or items borrowed from any source in any household.

4.3.4 Security of vanilla gardens/fields

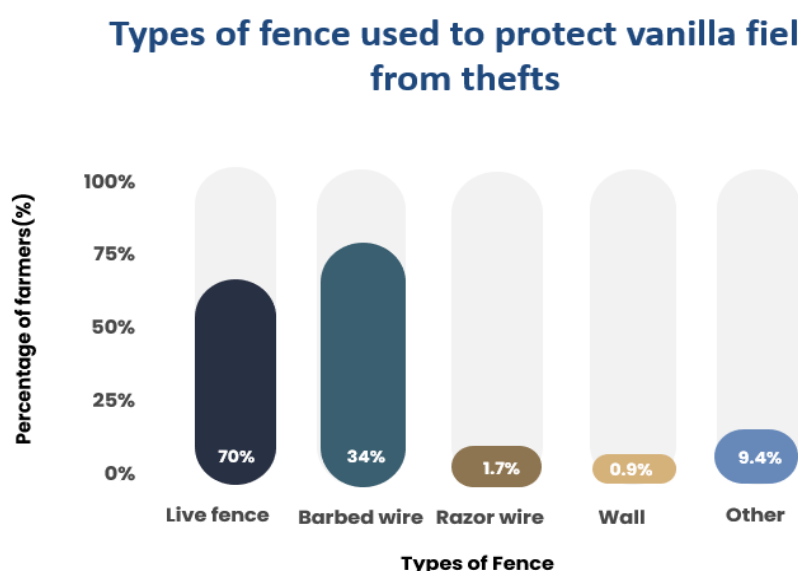
A. Security costs

Security costs to safeguard vanilla fields were incurred by 205 farmers equivalent to 50%. The average number of workdays of family labor used for guarding the vanilla fields was 106 compared to 69 workdays (2.3 months) of hired labor. The average cost incurred on hired labor for security was USD 132.6 per month.

B. Type of fence

Different types of fences were constructed to protect vanilla fields from thefts as shown in Fig 34. The most common type was a live fence reported by 70% farmers; followed by barbed wire which was used by 34%. Other types of fences, which were used by a minority (less than 10%) included razor wire fence, wall fence and other types that were not identified. The average cost of constructing a fence was USD 84.5 (standard deviation USD 119).

Figure 34: Kind of fence used to protect vanilla field from thefts



4.4 Enhanced Mixed Cropping (IR 1.5)

4.4.1 Trees and permanent crops planting

Overall, one hundred forty-three farmers (34.6%) planted trees or permanent crops in their vanilla fields during the last two harvests. Of these farmers, 69.2% selected multi-purpose trees/crops based on the production and potential of the land; while 63.6% selected trees/crops based on their function in the production system; and 23.8% reflected on observed changes in climate over time (Table 30).

Table 30: Basis for selecting trees/permanent crops

Factors considered	% of farmers n = 328
1. Selected multipurpose trees/crops (food, fodder, timber, income...) based on the production potential of the land	69.2
2. Selected trees/crops based on their function in the production system (soil fertility improvement, biomass production, shade, tutoring...)	63.6
3. Reflected on observed changes in climate over time	23.8
4. Used their understanding of historical climate variability and trends to decide on what trees or permanent crops to plant and/or remove	20.8
5. Compared information on historical climate variability and trends with observed climate changes over time	18.2
6. Used their understanding of historical climate variability and trends to make investment decisions in their vanilla fields	18.2
7. Accessed historical climate information to understand its variability and trends	14.7
8. None of the above	1.4

Some farmers used their understanding of historical climate variability and trends to decide what trees or permanent crops to plant and/or remove (21%); while 15% accessed historical climate information to understand its variability and trends; and less than 2% did not consider any of the listed factors.

A. Planting of trees or permanent crops in vanilla fields

Farmers observed different practices when planting trees/permanent crops in vanilla fields. Table 31 shows practices including observing the rain permanently, the quality of seeds/seedlings and recommended agronomic practices. Overall, all the practices were implemented by less than 50% of the farmers. Planting during the rainy season to improve survival rates and to ensure growth was practiced by 48%; while 45% planted temporary/fast-growing shade crops (banana, plantain...) to provide shade as trees grow; 41% sourced quality seed or seedlings of selected trees/crops; 14% applied recommended spacing for trees along the boundary; and 22% planted short-term shade trees that mature within 10 years. About 3% of the farmers did not implement any of the identified practices.

Table 31: Practices used in planting trees/permanent crops in vanilla fields

Practices	% of farmers n= 366
1. Planted selected trees/crops during the rainy season to improve survival rates and ensure growth	47.6
2. Planted temporary/fast growing shade crops (banana, plantain...) to provide shade as trees grow	44.8
3. Sourced quality seed or seedlings of selected trees/crops	41.3
4. Applied recommended spacing of trees along the boundary, 5m-8m apart	14.0
5. Assigned resources (inputs, labor, land) to establish the selected crops/trees	28.7
6. Planted short-term shade trees that mature within 10 years	22.4
7. Planted long-term trees that take more than 20 years to mature, ensuring sustainability	21.0
8. Applied recommended spacing of trees inside the farm, 12m-15m inside the farm	18.9
9. Pruned established trees/permanent crops to ensure 30-50% shade during the rainy season, and 50%-70% shade during the dry season	14.7
10. None of the above	2.8

B. Purchase of planting materials to plant the trees

Of the farmers who planted trees or permanent crops only 7% farmers purchased planting materials in the form of seeds or seedlings at an average price of USD 1.12.

C. Labor used in planting trees or permanent crops

The number of workdays of family members and hired labor varied. Family members worked more on planting trees than hired labor as evidenced by the mean number of workdays of 9 for family members and 0.8 for hired labor. Table 32 shows that the female farmers used more family members workdays (11.2) and hired labor workdays (2.4) than male farmers.

Farmers in the Western region used more (10.3) family members workdays and less hired labor workdays (0.6) for planting trees or permanent crops than in the Central region. Similarly, farmers in areas of high level of production used more family members workdays (10.4); and less hired labor workdays (0.6), for planting trees or permanent crops than farmers in areas of medium level of production.

Table 32: Family and hired labor workdays for planting trees or permanent crops

Category	Disaggregation	Workdays of family members - Mean	Workdays of hired labor - Mean	Daily rate of hired labor (USD) - Mean
Overall		9.0	0.8	0.51
By gender	Female	11.2	2.4	0.59
	Male	8.7	0.6	0.50
By region	Western	10.3	0.6	0.70
	Central	7.4	1.0	0.27
By level of production	High	10.4	0.6	0.55
	Medium	4.0	1.4	0.02

D. Cost of hired labor (USD) by gender, region and level of production

The cost of hired labor per workday was on average USD 0.51 overall. The average cost for female farmers was USD 0.59 and USD 0.50 for male farmers (Table 31). The cost of hired labor was considerably low in the Central region with an average of USD 0.27 compared to USD 0.70 per workday in the Western region. The results also show that the average cost of hired labor was higher in the areas of high level of production (USD 0.55) compared to areas of medium level of production (USD 0.02).

4.4.2 Alternative crops

Vanilla farmers are involved in a multitude of other crops to varying extents. The most important crops besides vanilla across both Western and Central regions were matooke, coffee, cocoa, bananas, avocado, cassava and fruits (jackfruit and mangoes). Matooke, coffee and bananas were the most common in the Western region; and bananas and coffee in the Central region (Table 33).

Table 33: Alternative crops to vanilla

Crop	1 st choice	2 nd choice	3 rd choice	4 th choice	Overall score
Matooke	40.0	31.7	9.8	2.5	84.0
Coffee	31.0	12.5	4.7	1.2	49.4
Cocoa	22.1	6.4	1.7	1.5	31.7
Bananas	3.2	12.8	11.3	4.2	31.5
Avocado	0.7	3.7	6.6	7.1	18.1
Cassava	0.0	3.0	6.6	1.5	11.1
Jackfruit	0.0	2.0	3.9	3.7	9.6
Mangoes	0.3	0.3	4.7	3.2	8.5

CHAPTER FIVE: EXPANDED TRADE OF AGRICULTURAL PRODUCTS

This section presents the findings on the status of trade in agricultural products and vanilla in particular. The baseline assessment examined the status following three key elements of the result areas of the VINES project, namely:

- a) Value addition to Post-production Agricultural Products;
- b) Access to Markets to Sell Agricultural Products; and
- c) Transaction Efficiency.

In order to clearly appreciate the status of the vanilla supply chain, the survey undertook mapping of value chain actors, examined their business models, mapping of external influences on the vanilla value chain, quality of inclusiveness of buyer-seller relations in the vanilla supply chain, as well as international and national vanilla market trends

5.1 Value Added to Post-Production (IR 2.1)

The survey examined the capacity of all processing firms participating in the project in meeting buyers' quality standards and/or food safety standards along the supply chain. To determine their capacity, the survey measured the practices along the following post-production competencies:

- a) Actions taken to ensure quality during and after harvesting;
- b) SMEs using Traceability systems;
- c) SMEs practices to meet export quality standards; and
- d) Post-production processing or handling practices.

The baseline survey findings are presented in the sections below.

5.1.1 Post-harvest handling losses

This indicator measures the percentage of the equivalent cured vanilla, harvested by vanilla producers, who supply participating vanilla processing firms that preserve the vanilla quality after post-harvest handling, curing and storing, until it is ready to be shipped from the warehouse.

Findings showed that for the three hundred farmers whose vanilla plants were under production, overall, a total of 1,397.5 kg of vanilla was lost as a result of poor post-handling practices. This represented approximately 6.3 % of the total volume of vanilla produced by farmers in the last two harvesting seasons. The average loss was 3.2kg per farmer with a standard deviation of 11kg. Further analysis showed that female farmers experienced higher post-harvest losses at 3.8kg per farmer compared to 3.2kg for male farmers. A total of 975kg were lost during the main harvest compared to 423kg for fly harvest.

5.1.2 Actions taken to ensure quality during and after harvesting

Findings showed that only 32% of the vanilla farmers assessed took actions to ensure good quality of vanilla during and after harvest. The range of actions

taken as shown in Table 34. Timely harvesting of the beans, 8-9 months after pollination, in order to ensure high vanillin content, was the most common action. It was practiced by 74% of farmers in the main harvest and 69% in the fly harvest. This was followed by harvesting beans before they split or mold, practiced by 40% and 48% of farmers in the main and fly harvests, respectively.

Table 34: Actions taken to ensure the quality of vanilla during and after the harvest

Actions	% of farmers	
	Main (n = 349)	Fly (n = 333)
1. Harvested vanilla beans 8-9 months after pollination to achieve higher vanillin content.	74.3	68.5
2. Harvested vanilla beans before they split or mold.	39.7	47.5
3. Synchronized harvests with designated Ministry of Agriculture trading windows (harvest dates) to enhance sales of mature vanilla with high vanillin content.	17.0	11.7
4. Harvested selected and individual mature vanilla beans from a cluster rather than harvesting the whole cluster.	37.0	32.1
5. Used clean collection bags to reduce bean exposure to contaminants and contact with soil.	38.7	31.8
6. Minimized vanilla beans damage during harvesting by ensuring bags are not overfilled or stacked.	21.7	21.5
7. Stored vanilla beans in dry, cool conditions for less than 12 hours prior to collection.	18.0	15.0
8. Identified vanilla buyers prior to harvest for minimizing risk.	37.0	32.5
9. Coordinated beans collection with buyers to ensure that the vanilla beans maintain their quality during post-harvest.	13.3	11.0
10. None of the above	6.0	7.7
Average for all	31.6%	

Other common practices in both harvest seasons were harvesting selected and individual mature vanilla beans from a cluster rather than harvesting the whole cluster; using clean collection bags to reduce beans exposure to contaminants and contact with soil; and identifying vanilla buyers prior to harvest to minimize risk. These were practiced by 37%, 38.7% and 37% of farmers in the main harvest; and 32%, 32% and 33% of farmers in the fly

harvest. Of all the farmers who harvested vanilla, 6% and 7.7% of the farmers did not practice any of the listed actions in the main and fly harvests, respectively. This variation in the harvest practices between main and fly harvests could be attributed to awareness and information gaps among farmers, hence an important issue to be followed up by the VINES project and relevant Government agencies.

5.1.3 SMEs using traceability systems

Indicator 30. Number of Exporters, Aggregators, Traders, Processors, Farmer Organizations who use Traceability Systems (Baseline Value = 2 SMEs)

The survey examined the extent to which firms involved in vanilla export implemented traceability systems. This indicator measures the number of post-production supply chain actors (aggregators, farmer organizations, processors and exporters) who input information in established digital traceability systems, and/or who access information from traceability systems for making informed production, post-harvest management, processing and/or export decisions. Findings showed that two firms, namely: Amfri Farms and Enimiro, implemented traceability systems. While firms like Touton, which will begin curing vanilla in the December/January season, mentioned that they implemented some form of traceability in their coffee sourcing; it was found that they had no digitized tracking system, hence did not satisfy the requirements under this indicator.

5.1.4 SMEs practices to meet export quality standards

Indicator 31. Number of Processors who Implemented Practices to Meet Export Quality Standards for Vanilla (Baseline Value = 2 SMEs)

This indicator measures the total number of processors who have applied improved management practices and/or technologies to meet export quality standards for vanilla. To determine this, the survey assessed processors along the following six (6) improved standards:

1. **Analysis** of hazard points (HACCP) along the supply chain;
2. **Upgrading**: Implementation of upgrading plans to meet major food safety regulations;
3. **Testing** undertaken by accredited and audited laboratories;
4. **Traceability systems**;
5. **Direct trading** arrangements; and
6. **Certification** for accessing specialized and high value markets that provide price premiums.

Firms that implemented at least the first three practices above, were considered to meet this indicator.

Findings showed that only two (2) processors implemented all the practices to meet export quality standards in the previous year 2020, namely: Timex (U) Ltd and Amfri Farms.

5.1.5 Post-production processing or handling practices

Indicator 32. Number of Processors who Implemented at Least 2 Improved Vanilla Post-Production, Processing or Handling Practices (Baseline Value = 6 SMEs)

Under this indicator, the survey assessed processors along eight (8) improved practices in vanilla post-production, processing or handling practices aimed at improving vanilla processing efficiency (conversion rate from green to cured vanilla), achieving higher vanillin content, and differentiating beans for their end markets. These include bean blanching, grading, fermentation, drying, slow dehydration, curing dry vanilla, storage, vacuum packaging and bulk packaging. Six (6) of the SMEs were implementing recommended storage practices, including use of paper or boxes, and bundling them into clusters of 20-50 pods for sale, keeping the storage materials clean, and allowing for aeration to retain quality until shipping to international buyers. Other practices include vacuum packing, done by Gourmet Gardens; and bulk packaging done by Nilavan.

5.2 Access to Markets (IR 2.2)

The survey assessed access to markets and related agricultural marketing competencies of farmers and all processing firms participating in the project. To determine their capacity, the survey measured the practices along the following criteria:

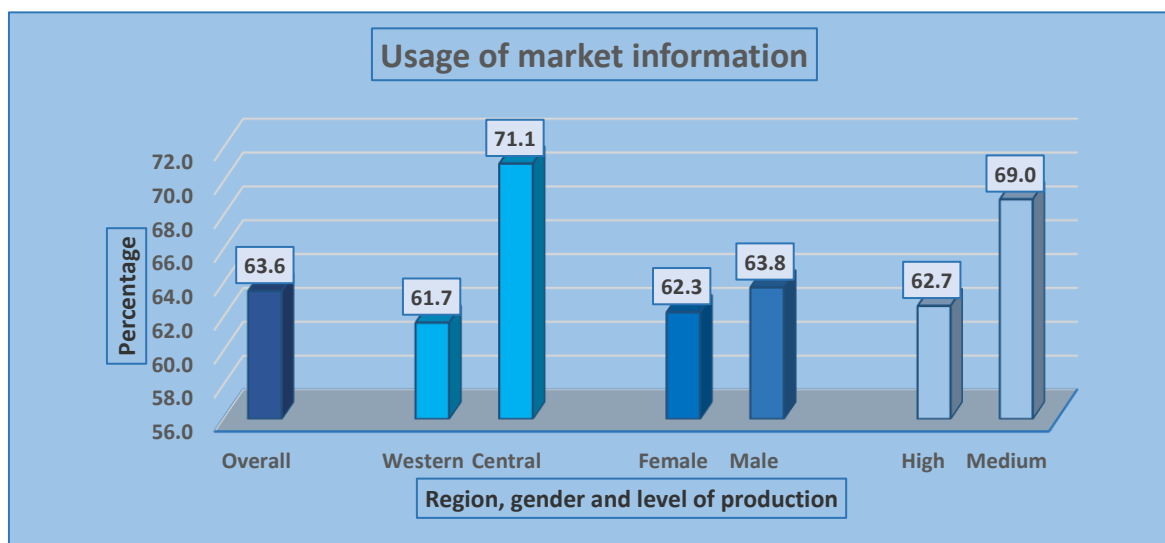
- a) Using vanilla market information to inform production decisions;
- b) Vanilla buyers and volume sold (including choice of buyer);
- c) Sale price of green vanilla and costs of selling (including payment modalities and a premium);
- d) Value of vanilla sold by farms and firms;
- e) Vanilla quality determination; and
- f) Mapping of the supply chains and the different business models

The baseline survey findings are presented in the sections below.

5.2.1 Using vanilla market information to inform production decisions

Indicator 40: Number of Farmers and Firms who Access Market Information for Decision-Making (Baseline Value = 2286 Farmers)

Of the 417 respondents, 63.6% reported using vanilla market information to inform their production decisions. Figure 35 shows that majority of the vanilla farmers used market information to inform their production decisions.

Figure 35: Vanilla market information usage to inform production decisions

In the Central region, 71% of vanilla farmers compared to 61.7% in the Western region, used market information to inform their production decisions. About 64% and 62% male and female vanilla farmers, respectively, used market information to inform their production decisions. More farmers (69%) in medium-producing areas used market information to inform their production decisions than those in high-producing areas (62.7%).

Findings from key informants confirmed the fact that generally vanilla farmers in all districts had access to market information, especially about national / local market prices and harvesting dates but with limited access to international market price information. Key informants reported that farmers received synthesized market information in terms of market prices, quality requirements and sources of agro-inputs. It was further reported that there are gaps in the market information.

5.2.2 Vanilla buyers and volume sold

Indicator 3: Volume of Commodities Sold by Farms and Firms Receiving USDA Assistance (Baseline Value For Green= 905mt)

The average volume of green vanilla sold per farmer was 38.1kg with a standard deviation of 76.6 kg for 406 farmers. There were numerous vanilla buyers taking varied volumes of green beans. The biggest proportion of farmers (27%) who responded to this question, however, reported that they sold their produce through middlemen/other (see 4.2.2A) and did not deal directly with any of the four major buyers/exporters¹². The survey results showed that of the 406 farmers, 46.8% usually sell to the same buyers every

¹² It is likely that even if there could be representatives of the four main buyers, they probably did not share information with farmers on which SME they represented or traded with.

harvest season, which could be attributed to market information gaps between the buyers (traders) and sellers (farmers). The average volume sold to the largest buyer was 85.6 kg of green vanilla with a standard deviation of 31.6 kg. About 29% of the farmers reported that their main buyer offered to buy their vanilla during the next harvest.

A. Choice of buyer

Out of the 406 farmers that responded to questions about to whom they sold the vanilla, 26% mentioned other buyers (mainly individual middlemen/traders) rather than the ones listed in the VINES project database. About 13% reported that they sold to UVAN Ltd and ESCO Uganda Ltd, and 7% sold to RFCU. Likewise, findings showed that the majority of farmers (27%) sold the largest volume of vanilla to "Other buyers" followed by UVAN Ltd (16%), ESCO Uganda Ltd (14%) and RCFU (8%).

B. Reason for choice of buyer

Farmers gave varied reasons for the choice of buyers for their vanilla as shown in Table 35. Some of the reasons were price-related while others were related to incentives. The most important reason was the price offered as reported by 52% of the farmers, followed by a long-term relationship established (35%), distance to selling place (31%) and training or technical assistance provided (15%).

Table 35: Reason for choice of buyer

Reason	% of farmers
1. Price offered	51.8
2. Long-term relationship established	35.1
3. Distance to selling place	30.8
4. Other incentives (assumes some costs)	28.8
5. Provided training or technical assistance	15.1
6. Quality requirements	12.4
7. Payment terms and modalities	11.0
8. Quantity requirements	8.7
9. Lack of alternative buyers	7.7
10. Gave a price premium/bonus	6.0
11. Paid for transportation costs	5.4
12. Provided complementary services (harvesting, transportation...)	3.7
13. Guaranteed the price paid in advance	3.3
14. Gave interest free loan	2.7
15. Gave tokens (calendars, t-shirts)	1.0
16. Guaranteed the volume bought in advance	0.3

Less than 10% of the farmers gave reasons including: lack of an alternative buyer (8%); buyers offered a premium (6%); met the transport costs (5%); and provided complementary services such as harvesting (4%). About 3% of the farmers chose buyers who gave them interest-free loans or guaranteed the price in advance; while 1% chose the buyer for the tokens they offered.

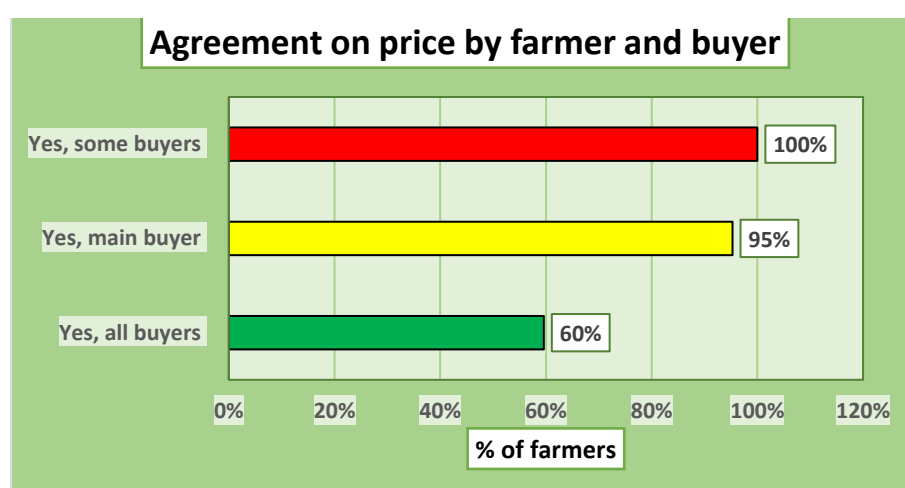
5.2.3 Sale price of green vanilla and cost of selling

Indicator 23. Farm Gate Price Paid to Producers for Green Vanilla (Baseline Value = 9 USD/Kg)

The average sale price for green vanilla was USD 9/kg with a standard error of 0.3, the price was agreed upon between farmers and buyers to varying extents as shown in Figure 36. The selling price in fry was USD 10/kg and USD 8/kg in the main season. About 60% of the farmers reported that they agreed upon the price with all their buyers; 95% agreed upon the price with their main buyer; while all the farmers said they agreed upon the price with some of the buyers.

Some farmers reported that they transport their vanilla harvest to the selling point while others sell at the vanilla field. About 29% of the farmers transported their vanilla to the selling point at an average cost of USD 2.6 (US\$ 9.519) (Standard deviation USD 7.7). It took the farmers 3.8 hours (Standard deviation 8 hours), on average, to transport their vanilla harvest to the selling point.

Figure 36: Extent of agreement on price between farmer and buyer



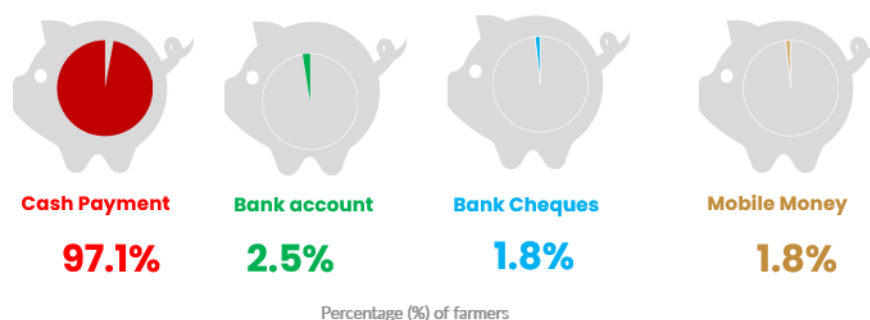
A. Payment modality

Different buyers used different modes of payment for the vanilla bought. The modes included cash, deposit on a bank account, using a cheque and through mobile money. Fig 37 shows that the majority (97%) of buyers paid for vanilla using cash transactions. Deposits on bank accounts were made by 3% of the

buyers while payment by cheque and by mobile money were made by 2% of the buyers in each case.

Figure 37: Modes of payment used by vanilla buyers

Modes of payment used by vanilla buyers



B. Price premiums

Indicator 21. Number of Farmers Receiving Price Premiums for Vanilla Quality and/or Certification (Baseline Value = 44)

This indicator evaluates the number of vanilla producers who report having received price premiums for vanilla quality and/or certification. According to the data from the on-farm survey, findings showed that only 3.4% of all respondents whose farms were in production during the last two vanilla harvest seasons had been offered premium prices by buyers based on vanilla quality and/or certification. This was extrapolated to only 44 farmers who received premium prices for vanilla.

Very few farmers reported that they received premium prices for quality, volume of vanilla offered and loyalty to the buyer. For good quality, 2% of the farmers received a premium of USD 1.2/kg (0.3% received a premium price based on the volume offered and for being loyal to the buyer. On the other hand, 4% of the farmers had their price reduced to USD 6.2/kg and standard deviation USD 7.7/kg due to poor quality of the vanilla.

5.2.4 Value of vanilla sold by farms and firms

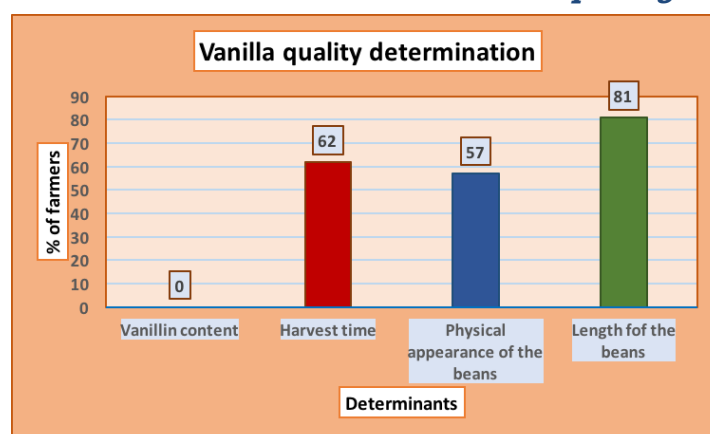
Indicator 2: Value of Annual Sales of Farms and Firms Receiving USDA Assistance (Baseline Value for Green = USD 2.13 Million)

Survey results showed that the total value of the green vanilla sold by farmers in the base year (2020/2021) was USD 2.13 million. The lower figures in the value of green vanilla may explain the declining trends in Uganda's vanilla exports over years as explained later in Figure 41 below. The oversupply in the global vanilla market in 2020 contributed to the drop in farmgate price.

5.2.5 Vanilla quality determination

The survey assessed criteria and practices commonly used by vanilla buyers to determine the quality of green vanilla. Survey results in Figure 38 show that buyers used multiple methods, and the length of vanilla beans was reported as the most prominent by 81% of the farmers; followed by time of harvest (62%); and physical appearance of vanilla beans by 57%. None of the farmers had the quality of their vanilla determined using vanillin content (0%).

Figure 38: Factors considered to determine vanilla quality



5.2.6 Mapping of the vanilla value chain actors

The survey undertook a mapping of vanilla value chain actors to examine their relationships. This was also intended to give a wider understanding of their different business models. Data collected through the mapping of the key supply chain actors was used to develop a business model canvas for each. Data was collected using the *Link Methodology Scorecard*, which was administered to all the key value chain actors.

In the project design for the VINES project, the *Link Methodology Scorecard* was to be administered to the three (3) supply chain actors (UVAN, ESCO and RFCU). However, because of the challenges experienced in engaging UVAN and ESCO on the project, the project, considered the Vanilla Innovation and Expansion Fund (VIEF) partners ideal for learning. The tool was therefore administered to four (4) key VINES' partners, namely: Rwenzori Farmers' Cooperative Union (RFCU) – not a VIEF recipient, Gourmet Gardens Ltd, Enimiro Uganda (SMC Ltd) and Touton S.A. Uganda Ltd.

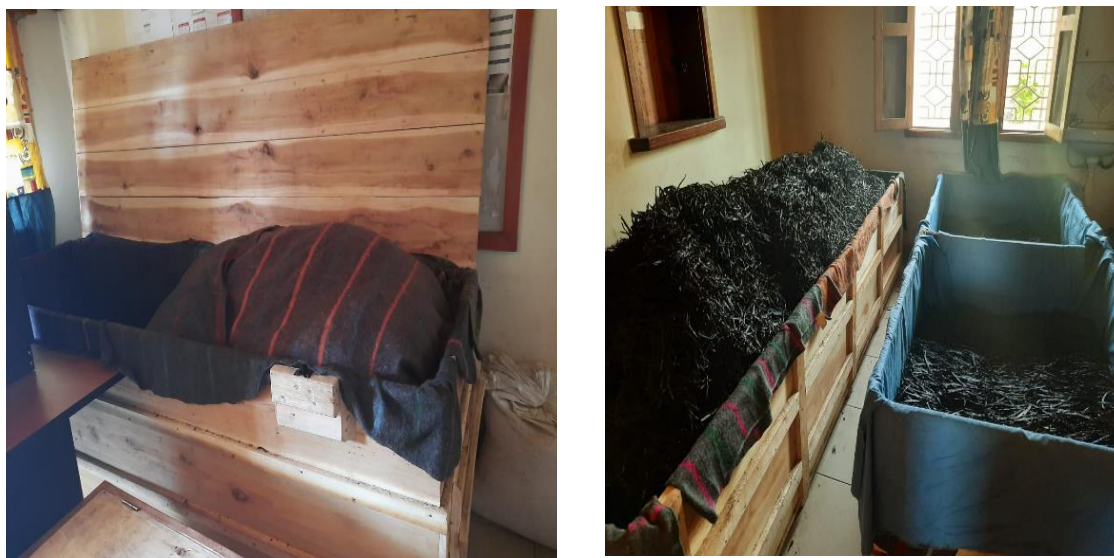


Figure 39: Curing vanilla at RFCU in Kasese

A. Mapping of key external influences

The survey examined some of the external influences along the 6 (six) vanilla supply chain functions undertaken by the actors namely: Input and service providers, farmers, marketing, processors, commercialization and consumers. Four main external influences were identified, namely: economic forces; political, legal and regulatory; and social and environmental factors.

B. Business models of key vanilla value chain actors

Based on the data generated using the *Link Methodology Scorecard*, a business model canvas was developed for each of the 4 supply chain actors. Each business model canvas plots the direct and indirect actors, their roles, product flow and information, relationships between actors, product characteristics and commercial figures (prices, volumes and returns).

5.2.7 Quality of inclusiveness of buyer-seller relations in vanilla supply chain

Indicator 29: Quality and Inclusiveness of Buyer-Seller Relations (Baseline Value: Buyers = 70%; Sellers = 41%)

This indicator measures linkages among direct supply chain actors by evaluating the application of six (6) guiding principles namely:

- 1) **Supply-chain wide collaboration:** Establishes shared goals for collaboration, recognizing and valuing interdependence among supply-chain actors.
- 2) **Effective market linkages:** Achieves producer and buyer goals by creating and delivering social and commercial value along the supply chain.

- 3) **Fair and transparent governance:** Establishes and implements clear and consistent quality standards, buying and selling commitments, and equitable processes of risk management.
- 4) **Equitable access to services:** Allows producers to access services (financial, technical and operational), providing incentives to invest in upgrading production based on market needs.
- 5) **Inclusive innovation:** Promotes innovation in products, services and processes, providing the means to remain competitive in dynamic markets.
- 6) **Measurement of outcomes:** Establishes a monitoring process to assess the health of trading relationships, and reducing the risk that minor problems will destroy the business.

The *Link Methodology Scorecard* was used to assess the value chain actors' relationships in Uganda's vanilla sector. For purposes of this survey, the methodology was used to measure the quality of inclusiveness of buyer-seller relations. Analysis of findings indicate that, on a scale of 0-6 (not applicable to strongly agree) for each of the above indicator principles, generally, the quality of inclusiveness of buyer-seller relations was fair. This was evidenced by the fact that neither of the value chain actors attained above the average score of 3 (Table 36).

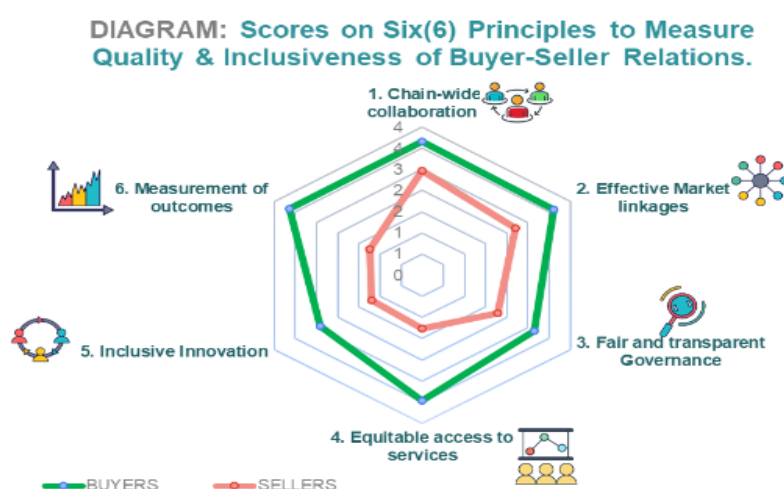
Table 36: Inclusiveness of buyer-seller relations

PRINCIPLE	Buyer scores	Seller scores
Chain-wide collaboration	4	3
Effective market linkages	4	3
Fair and transparent governance	3	2
Equitable access to services	4	2
Inclusive innovation	3	1
Measurement of outcomes	4	1
Percentage of maximum scores (30):	70%	41%

Findings on the status of the linkages among direct supply chain actors (buyers & sellers) on each of the six (6) guiding principles is summarized in Table 36.

Findings showed that the buyers relative to the sellers (who included farmer respondents), scored better on each of the six (6) principles assessed as summarized in the web diagram (Fig 40). The buyers attained relatively higher scores, attaining 70% of maximum total scores, compared to 41% for sellers. Using a simple average of the two scores above, findings showed that generally, the supply chain actors altogether (buyers and sellers) attained 55% of the maximum average scores (17) along the 6 principles accessed using the Link methodology. This indicates that there exist significant gaps that need to be addressed to increase the level of inclusiveness in the buyer-seller relations.

Figure 40: Measurement of quality and inclusiveness of buyer-seller relations



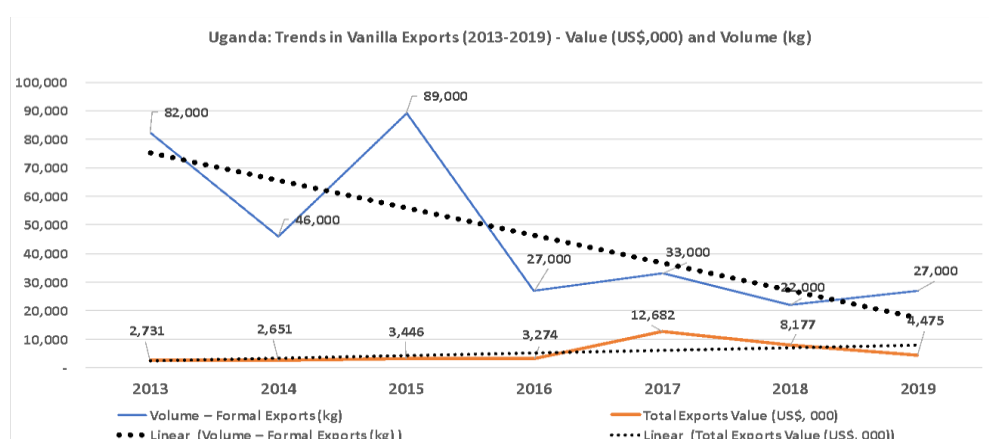
The low score of the sellers largely reflects the wide knowledge and information gap between buyers (traders) and sellers (farmers), which largely disadvantaged the farmers. Such gaps in the relations between buyers and sellers in the vanilla supply chain, if not addressed, could significantly undermine productivity at farm level, efforts to deepen markets, negatively impact incomes and enterprise profitability, as well as the attainment of the overall objectives of the VINES project.

5.2.8 International and national vanilla production and market trends

The survey examined the current status of markets for agricultural products, the market trends (domestic, regional and international).

A. Uganda vanilla exports

An analysis of Uganda's formal vanilla export figures shows a downward trend, from 8.2 tonnes of cured beans in 2013 to 2.7 tonnes in 2019. Fig 41 shows an analysis of Uganda's vanilla export performance and price changes for the period 2013-2019.

Figure 41: Trends of Uganda's Formal Vanilla Exports by Volume and Value

Data Source: UBOS Statistical Abstract 2

From Figure 41, the analysis indicates a downward trend in Uganda's formal vanilla exports over the past seven years. Implications of this trend to commercial actors (farmers, traders and processors); and support actors (development partners and MAAIF) are to establish the causes of the downward trend and address them. It will be important for VINES and its partner VANEX, working with MAAIF and other Government agencies, to address issues related to inadequate reporting and data collection that seem to plague the sector.

While volumes of formal exports have declined, the trend in the value of exports has largely remained constant because of a surge in prices of vanilla as indicated in **Table 35**, especially during 2017 and 2018. While formal export volumes fell from 8.2 tonnes in 2013 to 2.7 tons in 2019, the computed price rose from USD 73/kg to USD 213/kg over the same period, and to USD 217/kg in 2019.

A. Lead importers of Ugandan vanilla

There are six (6) consistent importers of Ugandan Vanilla as shown in Table 37, ITC data also indicates some countries, which act as “**one – off importers**,” such as Canada, South Africa, and Qatar, which import once in a year, but do not show a come-back. This is hard to explain from trade data, but is indicative of possible market developments for Ugandan vanilla in these countries.

Table 37: Leading importers of formal Ugandan vanilla by country (2015-2020)

Importers	2016	2017	2018	2019	2020
	Exported quantity (Tons)				
World	28	32	22	30	15
Germany	3	2	3	3	6
United States of America	4	21	7	15	6
India	5	1		1	1
United Kingdom	5	1	0	1	1
France	6	2	6	4	0

Source: ITC 2020

5.3 Transaction Efficiency at Farm Level (IR 2.3)

5.3.1 Gross margin

Indicator 13: Farmer's Gross Margin Per Hectare Obtained with USDA Assistance (Baseline Value = USD 332.8)

The indicator measured the difference between the total value of all products from the vanilla-based agroforestry system and all cash expenses incurred, divided by the total number of units of production.

The survey computed the gross margin at the farm level based on field data. Findings showed that the estimated gross margin per hectare was USD 332.8, with gross margin per production unit (VINE) of USD 0.20 as summarized in Table 38.

Table 38: Vanilla gross margins per hectare

	UGX	USD Equivalent
Gross margin per hectare	1,218,381	332.8
Gross margin per production unit	736.3	0.20

The gross margin of USD 332.8 per hectare is low compared to the projected value. Possible factors that contribute to this low gross margin are the low value of most of the other crops produced by vanilla farmers; high production costs; and low productivity. Most of the other crops are food crops consumed at family level.

5.3.2 Marketing competencies

The survey evaluated the status of agricultural marketing competencies¹³ among vanilla producers. The four (4) interrelated competencies below were

¹³ A **competency** is the set of attitudes, knowledge and skills that enable people to carry out an activity effectively and based on values. How a person demonstrates a competency requires not only that he or she possesses the knowledge, but also that he or she has: 1) the interest and attitude to perform the practice (desire to do), 2) the necessary skills to implement the practice (power to do), 3) the commitment to implement the practice with quality (do it well), and 4) a set of values that motivates the implementation of the practice (internationalization of the behavior change).

assessed to evaluate the number of vanilla producers that have achieved at least a functional level of marketing competency as follows:

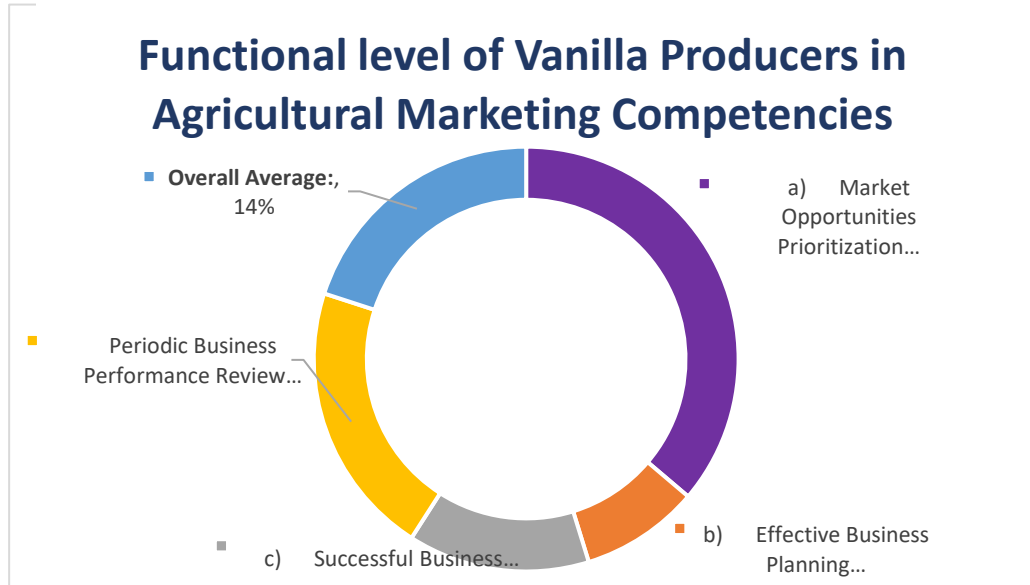
- a) **Market Opportunities Prioritization Competency:** Prioritizing market opportunities to select crops and/or livestock products by interacting with diverse buyers in order to identify their needs and requirements, assessing market risk, and engaging with other farmers to evaluate identified opportunities;
- b) **Effective Business Planning Competency:** Engaging with other farmers to plan for collective marketing by understanding the functioning of the value chain, identifying constraints and/or opportunities, developing a collective business vision and a plan for achieving it;
- c) **Successful Business Implementation Competency:** Committing to the success of the business plan by implementing practices needed to meet buyers' requirements, commercializing the agreed volume of produce, complying with agreements made with buyers, and keeping records; and
- d) **Periodic Business Performance Review Competency:** Evaluating individual and group outcomes to identify areas for improvement and growth, by calculating production costs, sales and income, assessing profits from the whole production system and commercialization, and revising the business plan as needed.

Based on the data collected from vanilla producers, the overall competency level was calculated by taking a simple average of the values given for each of the behavioral evidence for each competency above. Using the calculated rate for each vanilla producer, respondents were classified in four levels of competency as follows: (a) Basic: (0 - <40%), (b) In Development: (40 - <60%) (c) Functionally Competent: (60 - <75%) and (d) Fully Competent: (75 – 100%).

Findings showed that vanilla producers in Uganda have not reached a functional level in agricultural marketing competencies having an overall score of 14% at the basic level (0 - <40%). Further analysis along each of the four agricultural marketing competencies showed a low level of functionality at 25% for the Market Opportunities Prioritization competency; followed by 15% for the Periodic Business Performance Review competency; 10% for the

Successful Business Implementation competency; and 6% for the Effective Business Planning competency as summarized in Figure 42.

Figure 42: Agricultural Marketing Competencies of vanilla farmer

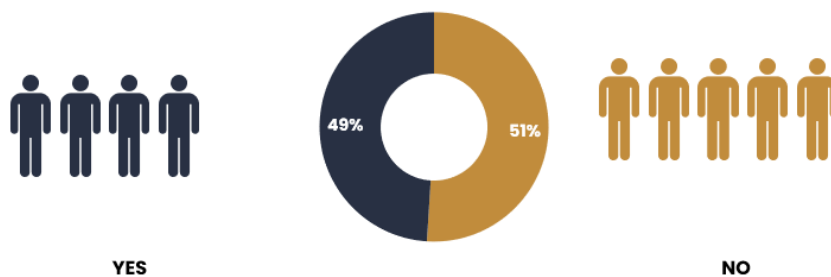


A. Market Opportunities Prioritization Competency

A small majority of farmers prioritized their crops based on identified and evaluated market opportunities as seen in Fig 43. Fifty-two percent (52%) of the farmers reported that they considered, identified and evaluated market opportunities to priorities in selecting their crops.

Figure 43: Prioritization of crops based on identified and evaluated market opportunities

Distribution of farmers prioritization of crops based on identified and evaluated market opportunities



Identifying and prioritizing market opportunities

Table 39 shows the actions taken by farmers to identify and prioritize market opportunities to inform crop selection. Whereas farmers undertook several actions, the most common one was identifying products that buyers want to buy, which was cited by 38% of the farmers.

Table 39: Actions taken to identify and prioritize markets

Actions	% of farmers
1. Identified products that buyers want to buy	38.0
2. Interacted with a diverse group of potential buyers	25.8
3. Described buyers' requirements for prioritized products (e.g., quantity, quality...)	13.9
4. Described buying conditions for prioritized markets (e.g., pricing, form, and timing of payment...)	11.4
5. Evaluated how long it will take to start getting an income from identified products and/or markets	11.2
6. Engaged with other farmers to identify opportunities for collective marketing	10.5
7. Assessed family labor needed to access identified market opportunities	10.2
8. Assessed input needed to access identified market opportunities	9.0
9. Engaged in the prioritization of market opportunities with other farmers	7.8
10. Assessed the level of risk of different market opportunities	7.3
11. Contributed to the evaluation of market opportunities with other farmers	7.3

About 26% of farmers interacted with a diverse group of potential buyers; 13.9% described buyers' requirements for prioritized products; 11.4% described buying conditions for prioritized markets; and 11.2% evaluated how long it will take to start getting an income from identified products and/or markets. Less than 8% of the farmers engaged in the prioritization of market opportunities with other farmers.

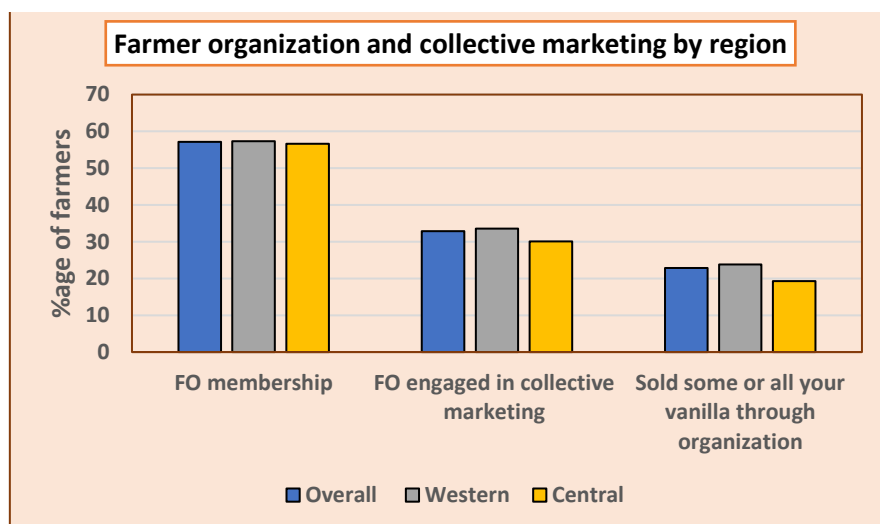
B. Effective Business Planning Competency

In order to assess the status of business planning competencies of vanilla producers, the survey examined the level of farmers' engagement in a number of behavioral evidence/practices; engagement with other farmers to plan for collective marketing by understanding the functioning of the value chain, identifying constraints and/or opportunities, developing a collective business vision and a plan for achieving it.

Farmer organization membership and collective marketing

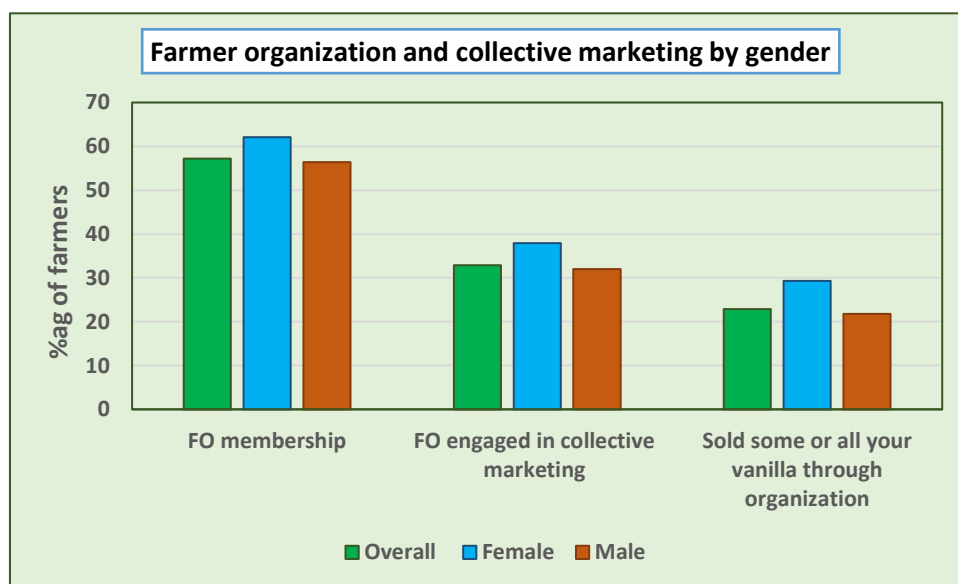
Fifty-seven percent (57%) of the farmers surveyed were members of a farmer organization (FO). There was no difference between regions, though the results (Figure 44) showed that 58% of the farmers in high-production areas belonged to FOs while in medium production areas, it was 52%.

Figure 44: FO membership and collective marketing by region



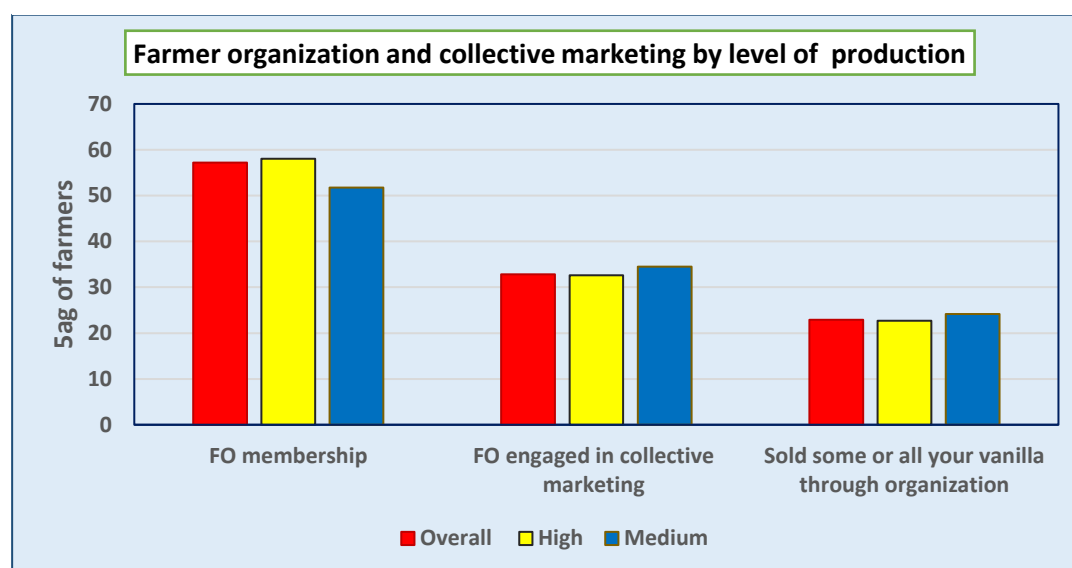
More female (62%) farmers belonged to a FO than male farmers (56%) as shown in Figure 45. Findings showed that overall, the vanilla producers assessed attained a score of 6.4%, hence categorized as having a basic competency level regarding the Collective Marketing competency. More female (62%) farmers belonged to a FO as compared to the male farmers (56%) as shown in Figure 45.

Figure 45: FO membership and collective marketing by gender



FO engagement in collective marketing was reported by 33%, though only 23% of the farmers said they sold some or all their vanilla through a FO (Figure 46). More female (38%) vanilla farmers sold their vanilla through a FO as compared to the male (32%) farmers.

Figure 46: FO membership and collective marketing by level of production



A. Successful Business Implementation Competency

The survey assessed vanilla producers' level in relation to successful business implementation competency. To determine this, the survey measured producers' status across the following three main evidence areas:

- i. Collective Marketing;
- ii. Planning for Collective Marketing; and
- iii. Contribution to the implementation of the collective marketing plan.

Planning for collective marketing with other farmers

Very few farmers took actions to plan for collective marketing with other farmers as shown in Table 40. The most common action was contributing to the farmer organization's business vision cited by 11% of farmers. This was followed by engaging in the design of production, postharvest and marketing plans (8.3%); describing the functions of the actors engaged in prioritized value chains (7.5%); estimating the profitability of engaging with prioritized markets (7.3%); and contributing to the analysis of bottlenecks for engaging with prioritized markets (6.8%). However, 9.3% of the farmers did not take any of the listed actions.

Table 40: Actions taken to plan for collective marketing

	Behavioral Evidence	% of farmers (n = 134)
1.	Described the functions of the actors engaged in prioritized value chains	7.5
2.	Contributed to the analysis of bottlenecks for engaging with prioritized markets	6.8
3.	Contributed to the analysis of constraints for engaging women and youth with prioritized markets	6.1
4.	Contributed to the analysis of opportunities for engaging women and youth with prioritized markets	5.1
5.	Engaged in the design of production, postharvest and marketing plans	8.3
6.	Assessed the risk of implementing different production, postharvest and marketing activities	5.4
7.	Engaged in the design of actions to mitigate or manage identified risks	4.6
8.	Estimated the financing needs to engage with prioritized markets	6.3
9.	Sought finance needed to engage with prioritized markets	4.6
10.	Estimated the profitability of engaging with prioritized markets	7.3
11.	Contributed to the farmer organization's business vision	11.0
12.	Contributed to the farmer organization's assessment of potential business relations and partnerships	5.8
13.	Provided inputs for the preparation of the business plan	3.9
	None of the above	9.3

Contribution to the implementation of the collective marketing plan

Findings showed that overall, the vanilla producers assessed got a score of 9.7% hence categorized as having basic competency level. Table 41 shows the different ways that farmers contributed to implementation of collective marketing plans. Eleven (11%) of the farmers agreed to the terms of the contracts with buyers or committed to complying with agreements made with buyers. Ten percent (10%) sold the agreed volume of produce through the farmer organization; followed by 9.3% who planned their production, post-harvest and marketing activities based on the farmer organization's business plan; and those who planned their finances based on the farmer organization business plan; or implemented practices needed to meet buyers' requirements. It was reported that 1% of the farmers did not take any of the listed actions.

Table 41: Contribution to implementation of collective marketing plan

Contribution	% of farmers
1. Planned their production, postharvest and marketing activities based on the farmer organization's business plan	9.3
2. Planned their finances based on the farmer organization business plan	9.3
3. Implemented practices needed to meet buyers' requirements	9.3
4. Agreed to the terms of the contracts with buyers	11.4
5. Sold the agreed volume of produce through the farmer organization	10.0
6. Committed to complying with agreements made with buyers	11.0
7. Kept records on their production, costs, sales, and profits	8.0
8. None of the above	1.0

D. Periodic Business Performance Review Competency

Findings showed that overall, the vanilla producers assessed attained a score of 15% hence categorized as having a basic competency level regarding competencies in periodic business performance review. Detailed analysis regarding the practices taken to evaluate the results of the last two vanilla harvests showed the same trend.

Evaluation of the results of the last two vanilla harvesting seasons

Evaluation of results of vanilla farming in the last two years was carried out on by less than 30% farmers. The most common actions were: a) calculating production costs (25.6%); b) evaluating production, productivity, and product quality (24.3%); c) included family labor in the production cost calculation (17.8%); and evaluating revenue and profit from their production system (17.8%). Table 42 further shows that 10.7% identified opportunities to improve results in the next marketing cycle; while 44.2% did not evaluate the results.

Table 42: Actions taken to evaluate the results of the last two harvests

Behavior	% of farmers
Calculated their production costs	25.6
Evaluated their production, productivity, and product quality	24.3
Included family labor in the calculation of their production costs	17.8
Evaluated their income and profit from their production system	17.8
Evaluated the total value of sales from their production system	16.6
Identified opportunities to improve results in the next production season	13.1
Identified opportunities to improve results in the next marketing cycle	10.7
Contributed to the evaluation of the farmer organization sales, income, and profit	7.5
Identified opportunities to improve results for women and youth	7.1

Behavior	% of farmers
Contributed to the revision of the farmer organization collective marketing plan	6.8
None of the above	44.2

5.4 Policy and Regulatory Framework

5.4.1 Overview of Uganda's Agriculture Policy and Regulatory Framework

In 1990, the USAID funded Export Policy Analysis and Development Unit (EPADU), with additional funding from the Norwegian Fund for Women, supported women vanilla growers and provided TA to vanilla growers in Mukono district, thus revitalizing the vanilla industry in Uganda. That effort came to an end at the end of 1994. This investment was followed by the USAID-funded Uganda's Investment in Developing Export Agriculture (IDEA) Project, which supported the early expansion of Uganda's vanilla sector.

A. Agriculture Policy

A predictable and stable regulatory framework enhances investment in agriculture and accelerates commercialization. Uganda, unfortunately, has a weak regulatory framework. Uganda's regulatory environment for agribusiness development has been ranked by Enabling the Business of Agriculture (EBA) as number 32 out of 62 countries, suggesting that a number of improvements have to be made to improve Uganda's regulatory environment.

The Agricultural Chemicals Board (ACB) in charge of registering and regulating the quality of agrochemicals, including fertilisers, is under-resourced to effectively carry out tests on agrochemicals found on the Ugandan market. This leads to high levels of adulteration of agro input chemicals, in addition to deterring entry of high-quality input dealers. Inefficiencies in regulation also apply to seeds in terms of the seed regulatory framework, seed registration, and seed quality control.

Uganda got a new plant protection law (Plant Protection and Health Act) that entered into force in 2016, replacing the outdated one of 1962. Strong plant protection frameworks protect crops from pests and diseases by regulating the processes and practices to which agricultural products may be subjected during production, processing and trade. This means that the country has a new law that allows responsible government institutions and departments under MAAIF to regulate cross-border agricultural trade more effectively. Effective laws are important in negotiating access to foreign markets for farmers, and to issue valid and reliable phytosanitary certificates for exports. Producers and exporters rely on the guarantees of phytosanitary certificates to show that their products comply with the plant health requirements in destination markets. The new law streamlines imports of plant-based products by allowing officials to target border inspections and controls, and facilitates trade with other countries. In addition, a MAAIF department is designated to conduct pest surveillance in the country, and carry out pest risk analysis. Its pest risk analysis (PRA) for imports of plant products are,

however, not publicly available, for example, online or in hard copies to the public. Publishing of PRA reports creates transparency in the phytosanitary policy environment, since PRA reports would provide a basis for phytosanitary legislation.

A. The National Sanitary and Phyto-Sanitary (SPS) Policy

MAAIF has drafted a National SPS Policy and presented it for stakeholder validation in June 2018. The policy is aimed “to protect human, animal and plant life or health, promote trade and strengthen national, regional and international cooperation through implementing science-based Sanitary and Phyto-Sanitary measures¹⁴.”

The draft SPS policy points out the challenges faced by Uganda in complying with SPS requirements including:

- i. Inadequate regulatory infrastructure such as laboratories and quarantine facilities;
- ii. Inadequate funding of SPS related activities;
- iii. Inadequate coverage and scope of extension services;
- iv. Weak risk assessment systems;
- v. Weak conformity assessment and enforcement mechanisms
- vi. Inadequate scientific and technical expertise;
- vii. Inadequate production, processing and distribution infrastructure; and
- viii. Low public awareness of SPS requirements.

The draft policy targets the above challenges and seeks to create a conducive legal and regulatory framework. The policy also seeks to institute measures to enhance compliance to international best practices; protect human life, food safety, border control and internal quarantine systems; as well as strengthen skills and capacity building along the value chain, while increasing access to national, regional and international markets among others.

Uganda’s SPS challenges in external markets are confirmed by high interception levels of fresh fruits and vegetables (FFVs) on the EU market as indicated in Table 43.

Table 43: Fruits and Vegetables interception rates

Period	No of interceptions for FFVs
June 2016 – May 2017	86
June 2017 – May 2018	120
June 2018 – January 2019	101

Conclusively, with a negative reputation of interceptions on the EU market, it is essential that the vanilla industry strictly observes SPS requirements to avoid facing similar interceptions.

¹⁴ MAAIF: “Draft National Sanitary and Phytosanitary Policy,” 2016, p. 13

5.4.2 Policy and regulatory framework of vanilla supply chain in Uganda

This survey attempted to determine the baseline status regarding policies, regulations and/or administrative procedures in each of the following stages of development (under Indicator 39 of the VINES project PMP). This section reports on the key findings generated, especially through secondary data and KIIs.

Uganda does not have a vanilla specific policy or regulatory framework. The National Agricultural Policy (NAP 2013) however, provides a policy framework for agricultural commodities under which vanilla falls. Table 44 shows strategies of the NAP's objective 2 and how they relate to the vanilla industry.

Table 44: Link between the National Agricultural Policy and the Vanilla Industry

NAP strategy under objective 2	Relevancy to the Vanilla Industry
i. Generating, demonstrating and disseminating appropriate, safe, and cost-effective agricultural technologies and research services to enhance production and increase quality of products through access to high quality agricultural technology, agribusiness and advisory services for all categories of farmers.	i. Uganda's vanilla industry should aim at promoting cost effective technologies and production of high-quality vanilla under market driven advisory services. ii. From the link methodology, some of the lead firms along the vanilla value chains are this component of the NAP.
ii. Promoting the growth of a vibrant private sector-led agricultural input supply system that is responsive to farmer and sector needs.	iii. Quality inputs is a prerequisite for the success of the vanilla industry to enable farmers produce high quality vanilla.
iii. Strengthening the certification and regulatory system to guarantee the quality of agriculture inputs at all levels.	iv. The country lacks voluntary regulatory mechanisms in the inputs sector and products, and CRS could initiate voluntary regulation among actors of the vanilla value chains.

Findings from the different stakeholders indicate that the current policy framework is generally weak and may have negative implications for the development of the sector. According to the Agriculture Sector Strategic Plan (ASSP) 2015/2016 to 2019/2020 of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), vanilla export values were projected to grow from USD 2.56 million (baseline 2014) to generating over USD 5.3 million by the year 2019/2020, which was much higher than several other crops like bananas, soyabeans, groundnuts etc. Vanilla is not currently listed among the priority crops in the strategy, which limits GoU's ability to make any meaningful interventions in the sector. As the Commissioner Crop Production (MAAIF) rightly put it:

“Vanilla is a crop which was left to the private sector. Government just supports all farmers who engage in priority crops and horticulture, including vanilla, which is a spice.” *Commissioner Crop Production (MAAIF)*

This was equally affirmed by the National Agricultural Advisory Services (NAADS) Secretariat:

“Vanilla is not among the crops prioritized by NAADs because MAAIF, which formulates Government agricultural policies, has not included it in the national priority export commodities. Vanilla was left to the private sector and, therefore, NAADS has no activities aimed at supporting the vanilla value chain” (KII- Head of Agri-business and Technical Services)

The absence of a policy to regulate activities and actors in the vanilla value chain, has had implication on the development and performance of the vanilla sector, which among others include:

- i. Production bottlenecks which threaten Uganda’s capacity to increase production and productivity. There is limited access to vanilla production-specific extension services and quality agro-inputs. In the absence of laws and regulations, rampant thefts at farm level have become a major disincentive for vanilla production.
- ii. Market access and commercial viability are weakened: While Uganda is increasingly being recognized internationally among the major producers and exporters, its potential is mainly undermined by quality assurance challenges largely due to a weak regulatory framework. Key drivers of poor quality include harvesting of premature beans and improper harvesting, post-harvest handling and processing. In addition, there is no coordination of value chain actors, as well as causing unhealthy competition and tension among actors. The effects of this regulatory gap, and its implications on market access, is increasingly a concern of Government.
- iii. Informal marketing through unregulated middlemen has undermined both export product quality, value and incomes of farmers by buying pre-mature vanilla beans plus increase in thefts which erodes the commercial viability of vanilla.
- iv. Low investments and Sustainability: Without a well-defined policy framework, Government has not committed any funds to the vanilla industry. In turn, this unfortunately rendered the vanilla sector to be depicted as quite risky and unattractive for investment. As a result, vanilla farmers and other market actors cannot access appropriate credit to finance their activities as profitable agribusiness.

5.4.3 Local Ordinances and other administrative measures

The survey attempted to identify and document the regulatory and administrative measures taken in Uganda to mitigate against the implications on the weak policy and regulatory framework for the vanilla value chain. Findings showed that in order to protect crop quality and boost production at both national and district levels, some district local governments have taken some measures within the existing national legal framework, as follows:

A. National Level administrative controls

Despite the absence of a sector specific policy and regulatory framework, survey findings indicated that government has taken a number of measures to address the issue of quality and predictability, include:

- i. **Vanilla harvest date(s):** Government, through MAAIF and in conjunction with VANEX and CRS, has since 2020 started setting and announcing the national harvest day(s) in consultation with industry stakeholders to promote quality and processing of vanilla.
- ii. **Provision of Extension service to promote good agronomic practices:** The services are delivered through the national agriculture extension service framework though not specifically targeting vanilla industry. *(as discussed earlier, NAADS has not prioritized the vanilla value chain for support)*
- iii. **Carry out monitoring and inspection for quality assurance:** Through the existing national agriculture quality monitoring frameworks, Government is undertaking supervision of vanilla industry actors; Vanilla sellers and processors.
- iv. **Carry out on ground demonstration gardens:** Government has initiated and funded the setting up of a vanilla demonstration garden in Kazo District (2021).

B. By-laws and Administrative measures at local government level

- i. **Restrictions on movement of planting materials:** Only 3 (27%) out of the 11 political leaders' interviews (DLGs and LCIII level) reported existence of by-laws to restrict movement of planting materials. Contrary to the political leaders however, the majority of the technical district leaders interviewed (60%) reported absence of restrictions to movement of planting materials. The leaders mainly contended that the national trade policies promote free movement of goods and services with no regard to the unique challenges of the vanilla value chain.
- ii. **Guiding Vanilla processing and marketing/trade:** Forty five percent (45%) of the 11 political leaders interviewed at local government levels reported that they had adopted some measure to regulate processing and trade in vanilla.

CASE 1: Measures taken in Ntoroko District: Ntoroko Local District Government and Local Government Council levels I to III, have taken measures to regulate vanilla processing and trade. The measures in this district were found more comprehensive with the following outstanding elements:

- a) By-laws passed at the sub-county level for vanilla production and marketing;
- b) Ordinance was passed at the district;
- c) Introduced licence from the LC1 chairman for farmers without which, no farmer can sell vanilla in specific sub-counties (Nombe, Karugutu Sub- County, and Karugutu Town Council);
- d) All farmers only to sell at the collection centre gazetted by the district;

- e) Farmer to sell only on designated dates announced on radio and displayed on notice boards; and
 - f) The dates of sale are gazetted and set by the Commissioner of Agriculture (MAAIF).
- iii. **Enforcement Measures for Compliance:** 7 (64%) out of the 11 political leaders' interviews (DLGs and LCIII level) reported that there were some modalities to enforce compliance to local by-laws and central government directives. Enforcement officers included: local council chairpersons, police, extension workers, farmer organisations/groups and community guards.

Most technical leaders reported that enforcement was not effective due to various factors, namely:

- a) Weak by-laws (most of which were not yet ratified by either district councils or Office of the Attorney-General);
- b) Lack of awareness among farmers, enforcement officers and local leaders; and
- c) Very weak and ineffective punishments for offenders as one of the local government leaders well expressed.

5.4.4 Constraints to implementing effective regulation at district level

The district leadership interviewed during the survey raised a number of factors that had curtailed their capacity to successfully institute ordinances to regulate vanilla production, processing and trade in their districts and these include:

- a) *Bureaucracy within the Government systems:* There is laxity of authorities in following up on initiatives for vanilla bills at different levels (sub-county to district headquarters)
- b) Lack of awareness about vanilla by political leaders and communities (considered a new crop, not given priority as a cash commodity); COVID-19 lockdown derailed or delayed processes of institution regulatory frameworks;
- c) *Understaffing at the districts and local governments:* Lack of adequate staff to host and facilitate meetings to formulate regulations; and
- d) *Absence of strong farmer organizations:* Farmers are not coordinated nor empowered to demand or participate in shaping the necessary by laws.

5.5 Vanilla Standards Guidelines and Brand Development

Uganda has a National Vanilla Standard, US ISO 5565-1 (First Edition 2009-09 -04.) It covers vanilla pods, cut vanilla, vanilla in bulk and vanilla powder. The standard, regulated by UNBS, covers the following specifications; vanilla pods categorization (in 4 different categories); and vanillin content and moisture content. Findings indicated that only one SME (RFCU) had adopted these vanilla standards regulated nationally (as one of the quality assurance guidelines), while all other key supply chain actors adopted different standards and certifications from different agencies largely dependent on consumer market regulations.

5.5.1 Industry self- regulation mechanisms

A number of vanilla industry organizations have, over the years, emerged at different levels to create some form of self-regulation. These organizations take the form of farmer organizations (associations and cooperatives), traders' and exporters' associations. These formations have largely emerged to fill the gap in the absence of effective Government regulation and support for the development of the vanilla industry in Uganda. Some of the leading sector organizations include:

a) The Association of Vanilla Exporters of Uganda Limited (VANEX):

VANEX is a membership organization constituted by vanilla buyers and exporters in 2003, and incorporated in Uganda in June 2005, as a company limited by guarantee. The goal of VANEX is to pool the resources of its members and to harmonize and coordinate their efforts and activities in the best interest of the vanilla export industry in Uganda. VANEX is generally recognized as a pivotal platform for sector actors, and contributes to the effort to create an enabling environment for sustainable vanilla production and trade with a view of making Uganda a reliable global source of high-quality natural vanilla. Over the years, however, VANEX's influence in the industry weakened and became dormant until its re-launch in 2015 with the support of partners like CRS to start industry engagements to address issues of improving the regulatory policy environment for vanilla. VANEX remains a private sector organization and platform which, when strengthened, has the potential to make significant contributions especially in influencing trade and the public policy environment for vanilla in Uganda.

b) Rwenzori Farmers' Cooperative Union (RFCU): RFCU is a farmer organization that converted from the Mubuku Farmers Association to a cooperative union in 2014, to enhance its capacity to deliver services to its members. Through technical support and training of partners like Ndali Estate (a processor and trader) it obtained Fairtrade certification and facilitated vanilla exports to Ben & Jerry's and other buyers. RFCU is still a maturing organization; its membership has grown to over 3,200 and has the potential of becoming a formidable actor in developing farmers to produce high quality vanilla, access and compete in the international market. (*See more details in 4.2 above*).

c) Farmer groups at Community Level: Survey findings show that numerous farmer organizations have emerged at the community level in most of the Vanilla growing districts of Uganda: These organizations may take the form of, farmer groups at village level, cooperatives and associations. Seven (7) vanilla farmer groups were reported in the districts of: Rubirizi, Bunyangabo and Bundibugyo (Western region) and Luwero-Katikamu sub-county (Central Region) as shown in Table 45. The scope of commodities promoted by several community level organizations often extend beyond vanilla to include coffee and cocoa.

Table 45: List of community level farmer groups by region & district

Region	District	Name
Western	Rubirizi	1. Katanda Vanilla farmers' Association
	Kasese	2. Rwimi Rwenzori Association,
		3. Upper Rwenzori Vanilla Farmers' Association
	Bundibugyo	4. Abanya Rwenzori Farmers' Cooperative Union
		5. Bundibugyo NILLAVA Co-operative Society
		6. Semliki Farmers' Co-operative Union
Central	Rakai	7. Kiyovu Farmers' Co-operative

5.5.2 Community-level surveillance committees to enforce vanilla ordinances

Indicator 36: Number of Active Community-Level Surveillance Committees to Enforce Vanilla Ordinances (Baseline Value = 0)

This baseline survey examined the existence of active community-level surveillance committees to enforce vanilla ordinances (Indicator 36 in the PMP). Findings showed that at the District Local Government (DLG) level, the political leadership there was zero community-level surveillance committees reported. On the other hand, only 5(46%) districts out of 12 district technical leaders surveyed reported the existence of an active community-level surveillance committees to enforce vanilla ordinances. The districts included: Rubirizi, Ibanda, Bundibugyo, Buikwe and Rakai.

5.6 Cross-Cutting Issues

For purposes of this survey, two main cross-cutting issues were assessed among the vanilla producing households: (a) Gender equity and equality; and (b) Child protection.

5.6.1 Gender Equity and Equality

Indicator 44: Abbreviated Women's Empowerment in Agriculture Index – Percent Improvement over the Baseline Value in the Indicator on Control over use of Income (Baseline Value = 74)

The survey employed the Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) to measure the empowerment, agency and inclusion of women in Uganda's vanilla sector. The survey collected data under the following six (6) indicators:

- 1) Input in productive decisions;
- 2) Ownership of assets;
- 3) Access to and decisions on credit;
- 4) Control over use of income);
- 5) Workload; and
- 6) Group membership.

Findings showed that on the Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) to measure the empowerment, agency and inclusion of women in Uganda's vanilla sector, the score was 74.

Survey findings on each of the above A-WEAI indicators plus other selected related indicators are summarized in Table 46.

Table 46: Household status on selected A-WEAI indicators

Indicators	Freq. (n=307)	% of Respondents
Input in productive decisions	306	99.7%
Ownership of assets	307	100%
Access to and decisions on credit	279	90.88
Group membership	261	85.02
Control over use of income		
Workload	287	93.49

Findings showed that almost all respondents (99.7%) reported that women participated and provided input in productive decisions of the household. Furthermore, findings showed that all the respondents (100%) reported that women owned household productive assets or capital. Findings also showed that the majority of the households (91%) reported that women had access to credit. In addition, 85% of the respondents reported that women were members of farmer organizations and over 93% reported that the workload undertaken in the last 24 hours was adequate/normal.

At community level, however, the above findings did not fully agree with data from KIIs with district leaders who identified gender related issues that affect vanilla production in their localities. During analysis, these influencing issues at household and community level were grouped into five (5) categories namely:

- a) Decision-making and control of household incomes;
- b) Equality and empowerment;
- c) Gender Based Violence (GBV);
- d) Gender household labor relations; and
- e) Access to and Ownership of Land.

The findings are summarized in Table 47.

Table 47: Gender issues that affect vanilla production

CATEGORY	EMERGING GENDER ISSUES
1) Decision-making and control of household incomes	<ol style="list-style-type: none"> i. Some husbands work with their families but still control the selling of Vanilla and hide the money from the family. (<i>DAO- Mukono</i>); ii. Most of the women work with their husbands in vanilla production. It is a family crop, but men control the finances (<i>SAS – Butenga, Bukomansimbi</i>); iii. The decision when to harvest and where to sell, and custodian of income, is generally made by men; and iv. Unfair/unequal sharing of dividends/incomes at household level.

CATEGORY	EMERGING GENDER ISSUES
2) Equality and empowerment 3) (Positive behavioral change at household level)	<ul style="list-style-type: none"> i. Vanilla can be grown by both men and women. (<i>Sub-county AO- Buhuhira Kasese</i>); and ii. Some women are in vanilla production in their households.
4) Gender Based Violence (GBV)	<ul style="list-style-type: none"> i. Gender Based Violence has been reported in some areas due to inequality in income distribution (<i>DAO- Mukono</i>); ii. Broken marriages because of money wrangles between wife and husband especially in the harvesting periods. (<i>AO- Lwanda Sub-County Rakai</i>); iii. It has contributed to domestic violence in some households that have failed to define the general roles in production (<i>Rwimi Town Council-Town Clerk</i>); iv. When husbands (men) sell vanilla, they get a boom and they engage in extra-marital affairs with younger women. The family starves thereafter. (<i>CAO- Rakai</i>)
5) Gender labor relations (Household roles and tasks are allocated according to gender)	<ul style="list-style-type: none"> i. Vanilla is a male-dominated enterprise with very few women owning vanilla fields. Those who own have very few plants; ii. Men dominate vanilla farming and marketing; iii. Men entirely own the land in Bundibugyo; iv. Women participate from planting to harvesting, but are not given opportunities to sell; and v. Men leave all the work to women. (<i>Rwimi TC-Town Clerk</i>)
6) Access to and Ownership of Land (Socio-cultural biases that influence access to and ownership of land based on gender)	<ul style="list-style-type: none"> i. There is a challenge with land ownership, 89% of the vanilla gardens are owned by men. (<i>Extension Worker- Bundibugyo</i>); ii. Women and Youth have no right over land (<i>SAO- Ibanda</i>); iii. Traditionally most of the land is owned by men so they dictate what is to be grown on the land; sometimes women grow vanilla, but when it gets to marketing, it becomes for the man. (<i>DAO- Bunyangabu</i>); iv. Women and youth have no right over land; v. Women don't have access to ownership of land; women don't control farm-family income even when they provide labor. The youth are not involved in farming. (<i>CAO- Kasese</i>) vi. Land ownership (Many land wrangles happening in the area. vii. Many women lack or have inadequate control over land and household resources due to: <ul style="list-style-type: none"> a) Women culturally do not have control over land; while access at the same time is a problem; and b) They have to seek permission to grow vanilla (decision is by the husband).
1) Skill gaps	<ul style="list-style-type: none"> i. Most women still lack knowledge about the vanilla industry (production, processing and trading) hence require a lot of capacity building.

5.6.2 Child Protection

Indicator 45: Percentage (%) of Livelihood Service Participant hhs with at Least one Child Engaged in Child Labor:

(a) **Percentage of Livelihood Service Participant hhs with at Least one Child Engaged in Child Labor (Baseline Value = 12.3%)**

(b) **Percentage of Livelihood Service Participant hhs with at Least one Child Engaged in Hazardous Child Labor (Baseline Value = 9.8%)**

This survey examined child protection issues by assessing the child labor status of all children in households engaged in vanilla production. Data was collected to measure the percentage of livelihood service participant households with at least one child engaged in general child labor and hazardous child labor.

A. Child Labor

Agricultural activities that involve child labor are not prohibited at national and international level and this is in line with the following laws and policies of Uganda:

- i. Chapter Four of the 1995 Constitution of the Republic of Uganda provides for the protection and promotion of fundamental human rights and freedoms;
- ii. Vision 2040 clearly articulates the importance of social protection in addressing risks and vulnerabilities by age, social class, gender, climate disaster exposure and cultural norms; and
- iii. The Children Act (Cap. 59) as amended gives a legal framework for the rights and duties of parents, protection of children's rights, and protection from harmful customary practices and harmful employment.

Findings showed that only 12% of the children in households of the respondents, were engaged in vanilla production. Findings also showed that some of the tasks done by children in vanilla production include; land preparation, planting, weeding, manure application, mulching, pollination, harvesting and to provide security/guarding vanilla gardens. This practice was affirmed by respondents to key informant interviews at the district and local government levels, as well articulated by a respondent in Buikwe districts, thus:

“Yes, children do work in vanilla gardens. The work includes; planting, weeding, manure application; while some provide security to vanilla gardens, pollination and general management of vanilla gardens.” *Assistant Agriculture Officer - Ngogwe Sub-county*

The prevalence of child labor in vanilla production according to local government leaders is on the increase and the communities tend to attribute this to cultural perception and increased household poverty, forcing parents to encourage or engage children in child labor as expressed by some respondents during the key informant interviews:

“With high poverty levels in households, you find that some families have no other alternative but to engage their children in manual jobs; there are cultural practices that conflict with the national laws and do not take into account that children are not supposed to be involved in labor” *CAO – Kasese District.*

Some of the drivers for increased child labor identified by the district and local government leaders, interviewed include:

- a) Scarcity of labor (especially during the fertilization period);
- b) Household poverty - “... most farmers are poor thus resort to cheap child labor” SAO- Ibanda District. “... Vulnerability and the need to meet some household basic needs like sending children to school, and meeting medical bills for the parents.” *Rwimi Town Clerk – Bunyangabo Districts*
- c) High levels of illiteracy and increasing school dropouts;
- d) Domestic violence, divorces in families and teenage pregnancy; and
- e) Lack of awareness and knowledge of the laws that prohibit child labor.

B. Hazardous Child Labor

Findings showed that about 10% of the respondent households reported that a child got involved in an accident or became ill because of agricultural tasks, of which 4.5% were female and 5.3% male. This is considered hazardous child labor calling for necessary remedial interventions to eradicate the phenomenon in the vanilla industry.

C. Children Regularly Attending School

Indicator 46: Percentage (%) of Livelihood Service Participant Hhs with all Children of Compulsory School Age Regularly Attending School (Baseline Value = 98.57%)

In regard to the children in the vanilla producing households attending school regularly, 99% of the respondents affirmed this. Note, however, that the survey was conducted during a period when the country was still under strict COVID-19 prevention measures and schools were still closed. It was not, therefore, easy to verify this assertion that almost all children in the household regularly attend school.

5.6.3 Household expenditure

Indicator 5: Daily Per Capita Expenditures (As A Proxy for Income) in USDA-Assisted Areas (Baseline Value = USD 2.43)

The household survey collected data for the indicators related to vanilla farmers’ household consumption expenditures as a proxy for income. Findings showed that the average daily per capita for vanilla farmers in Uganda was 2.43 USD, which is slightly higher than the national average of USD 2.24 per day¹⁵ for the year 2020.

¹⁵SOURCE: World Bank Website; [GDP per capita \(current USD\) - Uganda | Data \(worldbank.org\)](https://data.worldbank.org/UY?locations=UY)

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

This chapter presents key conclusions made based on the survey findings.

6.1 Conclusions

A number of conclusions were deduced from the analysis of baseline data collected and are presented here below:

- 1) **Vanilla production and yield:** at the farm level, almost 100,000 vines were reported to be under production with an average yield of 0.22kgs/vine. This is considered to be quite low but is consistent with the 0.25kgs/vine projected in the proposal.
- 2) **Land restoration and climate-risk management:** The majority (84.9%) of farmers had attained only basic level of competency in planning for land restoration. While 50% of farmers utilized weather forecasts from the national meteorological information agency, very few took decisions to adopt climate change mitigation practices. It was evident from interviews with farmers that vanilla producing communities were experiencing climate change effects that if not addressed will significantly impact production, productivity and the quality of vanilla; ultimately household livelihoods. Use of some essential information obtained, for example, through soil testing, was very low partly due to limited availability of services.
- 3) **Access to reliable vanilla market information for production decisions:** Most farmers indicated that they accessed and utilized market information to inform production decisions; however, the quality of the information was highly variable. Apart from the farmers in RFCU's catchment areas who received reliable information from the Union or their cooperatives, farmers in other vanilla producing areas received information from traders and other middlemen, which disadvantaged farmers.
- 4) **Water resource management:** Most farmers use basic agronomic practices such as mulching to retain soil moisture, but fewer farmers (less than half), implemented practices that slowed water run-off from vanilla fields. Similarly, most farmers did not utilize practices to capture and store water and as a result rely on rainwater. As noted in the conclusions above, weak adoption of climate change/ land restoration practices among farmers puts, Uganda's vanilla farmers at risk as the impacts of climate change becomes more apparent.
- 5) **Irrigation practices:** Uptake of irrigation practices was generally very low with only 16% of vanilla producers practicing irrigation on their vanilla fields. Farmers reported limitations to uptake of irrigation practices partly due to limited access and high costs of improved irrigation technologies.
- 6) **Integrated soil fertility management:** Use and adoption of practices towards integrated soil fertility management were very low among vanilla farmers. More than half of the farmers did not take measures/practices to identify and improve nutrient needs of vanilla

and other crops in their fields. While more than half of farmers reported use of organic fertilisers, they had no requisite knowledge of appropriate techniques/practices in fertilizer preparation and application.

- 7) Land ownership and field characteristics:** Most vanilla farmers are smallholders, and most fields are owned by men due to prevalent gender inequalities on account of socio-cultural contradictions that still exist in many communities of Uganda.
- 8) Adoption of improved agronomic practices:** While majority of farmers reported to have adopted improved agronomic practices, less than half of the total acreage under vanilla was under such practice. In terms of harvesting practices over half of the farmers reported high post-harvest losses and rampant theft prior to harvest with mean of 24kg for the main season, the 22kg for the fly season. Theft of vanilla was the leading challenge faced by farmers, followed by pests and diseases, as well as several other poor agronomy practice related problems. To safeguard the vanilla industry, urgent interventions required to increase production in Uganda, should address the problem of thefts among other key challenges.
- 9) Farm operations and financial management practices:** While most of the vanilla farmers had access to agriculture financing, overall, only 19.8% of the farmers had adopted the different financial management practices assessed. Most Vanilla farmers manifested weak financial management practices. The survey revealed that saving practices were particularly weak. Access to financial services by vanilla farmers is generally low with SACCOs and mobile money as the most used services. While there was an appetite among farmers to borrow wisely for investment in vanilla related production activities, loan funds available were limited. Females compared to males, are most disadvantaged at the household level regarding accessing credit and decisions to borrow. These trends are likely to impact negatively on vanilla production if not addressed.
- 10) Farming as a business:** The fact that only 7.3% of farmers assessed their costs/profit, it is clear from the surveys that farmers do not treat vanilla farming as a business. Only a few farmers evaluated results of the previous season when making decisions about the following season.
- 11) Value-addition and post-harvest handling:** post-harvest handling losses significantly affect vanilla farmers and disproportionately impact female farmers. Most of the farmers did not practice the recommended measures to ensure quality during harvest. The survey was unable to determine the root cause of the loss, e.g., whether it was from loss as a result of a time lapse between harvest and delivery to the aggregation center or loss as a result of rejection at the aggregation center because the vanilla did not meet quality parameters. Regardless, the problems of post-harvest loss and poor quality, if not addressed, will seriously undermine Uganda's vanilla production and competitiveness in international markets.
- 12) Market access and payment modalities:** Majority of vanilla farmers reported that they received market information from middlemen

and that the price they were offered was the main reason for choosing to deal with the same buyer every season (47%). This behavior is likely to work largely in favor of the traders to the detriment of farmers, and is a reflection of market information gaps between the buyers (traders) and sellers (farmers), calling for remedial interventions. Most of the payments to farmers for green vanilla were made in cash with minimum use of non-cash methods. The average price was USD 8 per kilogram of green vanilla. Premium prices tied to either quality or certification status were rare, with 0.3% of farmers receiving premiums. Interventions that seek to reward and incentivize quality should strengthen relationships between farmers and traders, and accelerate adoption of best practices.

- 13) Quality of inclusiveness of buyer-seller relations:** generally, both buyers and sellers in all the four business models evaluated scored low on the six (6) key elements used to measure the strength of these relationships. Sellers' (41%) scores were lower compared to those of buyers (70%). If the big gaps that exist currently in the relations between buyers and sellers in the vanilla supply chain are not addressed, it could significantly undermine productivity at farm level. VINES project should develop and implement deliberate measures to deepen markets, strengthen relationships (especially targeting sellers) and increase incomes/profitability to enhance achievement of project objectives.
- 14) Vanilla production and market trends:** The global vanilla market is currently in a state of oversupply as new plantings from the most recent boom period come into production. This situation would ordinarily have resulted in a market collapse. Fortunately, this has not happened because of Government's intervention in Madagascar, the world's largest vanilla producing country (75% of global supply in 2021). The government in Madagascar continues to impose a minimum export price of USD 250/kg for vanilla which has benefited farmers and processors (and those from other smaller origins) because it has kept prices much higher than they would be if the market were left to do its work. Uganda's formal exports appear to be on a downward trend, which is at odds with conversations with industry players. Nevertheless, the quality problems if not addressed could undermine the potential of vanilla becoming a major export earner for the country.
- 15) Marketing competencies and opportunities:** The survey revealed that Ugandan vanilla farmers only achieved a basic level of competency across all four competency measures. There is a clear need to build capacity of both buyers and sellers in the vanilla sector along all four interrelated competencies assessed: Market Opportunities Prioritization, Effective Business Planning, Successful Business Implementation, and Periodic Business Performance Review competencies.
- 16) Farmer organization membership and collective marketing:** 57% of vanilla farmers were members of a farmer organization (FO). However, only a few (23%) participated in collective marketing. The participation of women was much higher compared to males. While the FOs could be good and effective channels to deliver services to promote vanilla farmers aligned with project objectives, these organizations are weak and need support to build their requisite capacities.

- 17) Supply chain development:** There are weak linkages between the supply chain actors. Only a few vanilla farmers (less than 20%) were aware of buyers' preferences.
- 18) Policy and Regulatory Framework for Vanilla in Uganda:** Uganda does not have a vanilla specific policy or regulatory framework for production and trade. While the National Agricultural Policy (NAP 2013), provides a policy framework for agricultural commodities in general under which vanilla falls, this presents a challenge to efforts to grow and transform the vanilla industry. Furthermore, for many years there has been almost zero-funding from Government to support the sector. In addition, sector-level organizations such as VANEX – buyers and farmer organizations - producers are generally weak at both national and district/ community level. There is a need to take initiatives and support interventions to enable effective regulation of production and trade in vanilla in Uganda. This should also include support to ensure enforcement of administrative measures by government and district local governments.
- 19) Gender equity and equality:** Using A-WEAI indicators plus other related indicators, it was reported that there was a fair performance in terms of gender equity and equality at household level. Cases of gender-based violence were however, reported and corroborated by the community leaders and this could significantly undermine vanilla production in their localities.
- 20) Child protection, labor and school attendance:** It was noted in interviews that child labor was increasing in vanilla production areas. This included reported cases of hazardous child labor. While most of the households (99%) reported that children of compulsory school age regularly attended school this finding could not be easily verified.
- 21) Household expenditure:** The average daily per capita for vanilla farmers in Uganda was 2.43 USD which is slightly higher than the national average of USD 2.24 per day¹⁶for the year 2020.

6.2 Recommendations

The following recommendations were made based on the findings and conclusions:

- 1) The need for capacity development was envisaged both at project design and during the baseline study. Several capacity development needs were identified at both stages, and these are categorised as:
 - a) Improved access to and adoption of productivity-enhancing technologies to improve land productivity (vanilla yields) and income of the farmers;
 - b) Vanilla-specific agronomic practices, including land and water resource management, and, agroforestry. These practices will contribute to overcoming low vanilla yields and increase production and productivity; reducing the rampant boom and bust cycles of production; and contribute to improving soil, water

¹⁶SOURCE: World Bank Website; [GDP per capita \(current USD\) - Uganda | Data \(worldbank.org\)](https://data.worldbank.org/UY)

- and land resources management. Importantly, this would improve farmers' incomes;
- c) Post-harvest management and quality control knowledge, skills and practices to improve marketability of vanilla through improved quality; and
 - d) Farming as a business: Financial and business skills will contribute to improved technical and financial efficiency, which in turn will increase income and profitability of the enterprise.
- 2) Increase farmer access to financial resources, with an emphasis on internal savings, in order to build a capital base, especially with SACCOs that will provide capital for investment in productivity - enhancing technologies, practices and services. Farmers' savings at household level should be linked to formal financial services for access to a bigger resource envelope as well as financial literacy. This is envisaged to provide a wider capital base for farmers and subsequently improve incomes for the farmers
 - 3) Efforts to provide effective and efficient market information services to improve access to market information among the traders and farmers should be developed and implemented. Such interventions should target both traders and farmers; and they include but are not limited to: carrying out market studies to generate the information; collating packaging and disseminating information timely; improving access to tools and equipment which aid information sharing use of multiple channels such as radios and phones; which are very common modes; as well as engaging public extension agents in information dissemination; should be promoted. This calls for harmonization with current Government frameworks and programmes, as well as other development initiatives.
 - 4) Support supply chain development that enables farmers and other supply chain actors to link up effectively and efficiently through information exchange and access to markets. Support to formation of, operationalization and development of platforms where key stakeholders in the vanilla value chain will provide an avenue for networking and partnership development for information exchange and market linkages. A detailed value chain analysis and mapping of vanilla value chain actors will form the basis for identifying the key actors to participate in the platforms.
 - 5) Farmer institutional development involving farmer mobilization, sensitization and organization is a continuous process. Formation and strengthening of farmer organizations allows for collective access to services across the value chain. Bulking of demand for agro-inputs and extension services; bulking of produce; access to processing facilities and collective marketing of vanilla to improve market access and farmer income will be achieved with farmer organization and institutional development. Farmer institutions should include community level farmers' groups which aggregate at sub-county, district or regional levels, and an apex body at the national level.
 - 6) There is a need to take steps to support the process of formulating an effective policy and regulatory framework for production and trade in vanilla in Uganda. Technical support through capacity development for the key stakeholders in the process is key. This should also include support to ensure enforcement of administrative measures by

government and district local governments (including passing relevant by-laws and ordinances). Development and enactment of such laws, ordinances and bye-laws should be followed by instruments and infrastructure for enforcement.

- 7) Efforts should be made to promote gender equity and equality in the vanilla industry. Such efforts should seek to address drivers of gender inequalities not only at household level but also at community level. These initiatives should also seek to eliminate gender-based violence (GBV), which is a common phenomenon in vanilla growing families. In addition, interventions to involve women and youth in vanilla value chain activities, which could be off-farm, should be promoted.
- 8) The project should develop and implement an effective communication and stakeholder engagement strategy to support the different pillars of the project. The strategy should take into consideration the key public and private sector players in the vanilla sub-sector, including service providers, implementers, managers and policy makers.
- 9) There is an urgent need for measures to ensure child protection and eliminate all forms of child labor in vanilla production. This issue is top-of-mind among global buyers. This will require the VINES project to analyze and quantify the problem and then work with community leaders and other stakeholders to educate and increase awareness among farmers and other important constituencies. Ordinances and bye-laws to minimize/eliminate child labour should be enacted and enforced by the respective communities.
- 10) The VINES project should review the project design documents and address the recommendations resulting from analysis of baseline questions and their implications regarding project relevancy, implementation and sustainability. Some of the proposed measures require immediate action while others could be addressed during the mid-term review.

APPENDICES

Appendix 1: The Vines Project Performance Indicators Table

Table 48: The vines project indicators table

GOAL: to increase and improve the supply of high-quality vanilla by improving productivity with 16,000 farmers, enhancing quality and compliance with food safety standards, and expand global trade in vanilla to meet growing international demand.							
#	Performance Indicator and disaggregates	Type	Standard / Custom	Baseline (proposal)	Actual Baseline	Standard Error (SE)	Confidence Interval (CI)
1	Yield of targeted agricultural commodities among program participants with USD.A Assistance0 ¹	Outcome	Standard #1	0.24 kg/vine	0.221Kg/Vine		
2	Value of annual sales of farms and firms receiving USDA assistance	Outcome	Standard #18	5.6 million US Dollars	Green (2.13 million US Dollars) Cured (2.61 million US Dollars)		
3	Volume of commodities sold by farms and firms receiving USDA assistance	Outcome	Standard #19	66 MT of cured vanilla	Green (905 MT)		
5	Daily per capita expenditures (as a proxy for income) in USG-assisted areas	Outcome	FTF #EG.3-a	1.50 US Dollars	2.43 US Dollars	0.583	(1.29, 3.57)
10	Number of hectares under improved management practices or technologies that promote improved climate risk reduction and/or natural resources management with USDA assistance	Outcome	Standard #2	0 hectares	2830.5 Hectares	262	(2319,3344)
11	Number of hectares under improved management practices or technologies with USDA assistance	Outcome	Standard #3	0 hectares			
12	Number of individuals in the agriculture system who have applied improved management practices or technologies with USDA assistance	Outcome	Standard #4	0 individuals			
13	Farmer's gross margin per hectare obtained with USG assistance	Outcome	FTF #EG.3-6, -7, -8	1,000 US Dollars /ha	332.8 US Dollars/ ha		
16	Number of individuals accessing agriculture-related financing as a result of USDA assistance	Output	Standard #5	0 individuals	61		

GOAL: to increase and improve the supply of high-quality vanilla by improving productivity with 16,000 farmers, enhancing quality and compliance with food safety standards, and expand global trade in vanilla to meet growing international demand.

19	Number of farmers who have reached at least a functional level of "land restoration and climate-risk management" and of "vanilla-based agroforestry management" competencies as a result of USDA assistance	Outcome	Custom	1,620 individuals	59	14.8	(29,88)
20	Number of farmers who have reached at least a functional level of financial and marketing competencies as a result of USDA assistance	Outcome	Custom	806 individuals	Overall, 44 Financial Competency 44 Market Competencies 73	8.87 8.87 11.28	(25.79, 60.45) (25.79, 11) (25.79, 60.45) (50,95) (49.97, 95.108)
21	Number of farmers receiving price premiums for vanilla quality and/or certification	Outcome	Custom	1,300 individuals	44	12	(22,68) (22, 68)
23	Farm gate price paid to producers for green vanilla	Outcome	Custom	10 US Dollars/kg	Average = 9 US Dollar/kg Main= 8 US Dollar/kg Fly= 10 US Dollar/Kg	0.300 0.247 0.358	(8.41,9.59) (7.52,8.48) (9.30,10.70)
24	Cured Vanilla Uganda export price FOB	Outcome	Custom	90 US Dollars/kg			
25	Volume of vanilla shipped to international markets	Outcome	Custom	66 MT	Missing data ¹⁷		
26	Volume of vanilla shipped that is rejected for not meeting quality or food safety standards	Outcome	Custom	6 MT	No available data		

¹⁷ This information is missing due to SMEs declining to provide some information they considered confidential or lack of cooperation with the research team partly attributed to existing mistrust among private sector actors coupled by absence of strong sector association that could unify the actors at the time of the study.

GOAL: to increase and improve the supply of high-quality vanilla by improving productivity with 16,000 farmers, enhancing quality and compliance with food safety standards, and expand global trade in vanilla to meet growing international demand.

27	Percentage of the volume of vanilla harvested that preserves its quality through post-harvest handling, curing and storage	Outcome	Custom	80 Percent	No available data		
28	Number of international buyers purchasing vanilla from Uganda	Outcome	Custom	25 buyers	Missing data ¹⁸		
29	Quality and inclusiveness of buyer-seller relations ^{1Fii}	Outcome	Custom	Score=25 of a maximum of 100	Producers= 41% Buyers=70%		
30	Number of Exporters, Aggregators, Traders, Processors, Farmer Organizations Who Use Traceability Systems	Outcome	Custom	0 organizations	2 (Amfri Farms and Enimiro)		
31	Number of processors who implemented practices to meet export quality standards for vanilla	Outcome	Custom	3 processors	2 (Timex, Amfri farm)		
32	Number of processors who implemented at least 2 improved vanilla post-productions, processing, or handling practices	Outcome	Custom	3 processors	6		
35	Value of agriculture-related financing accessed as a result of USDA assistance	Output	Standard #8	0 thousand US Dollars	0		
36	Number of Active Community-Level Surveillance Committees to Enforce Vanilla Ordinances	Outcome	Custom	0 Community Surveillance Committees	0		
37	Number of vanilla ordinances enforced	Outcome	Custom	0 ordinances	1		
38	Number of policies, regulations and/or administrative procedures in each of the following stages of development as a result of USDA assistance	Output / Outcome	Standard #17	0 ordinances			
39	Number of farmers who access climate information for decision-making	Outcome	Custom	0 individuals	1083	74.5	(939,1229)

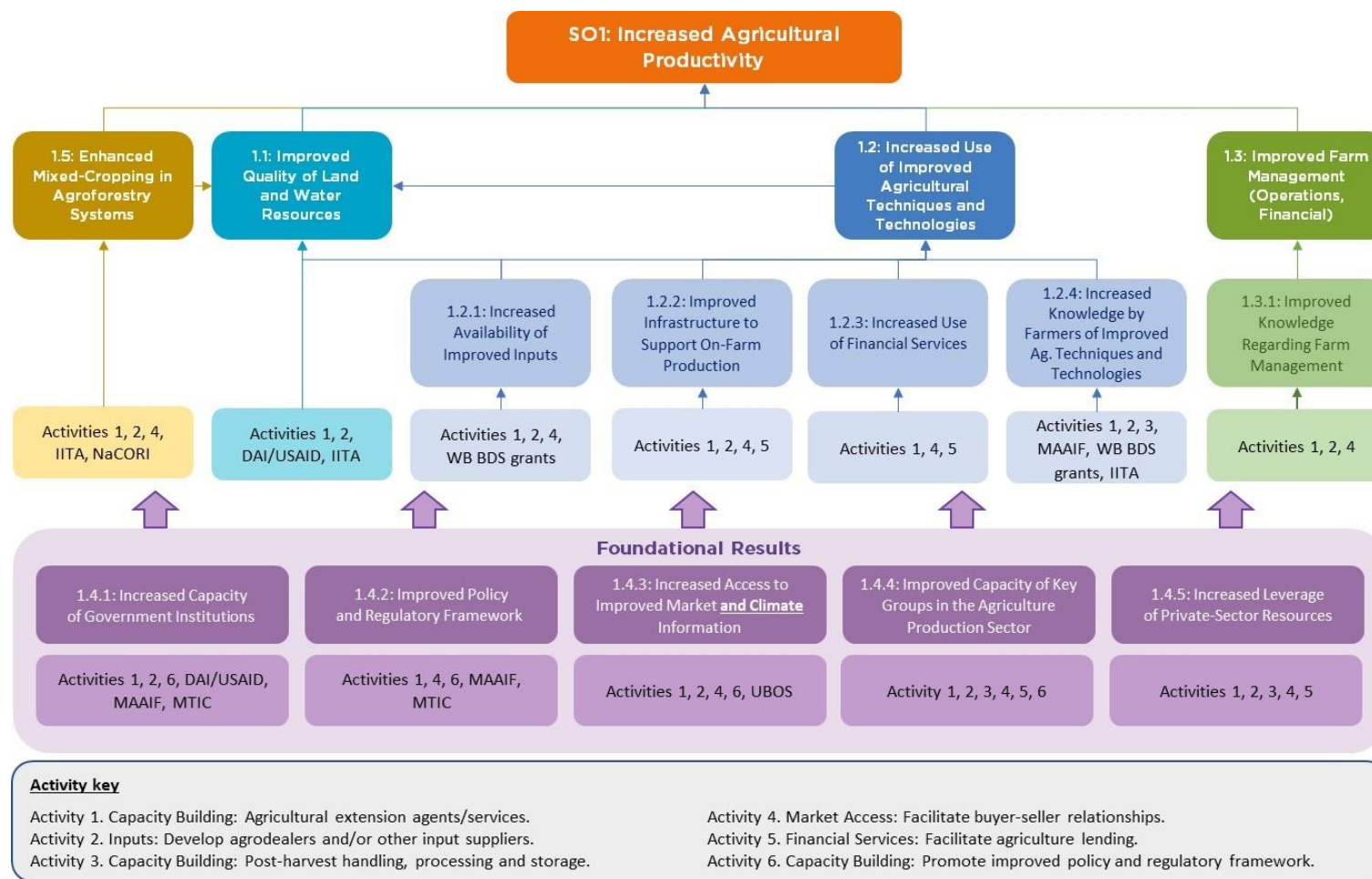
¹⁸ This information is missing due to SMEs declining to provide some information they considered confidential or lack of cooperation with the research team partly attributed to existing mistrust among private sector actors coupled by absence of strong sector association that could unify the actors at the time of the study.

GOAL: to increase and improve the supply of high-quality vanilla by improving productivity with 16,000 farmers, enhancing quality and compliance with food safety standards, and expand global trade in vanilla to meet growing international demand.

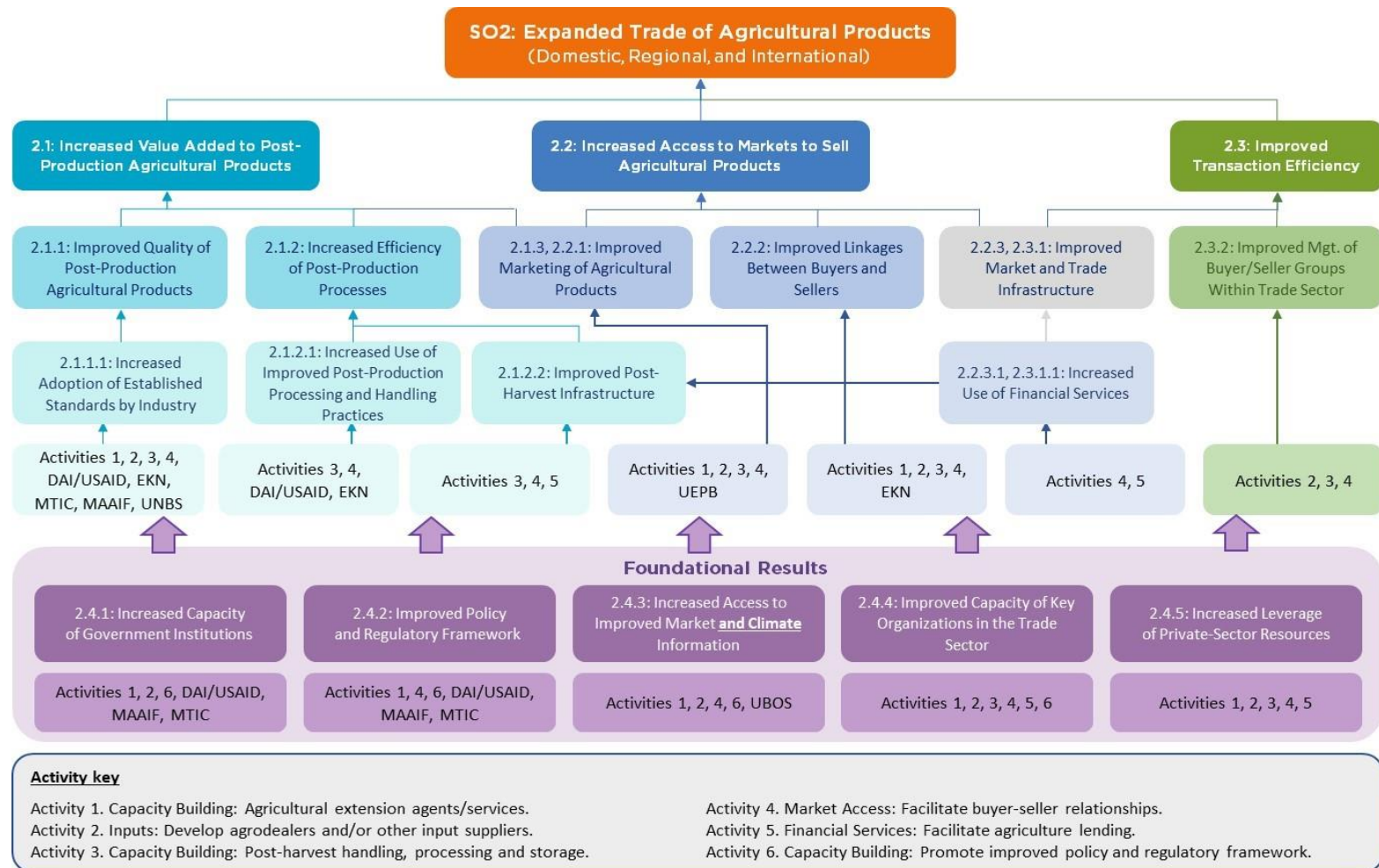
40	Number of farmers and firms who access market information for decision-making	Output	Custom	0 individuals	2286 Farmers	86.2	(2120,2455)
44	Abbreviated Women's Empowerment in Agriculture Index – Percent improvement over the baseline value in the indicator on control over use of income	Outcome	FTF - EG.3-f	0%	74	2.5	(69.4,79.2)
45	Percentage (%) of livelihood service participant HHs with at least one child engaged in child labor: a. Percentage of livelihood service participant HHs with at least one child engaged in child labor b. Percentage of livelihood service participant HHs with at least one child engaged in hazardous child labor	Outcome	USDOL /OCFT POH1, POH2, POH3	% Of participant children a.30% b.15%	12.3% (65/530) 9.8% (52/530)	1.4% 1.3%	(9.4%,.15.1%) (7.3%, 12.3%)
46	Percentage (%) of livelihood service participant HHs with all children of compulsory school age regularly attending school	Outcome	USDOL /OCFT POH4	50% of participant children	98.57% (483/530)	1.2%	(88.7%, 93.6%)

Appendix II: Vines Project Results Framework

Project Level Framework #1



Project Level Framework #2



Appendix III: Data collection tools

TOOL 1: VANILLA PRODUCERS' SURVEY – ALL MODULES FOR BASELINE ASSESSMENT

LABEL	TYPE	VALUES
MODULE I: INTRODUCTION AND CONSENT		
Interviewer Name:	Text	
Date:		
Data is collected as part of	Select	<input type="checkbox"/> Baseline [modules I, II, III, IV, V, VI, and VII] <input type="checkbox"/> 2021 Main Season Pre-Harvest Monitoring [module I, II, III and V - pre-harvest during growing season] <input type="checkbox"/> 2021 Main Season Post-Harvest Monitoring [module I, IV - after harvest and sale (by phone?)] <input type="checkbox"/> 2021 Fly Season Pre-Harvest Monitoring [module I, II, III and V - during growing season] <input type="checkbox"/> 2021 Fly Season Post-Harvest Monitoring [module I, IV - after harvest and sale (by phone?)] <input type="checkbox"/> 2022 Main Season Pre-Harvest Monitoring [module I, II, III and V - during growing season] <input type="checkbox"/> 2022 Main Season Post-Harvest Monitoring [module I, IV - after harvest and sale (by phone?)] <input type="checkbox"/> 2022 Fly Season Pre-Season Monitoring [module I, II, III and V - during growing season] <input type="checkbox"/> 2022 Fly Season Post-Harvest Monitoring [module I, IV- after harvest and sale (by phone?)] <input type="checkbox"/> Midterm [modules I, , VI, and VII] <input type="checkbox"/> 2023 Main Season Pre-harvest Monitoring [module I, II, III and V - during growing season] <input type="checkbox"/> 2023 Main Season Post-Harvest Monitoring [module I, IV- after harvest and sale (by phone?)] <input type="checkbox"/> 2023 Fly Season Pre-Harvest Monitoring [module I, II, III and V - during growing season] <input type="checkbox"/> 2023 Fly Season Post-Harvest Monitoring [module I, IV- after harvest and sale (by phone?)] <input type="checkbox"/> 2024 Main Season Pre-Harvest Monitoring [module I, II, III and V - during growing season] <input type="checkbox"/> 2024 Main Season Post-Harvest Monitoring [module I, IV- after harvest and sale (by phone?)] <input type="checkbox"/> 2024 Fly Season Pre-Harvest Monitoring [module I, II, III and V - during growing season]

LABEL	TYPE	VALUES
		<input type="checkbox"/> 2024 Fly Season Post-Harvest Monitoring [module I, IV - after harvest and sale (by phone?)] <input type="checkbox"/> Endline [modules I, VI, and VII]
Vanilla Producer ID		
		<ul style="list-style-type: none"> • Greetings, my name is _____, I am working for _____ who is conducting a farmer survey for the “VINES” project that CRS and Technoserve is starting to implement with support from the US Department of Agriculture to enhance vanilla farming and business over the next few years. • You have already been registered as a VINES project participant and the objective of this visit is to learn more about your vanilla production system by interviewing you while we visit your vanilla fields. • This information will be very important to plan for the different project activities and ensure that available resources are allocated in a way that address your needs and priorities as a vanilla farmer. • Since the project is just starting its implementation, this is the first time we are visiting you, and we would like to visit your vanilla fields; this visit will take approximately 3 hours.
I.1 Do you have the time now to visit your vanilla fields and to participate in this interview?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
I.2 Can we comeback? Or do you prefer not to participate?	Select	<input type="checkbox"/> Please come back <input type="checkbox"/> Prefer not to participate
		<ul style="list-style-type: none"> • The information collected from you will be combined with information collected from other vanilla producers who will be participating in the project, and we will not disclose your name and what you have told us to others. • By accepting to participate in this interview, you hereby consent to the collection, sharing, processing and use of your personal data as required for the implementation of the “VINES” project.
I.3 Do we have your consent?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.4 Are you a VINES direct project participant?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
1.5 Who is the main buyer for your vanilla?	Select	<input type="checkbox"/> Gourmet Gardens Ltd <input type="checkbox"/> Enimiro <input type="checkbox"/> Touton <input type="checkbox"/> UVAN Ltd <input type="checkbox"/> ESCO Uganda Ltd <input type="checkbox"/> RFCU <input type="checkbox"/> Trader/Local Buyer

LABEL	TYPE	VALUES
		<input type="checkbox"/> None of the above
<ul style="list-style-type: none"> • Thanks a lot for agreeing to participate and for your consent. • We ask you to be honest as there are no right or wrong answers, and your experience as a vanilla producer is unique. • You should not hesitate to let me know if you do not understand a question, I will be more than happy to explain. • If you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time. 		
MODULE IIA: VANILLA FIELD REGISTRATION AND INFORMATION		
<ul style="list-style-type: none"> • We will now walk to your vanilla field(s), delimit them as the interview will focus on these fields, and will take a measurement of your fields area. 		
II.1.1 Vanilla field 1 area	Number	Acres:
II.1.2 GPS Location Vanilla field 1	Number	Coordinates:
II.1.3 Number of vines in vanilla field 1	Number	Number of vines:
II.1.4 Number of vanilla vines under production in vanilla field 1	Number	Number of vines:
II.1.5 How old is this vanilla field (1)?	Number	Years:
II.1.6 What are the other cash and food crops grown in this vanilla field (1)?	Select	<input type="checkbox"/> Amaranth/Dodo <input type="checkbox"/> Avocado <input type="checkbox"/> Bananas (desert type) <input type="checkbox"/> Beans <input type="checkbox"/> Black pepper <input type="checkbox"/> Cabbage <input type="checkbox"/> Carrots <input type="checkbox"/> Cashew <input type="checkbox"/> Cassava <input type="checkbox"/> Citrus (Lemon and Oranges) <input type="checkbox"/> Cocoa <input type="checkbox"/> Coffee <input type="checkbox"/> Cowpeas <input type="checkbox"/> Eggplant <input type="checkbox"/> Ginger <input type="checkbox"/> Groundnuts <input type="checkbox"/> Guava <input type="checkbox"/> Honey/Beehives <input type="checkbox"/> Irish Potato

LABEL	TYPE	VALUES
		<input type="checkbox"/> Jackfruit <input type="checkbox"/> Macadamia <input type="checkbox"/> Maize <input type="checkbox"/> Mango <input type="checkbox"/> Matooke (cooking type) <input type="checkbox"/> Paw Paw <input type="checkbox"/> Pigeon peas <input type="checkbox"/> Pineapples <input type="checkbox"/> Pumpkin <input type="checkbox"/> Rice <input type="checkbox"/> Sesame <input type="checkbox"/> Sorghum <input type="checkbox"/> Soursop (Ekitaferi) <input type="checkbox"/> Soybeans <input type="checkbox"/> Sugar Cane <input type="checkbox"/> Sweet potato <input type="checkbox"/> Tomato <input type="checkbox"/> Turmeric <input type="checkbox"/> Yam <input type="checkbox"/> Other (please specify): _____
II.1.7 Which are the most important other crops grown in your vanilla fields? (select the four most important).	MSelect limited to only 4 choices	Exact same list as above once revised and finalized.
II.1.7.1 Alternative Crop #1	Select	First crop selected in Q. II.1.6
II.1.7.2 Alternative Crop #2	Select	Second crop selected in Q. V.2
II.1.7.3 Alternative Crop #3	Select	Third crop selected in Q. V.2
II.1.7.4 Alternative Crop #4	Select	Fourth crop selected in Q. V.2
II.1.8 Number of coffee trees in the vanilla field (1)	Number	Number of coffee plants:
II.1.9 Number of coffee trees <u>under production</u> in the vanilla field (1)	Number	Number of coffee plants:
II.1.10 Number of cocoa trees in the vanilla field (1)	Number	Number of coffee plants:
II.1.11 Number of cocoa trees <u>under production</u> in the vanilla field (1)	Number	Number of coffee plants:
II.1.12 Number of matooke (cooking type) plants in the vanilla field (1)	Number	Number of matooke (cooking type) plants:

LABEL	TYPE	VALUES
II.1.13 Number of matooke (cooking type) plants <u>under production</u> in the vanilla field (1)	Number	Number of matooke (cooking type) plants
II.1.14 Number of banana (desert type) plants in the vanilla field (1)	Number	Number of banana (desert type) plants:
II.1.15 Number of banana plants (desert type) <u>under production</u> in the vanilla field (1)	Number	Number of banana (desert type) plants:
Same questions asked for Vanilla Field 1 Information		
Same questions asked for Vanilla Field 1 Information		
Same questions asked for Vanilla Field 1 Information		
MODULE IIB: VANILLA PRODUCTION PRACTICES AND COSTS		
<ul style="list-style-type: none"> The following questions refer to the practices you implemented in your vanilla plots during the last two harvests (Fly: August 2020-January 2021 and Main: February-July 2021) 		
II.5 Land tenure and costs		
II.5.1 Do you own all the land where you planted vanilla?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.5.2 What percentage of this land do you own?	Number	Percentage:
II.5.3 What was the annual rental charges?	Number	<input type="checkbox"/> Ugandan shillings
II.6.1 Did you prepare land for planting vanilla during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.6.2 How many workdays of family labor was used in preparing the land during the last two harvests?	Number	Workdays
II.6.3 How many workdays of hired labor were used in preparing the land during the last two harvests?	Number	Workdays
II.6.4 How much did you pay on average for the hired labor during the last two harvests?	Number	Ugandan shillings/workday
II.7.1 Did you plant vanilla vines during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.7.2 What did you do in preparation for planting the vines?	MSelect Semi-structure interview type	<input type="checkbox"/> Selected a suitable site for planting, with fertile soils. <input type="checkbox"/> Selected well drained soils that prevent waterlogging. <input type="checkbox"/> Sourced tutors/support trees, matching tutor purchases with vine purchases.

LABEL	TYPE	VALUES
	question, open-ended question, and probing	<input type="checkbox"/> Prepared land for tutor/support tree planting. <input type="checkbox"/> Planted tutors/support trees 4-5 months before planting the vanilla vines for ensuring that they reach the needed thickness (5 cm) and height (about 6 ft) to allow proper growth of the vine. <input type="checkbox"/> Sourced quality and disease-free vines of a length over 1 m from mother gardens. <input type="checkbox"/> Prepared mulch and organic manure to restore soil and water and support the planted vines. <input type="checkbox"/> None of the above.
II.7.3 What did you consider when planting the vines and how did you do it?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Established 320-400 vines per acre, taking into consideration soil and water conditions. <input type="checkbox"/> Planted vines at a spacing of 3x3 m and 30 cm depth for optimum plant growth. <input type="checkbox"/> Planted vines during the rainy season. <input type="checkbox"/> Ensured that vines are well-covered with mulch. <input type="checkbox"/> Applied organic manure around the vine at about 30 cm away from the plant. <input type="checkbox"/> Trained the plant on the tutor and allow tendrils to establish around the tutor for a solid anchor of the vine. <input type="checkbox"/> None of the above
II.7.4 How many vanilla vines did you plant?	Number	Vines:
II.7.5 In what area did you plant these vines?	Number	Acres:
II.7.6 How many workdays of family labor did you use in planting vines?	Number	Workdays
II.7.7 How many workdays of hired labor did you use in planting the vines?	Number	Workdays
II.7.8 How much did you pay for the hired labor?	Number	Ugandan shillings/workday
II.7.9 Did you buy the vanilla vines?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.7.10 From whom did you buy the vines?	MSelect	<input type="checkbox"/> Another farmer <input type="checkbox"/> Farmer organization <input type="checkbox"/> Processors <input type="checkbox"/> Other (specify) _____
II.7.11 Number of vines purchased	Number	Vines

LABEL	TYPE	VALUES
II.7.12 Price paid per vine	Number	Ugandan shillings/vine
II.7.13 How much did you pay to transport the vines to your vanilla fields?	Number	Ugandan shillings
II.8 Trees and permanent crops planting		
II.8.1 Did you plant trees or permanent crops in your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.8.2 What did you consider when selecting which trees or permanent crops to plant in your vanilla fields?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Selected multipurpose trees/crops (food, fodder, timber, income...) based on the production potential of the land. <input type="checkbox"/> Selected trees/crops based on their function in the production system (soil fertility improvement, biomass production, shade, tutoring...). <input type="checkbox"/> Reflected on observed changes in climate over time. <input type="checkbox"/> Accessed historical climate information to understand its variability and trends. <input type="checkbox"/> Compared information on historical climate variability and trends with observed climate changes over time. <input type="checkbox"/> Used their understanding of historical climate variability and trends to decide what trees or permanent crops to plant and/or remove. <input type="checkbox"/> Used their understanding of historical climate variability and trends to make investment decisions in their vanilla fields. <input type="checkbox"/> None of the above
II.8.3 What did you do to plant trees or permanent crops in your vanilla fields?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Assigned resources (inputs, labor, land) to establish the selected crops/trees. <input type="checkbox"/> Sourced quality seed or seedlings of selected trees/crops. <input type="checkbox"/> Planted selected trees/crops during the rainy season to improve survival rates and ensure growth. <input type="checkbox"/> Planted temporary/fast growing shade crops (banana, plantain...) to provide shade as trees grow. <input type="checkbox"/> Planted short-term shade trees that mature within 10 years. <input type="checkbox"/> Planted longer-term trees that take more than 20 years to mature, ensuring sustainability. <input type="checkbox"/> Applied recommended spacing of trees inside the farm, 12m-15m inside the farm. <input type="checkbox"/> Applied recommended spacing of trees along the boundary, 5m-8m apart.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Pruned established trees/permanent crops to ensure 30-50% shade during the rainy season, and 50-70% shade during the dry season. <input type="checkbox"/> None of the above
II.8.4 How many workdays of family labor did you use in planting the trees?	Number	Workdays
II.8.5 How many workdays of hired labor did you use in planting the trees?	Number	Workdays
II.8.6 How much did you pay on average for the hired labor during the last two harvests?	Number	Ugandan shillings/workday
II.8.7 Did you purchase the planting materials to plant the trees?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.8.8 How much did you pay for these planting materials?	Number	Ugandan shillings:
II.8.9 How much did you pay to transport these planting materials to your vanilla fields?	Number	Ugandan shillings
II.9 Vanilla vines management practices (shade tree pruning, vines pruning, training, and looping; mulching; pollinization; preparing and applying organic manure/compost)		
II.9.1 What practices did you applied to manage your vanilla vines and tutors/support trees?	MSelect Semi-structure interview type question, open-ended question, and probing	<input type="checkbox"/> Trained vines firmly on the tutors/support trees, to facilitate looping, pollination and harvesting. <input type="checkbox"/> Conducted hand weeding ensuring minimal soil disturbance <input type="checkbox"/> Mulched the vanilla field with dry grass, crop residues and leaf litter towards the end of the rainy season. <input type="checkbox"/> Pruned vines to maintain a maximum of 8 loops, removing old, diseased, weak, and damaged vines. <input type="checkbox"/> Pruned the tutors/support trees to regulate the amount of shade and sun. <input type="checkbox"/> Produced organic manure using kitchen refuse/waste, crop residues and animal droppings. <input type="checkbox"/> Used vermiculture (growing of earthworms) to produce high quality compost. <input type="checkbox"/> Applied organic manure/compost to the soil around the vine and intercrops during the rainy season. <input type="checkbox"/> Limited the number of vanilla clusters to 10-20 per vine depending on soil and water conditions.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Limited the number of beans per cluster to 8-12 for avoiding excessive bearing and stressing of the plant and increase bean size. <input type="checkbox"/> Pollinated 10-12 flowers per cluster. <input type="checkbox"/> Looped vines at two feet from the tutor during the rainy season. <input type="checkbox"/> Covered looping area with a combination of soil and mulch. <input type="checkbox"/> None of the above
Vanilla training, pruning, looping, shade tree pruning, weeding, and mulching		
II.9.2 Did you train, prune, or loop your vines, prune your shade trees, mulch or weed your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.3 How many workdays of family labor did you use to perform these activities?	Number	Workdays
II.9.4 How many workdays of hired labor did you use to perform these activities?	Number	Workdays
II.9.5 How much did you pay on average for the hired labor to perform these activities during the last two harvests?	Number	Ugandan shillings/workday
Pollination		
II.9.6 Did you pollinate vanilla flowers during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.7 How many workdays of family labor did you use to pollinate vanilla flowers?	Number	<input type="checkbox"/> Workdays
II.9.8 How many workdays of hired labor did you use to pollinate vanilla flowers?	Number	<input type="checkbox"/> Workdays
II.9.9 How much did you pay on average during the last two harvests for the hired labor?	Number	<input type="checkbox"/> Ugandan shillings/workday
II.9.10 Who usually pollinates vanilla in your fields?	MSelect	<input type="checkbox"/> Adult men (30+ years) <input type="checkbox"/> Adult women (30+ years) <input type="checkbox"/> Young male adults (18-29) <input type="checkbox"/> Young female adults (18-29) <input type="checkbox"/> Male children <input type="checkbox"/> Female children

LABEL	TYPE	VALUES
Organic manure/compost application and control of pests or diseases,		
II.9.11 Did you apply organic manure/compost to your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.12 How much did you pay for producing/buying organic manure/compost and transporting it for your vanilla fields?	Number	<input type="checkbox"/> Ugandan shillings
II.9.13 Did any pest or disease affect your vanilla plants (before you harvested) during the last two harvest seasons?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.14 What have you done to prevent and/or control pests and diseases in your vanilla fields?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Prevented vanilla diseases by using clean and good quality vines. <input type="checkbox"/> Prevented vanilla diseases by avoiding waterlogging. <input type="checkbox"/> Monitored the vanilla fields to identify the presence of diseases. <input type="checkbox"/> Scouted the vanilla fields for pests such as slugs, snails, and caterpillars. <input type="checkbox"/> Used cultural practices (hand picking, destroying pests where possible). <input type="checkbox"/> Ensured timely weeding as part of pest and disease control method. <input type="checkbox"/> Ensured timely pruning of vines, tutors/support trees, and shade trees as part of the pest and diseases control methods. <input type="checkbox"/> Applied pesticides only if pest and disease thresholds have been reached. <input type="checkbox"/> Used botanical pesticides whenever possible. <input type="checkbox"/> None of the above
II.9.15 Did you monitor pests and/or diseases in your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.16 Did you control pests and/or diseases in your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.17 How much did you spend buying the inputs to control pests and/or diseases in your vanilla fields?	Number	<input type="checkbox"/> Ugandan shillings
II.9.18 How many workdays of family labor did you use to control pests and/or diseases in your vanilla fields?	Number	<input type="checkbox"/> Workdays

LABEL	TYPE	VALUES
II.9.19 How many workdays of hired labor did you use to control pests and/or diseases?	Number	<input type="checkbox"/> Workdays
II.9.20 How much did you pay on average for the hired labor during the last two harvests to perform these activities?	Number	<input type="checkbox"/> Ugandan shillings/workday
Planning for climate risk-management for the harvest season and during the harvest season		
II.9.21 Did you use seasonal weather forecasts on climate variability throughout the harvest season to select your vanilla cropping practices, and/or the timing to implement them while planning your activities for the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.22 What have you done to consider seasonal weather forecasts on climate variability throughout the year to inform these decisions?	MSelect Semi-structure interview type question, requires probing.	<input type="checkbox"/> Identified the moments across the year when different activities are carried out on the vanilla fields (seasonal calendar) and related them to the climate to understand how it affects production. <input type="checkbox"/> Considered the probability of occurrence of abnormal or extreme events in deciding whether to plant crops, which crops to plant and/or when to plant them. <input type="checkbox"/> Considered the probability of occurrence of abnormal or extreme weather events to select practices for the management of their vanilla fields. <input type="checkbox"/> None of the above
II.9.23 Did you use daily or weekly weather forecasts, local weather indicators or weather alerts to adjust your cropping practices during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
II.9.24 What have you done to consider daily or weekly weather forecasts, local weather indicators or weather alerts to inform these decisions?	Semi-structure interview type question, with MSelect	<input type="checkbox"/> Reviewed decisions made before starting the harvest season based on local climate indicators, updated weather forecasts, and weather alerts. <input type="checkbox"/> Adjusted practices during the harvest season if necessary. <input type="checkbox"/> Monitored the development of crops, considering weather forecasts and weather warnings. <input type="checkbox"/> Reflected on the results achieved with the use of climate information to make decisions for the next harvest season.

LABEL	TYPE	VALUES
		<input type="checkbox"/> None of the above.
MODULE III: NRM AND CLIMATE-RISK MANAGEMENT COMPETENCIES		
<ul style="list-style-type: none"> The following questions refer to the actions you took during the last two harvests (Fly: August-January 2020 and Main: February-July 2021) to restore and protect your natural resources. 		
III.1 Planning for Land Restoration and Climate-Risk Management Competency		
III.1.1 Did you use vanilla market information to inform your production decisions?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.1.2 What did you consider when selecting crops to integrate in your vanilla field(s)?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Used soil analysis or visual soil assessment to select crops <input type="checkbox"/> Selected crops based on the production potential of their vanilla fields. <input type="checkbox"/> Selected crops that are important for their household nutrition. <input type="checkbox"/> Selected crops that have market demand. <input type="checkbox"/> None of the above
III.1.3 What did you consider when planning for the use of land in your vanilla field(s) and for selecting cropping practices?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Used soil analysis/visual soil assessment to select planting areas. <input type="checkbox"/> Used soil analysis/visual soil assessment to select cropping practices. <input type="checkbox"/> Planned the use of their land based on the selected crops, optimizing the available space. <input type="checkbox"/> Planned the use of their land based on access to water. <input type="checkbox"/> Assigned resources (inputs, labor, land...) to implement selected practices. <input type="checkbox"/> None of the above
III.2 Conservation and Regenerative Agriculture Competency		
III.2.1 How did you prepare the soil for planting new crops in your vanilla fields and how did you manage weeds?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Used land preparation methods that minimize soil disturbance. <input type="checkbox"/> Used weeding option that minimize soil disturbance. <input type="checkbox"/> Used direct planting and seeding techniques. <input type="checkbox"/> None of the above.

LABEL	TYPE	VALUES
III.2.2 What have you done to protect the soil in your vanilla fields?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Avoided burning crop residue, pruning residues or leaf litter. <input type="checkbox"/> Kept the soil permanently covered with mulch, crop residue, live plants, or other materials. <input type="checkbox"/> Selected cover crops and/or green manures based on the production system. <input type="checkbox"/> Selected cover crops and/or green manures based on the agroecological zone. <input type="checkbox"/> Established selected cover crops or green manures. <input type="checkbox"/> Managed cover crops or green manure. <input type="checkbox"/> Saved seed from their cover crops or green manure to plant in the next season. <input type="checkbox"/> Used saved cover crops or green manure seed for new plantings. <input type="checkbox"/> None of the above
III.2.3 What did you do to combine diverse crops and/or trees in your vanilla fields?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Established a crop rotation system on their land. <input type="checkbox"/> Selected species with complementary growth habits for intercropping. <input type="checkbox"/> Implemented intercropping practices on their plots of land. <input type="checkbox"/> Integrated permanent crops and trees in their land. <input type="checkbox"/> Managed dispersed trees on their land. <input type="checkbox"/> Managed natural regeneration. <input type="checkbox"/> None of the above
III.3 Integrated Soil Fertility Management Competency		
III.3.1 How did you identify the nutrient/fertilizer needs of your vanilla and the other crops in your vanilla fields?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Evaluated the condition of their soil condition using the visual soil assessment (VSA) method. <input type="checkbox"/> Conducted soil sampling following the protocol established by the field or extension agent. <input type="checkbox"/> Interpreted the results of the visual soil assessment and/or the soil analysis. <input type="checkbox"/> Identified soil nutrition limitations based on crop nutrition needs. <input type="checkbox"/> Made crop nutrition decisions based on interpretation of soil analysis and/or VSA results. <input type="checkbox"/> None of the above
III.3.2 What did you do to meet the nutrient/fertilizer needs of your vanilla	MSelect Semi-structure	<input type="checkbox"/> Applied organic fertilizers to meet their crops' nutritional needs.

LABEL	TYPE	VALUES
and the other crops in your vanilla fields?	interview type question, open-ended question, and probing.	<input type="checkbox"/> Applied inorganic fertilizers to meet their crops' nutritional needs. <input type="checkbox"/> Combined organic and inorganic sources to meet their crops' nutritional needs. <input type="checkbox"/> Applied the right dose of the selected products based on identified crop needs. <input type="checkbox"/> Applied selected products in the right place according to the crop, the nutrients applied and plot slope. <input type="checkbox"/> Applied selected products at the right time based on crops needs. <input type="checkbox"/> Selected and applied selected products to correct soil acidity if needed. <input type="checkbox"/> None of the above
Fertilization costs		
III.3.3 Did you apply inorganic fertilizers in your vanilla fields?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.3.4 How much did you pay for inorganic fertilizers?	Number	Ugandan shillings
III.3.5 How much did you pay to transport the fertilizers to your vanilla fields?	Number	Ugandan shillings
III.3.6 How many workdays of family labor did you use to apply fertilizers in your vanilla fields?	Number	Workdays:
III.3.7 How many workdays of hired labor did you use to apply fertilizers in your vanilla fields?	Number	Workdays:
III.3.8 How much did you pay for the hired labor?	Number	Ugandan shillings/workday:
III.4 Efficient Water Resources Management Competency		
III.4.1 What did you do to keep moisture in your soil?	MSemi-structure interview type question, open-ended	<input type="checkbox"/> Captured rainwater in the soil where it falls (e.g., zai holes/pits, half-moons/demi-lunes, box ridges) <input type="checkbox"/> Kept the soil permanently covered with mulch, crop residue, living plants or other materials. <input type="checkbox"/> Broke hardened layers of soil to improve soil structure to increase water infiltration. <input type="checkbox"/> None of the above

LABEL	TYPE	VALUES
	question, and probing.	
Costs of implementing water infiltration practices		
III.4.2 Did you implement practices to improve water infiltration (shallow pits, bunds, rock / green cover lines, swales) in your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.4.3 How many workdays of family labor did you use during the last two harvests to implement water infiltration practices in your vanilla fields?	Number	<input type="checkbox"/> Workdays
III.4.4 How many workdays of hired labor did you use during the last two harvests to implement water infiltration practices in your vanilla fields?	Number	<input type="checkbox"/> Workdays
III.4.5 How much did you pay on average during the last two harvests for the hired labor?	Number	<input type="checkbox"/> Ugandan shillings/workday
Costs of practices for slowing water off the slopes		
III.4.6 Did you implement practices to ensure that water moves slowly off slopes in your vanilla fields during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.4.7 What did you do to ensure that water moves slowly off the slopes in your fields?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Built contour trenches along the slope (with or without infiltration pits). <input type="checkbox"/> Planted vegetative cover or live barriers along the contour. <input type="checkbox"/> Protected contour trenches with vegetative cover, live barriers, or other materials. <input type="checkbox"/> Covered steep hillsides with trees or plants with strong roots. <input type="checkbox"/> Planted crops in rows that are perpendicular to the slope. <input type="checkbox"/> Diverted runoff water to farmland and gardens during the rainy season. <input type="checkbox"/> None of the above
III.4.8 How many workdays of family labor did you use to implement practices for slowing water runoff in your vanilla fields?	Number	<input type="checkbox"/> Workdays

LABEL	TYPE	VALUES
III.4.9 How many workdays of hired labor did you use to implement practices for slowing water runoff in your vanilla fields?	Number	<input type="checkbox"/> Workdays
III.4.10 How much did you pay for the hired labor?	Number	<input type="checkbox"/> Ugandan shillings/workday
Costs of practices for capturing, storing and using water for multiple purposes		
III.4.11 Did you implement practices to capture, store, and use water for multiple purposes during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.4.12 What did you do to capture, store, and use water for multiple purposes?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Built water reservoirs to capture and store excess runoff. <input type="checkbox"/> Protected water reservoirs to reduce runoff. <input type="checkbox"/> Protected water reservoirs to prevent contamination. <input type="checkbox"/> Maintained water reservoirs. <input type="checkbox"/> Took measures to prevent mosquitoes from multiplying in water reservoirs. <input type="checkbox"/> Make joint decisions with their spouse/partner on the use of stored water. <input type="checkbox"/> Selected irrigation methods based on their efficiency and accessibility. <input type="checkbox"/> None of the above
III.4.13 Did you irrigate your vanilla plots during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.4.14 What proportion of your vanilla fields did you irrigate?	Number	Percentage:
III.4.15 How much did you spend on harvesting water and/or irrigating your vanilla fields?	Number	Ugandan shillings
III.5 Continuous Learning and Innovation Competency		
III.5.1 Did you face any problems in relation to your vanilla production activities and/or the management of your vanilla fields?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.5.1 Did you identified new opportunities in relation to your vanilla	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No

LABEL	TYPE	VALUES
production activities and/or the management of your vanilla fields?		
III.5.2 Did you try new things to address identified problems or opportunities?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
III.5.3 What did you do to address identified problems and/or opportunities in your vanilla fields?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Identified problems and opportunities for innovation. <input type="checkbox"/> Analyzed problems and opportunities for innovation. <input type="checkbox"/> Prioritized problems and/or opportunities for innovation. <input type="checkbox"/> Accessed information, including local knowledge, to identify solutions or innovations. <input type="checkbox"/> Established trials to compare identified solutions with traditional practices. <input type="checkbox"/> Recorded observations from comparisons between identified solutions and traditional practices. <input type="checkbox"/> Evaluated the results of these comparisons to make decisions. <input type="checkbox"/> Selected the most appropriate solutions that address identified problems or opportunities. <input type="checkbox"/> Tested the selected solutions on a small area of their land. <input type="checkbox"/> Applied tested solutions that worked well to a larger area of their land. <input type="checkbox"/> Shared their results and learning with their neighbors and others in their community. <input type="checkbox"/> Shared their results and learning beyond their community. <input type="checkbox"/> None of the above
MODULE IV: VANILLA PRODUCTION AND VALUE OF SALES		
Vanilla Producer ID		
<ul style="list-style-type: none"> The following questions refer to the actions you took during the last two harvests (Fly: August-January 2020 and Main: February-July 2021) to restore and protect your natural resources. 		
IV.1 Main harvest season (February-July 2021).		
IV.1.0 Did you harvest your vanilla during the Main harvest season (February-July 2021)?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
Security costs		
IV.1.1 Did you guard your vanilla fields from theft?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.2 How many workdays of family labor did you use for guarding your vanilla fields?	Number	<input type="checkbox"/> Workdays

LABEL	TYPE	VALUES
IV.1.3 How many months did you hire labor to guard your vanilla fields from theft?	Number	<input type="checkbox"/> Months
IV.1.4 How much did you pay to hire labor for guarding your vanilla fields?	Number	<input type="checkbox"/> Ugandan shillings/month
IV.1.5 Did you construct a fence to protect your vanilla fields from theft?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.6 What kind of fence did you use?	MSelect	<input type="checkbox"/> Live fence <input type="checkbox"/> Barbed wire fence <input type="checkbox"/> Razor wire fence <input type="checkbox"/> Wall fence <input type="checkbox"/> Other (please specify)
IV.1.7 Was the fence an effective measure to prevent theft in your vanilla fields?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.8 How much did the fence cost?	Number	Ugandan shillings:
Harvest and postharvest practices		
IV.1.9 When did you pollinate your vanilla vines for the Main harvest (February-July 2021)?	MSelect	<input type="checkbox"/> July 2020 <input type="checkbox"/> August 2020 <input type="checkbox"/> September 2020 <input type="checkbox"/> October 2020 <input type="checkbox"/> November 2020 <input type="checkbox"/> December 2020
IV.1.10 When did you harvest your vanilla during the Main harvest?	MSelect	<input type="checkbox"/> April 2021 <input type="checkbox"/> May 2021 <input type="checkbox"/> June 2021 <input type="checkbox"/> July 2021 <input type="checkbox"/> August 2021 <input type="checkbox"/> September 2021
IV.1.11 What actions did you take to ensure the quality of your vanilla during and after the harvest?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Harvested vanilla beans 8-9 months after pollination to achieve higher vanillin content. <input type="checkbox"/> Harvested vanilla beans before they split or mold. <input type="checkbox"/> Synchronized harvests with designated Ministry of Agriculture trading windows (harvest dates) to enhance sales of mature vanilla with high vanillin content.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Harvested selected and individual mature vanilla beans from a cluster rather than harvesting the whole cluster. <input type="checkbox"/> Used clean collection bags to reduce beans exposure to contaminants and contact with soil. <input type="checkbox"/> Minimized vanilla beans damage during harvesting by ensuring bags are not overfilled or stacked. <input type="checkbox"/> Stored vanilla beans in dry, cool conditions for less than 12 hours prior to collection. <input type="checkbox"/> Identified vanilla buyers prior to harvest for minimizing risk. <input type="checkbox"/> Coordinated beans collection with buyers to ensure that the vanilla beans maintain their quality during post-harvest. <input type="checkbox"/> None of the above
Vanilla harvest		
IV.1.13 What challenges did you face during the Main harvest?	MSelect	<input type="checkbox"/> Vanilla theft <input type="checkbox"/> Pest and diseases <input type="checkbox"/> No pollination <input type="checkbox"/> Flower abortion <input type="checkbox"/> Unpredictable or erratic rainfall <input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Lack of markets <input type="checkbox"/> Low prices <input type="checkbox"/> Price or market fluctuations <input type="checkbox"/> High labor costs <input type="checkbox"/> Illness <input type="checkbox"/> Accident <input type="checkbox"/> Death of a family member <input type="checkbox"/> Indebtedness <input type="checkbox"/> Limited access to inputs <input type="checkbox"/> Limited access to vanilla-specific extension services <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> None
IV.1.14 Volume of vanilla lost due to theft	Number	Kg:
IV.1.12 Volume of vanilla harvested during the Main harvest (February-July 2021).	Number	Kg:

LABEL	TYPE	VALUES
IV.1.15 Volume of vanilla lost due to post-harvest handling	Number	Kg:
Vanilla sales		
IV.1.16 Volume of vanilla sold	Number	Kg:
IV.1.17 To whom did you sell your vanilla (mark all that apply)?	MSelect	<input type="checkbox"/> Agri Exim/ Varun Bhassin <input type="checkbox"/> Amfri Farms/ Nazzim Shivji/Lilian Anguparu <input type="checkbox"/> Coetzee Organic (U) Ltd/ Gordon Wood Jones <input type="checkbox"/> Delicate Vanilla & Cocoa Ltd <input type="checkbox"/> DSTA Uganda Ltd <input type="checkbox"/> Esco Uganda Ltd <input type="checkbox"/> Essence of Africa Ltd <input type="checkbox"/> Gourmet Gardens Ltd/ Clemens Fehr <input type="checkbox"/> Harvest Trading Company Ltd <input type="checkbox"/> Jaysem Investments Ltd/ Sematimba Sulta <input type="checkbox"/> NEI Natural Extracts Industries Ltd <input type="checkbox"/> Nillavan Ltd/Ritah Young <input type="checkbox"/> Ndali Estate Ltd/ Lulu Sturdy <input type="checkbox"/> Olam company <input type="checkbox"/> Origin Products - Trading as Enimiro Ltd/ David Wright <input type="checkbox"/> Pearl of Africa Natural Spice Exporter/ Mansoor Nadir <input type="checkbox"/> Savvy Saucy Spicy Trading Co. Ltd <input type="checkbox"/> Taimex (U) Ltd/ Tamale Ismail/Tamale Musoke <input type="checkbox"/> Tambisa Uganda Limited/ Tamale Isa <input type="checkbox"/> Touton <input type="checkbox"/> Uganet Rwenzori <input type="checkbox"/> Uvan Ltd/ Aga Sekalala Snr <input type="checkbox"/> Vanaroma Ltd/ Mary Kiddu <input type="checkbox"/> Vita Plus Ltd/Kenneth Shaka <input type="checkbox"/> Bwera Farmers Cooperative <input type="checkbox"/> Kasanze Vanilla Growers Cooperative <input type="checkbox"/> Mubuku vanilla farmers' Association <input type="checkbox"/> Mughete Vanilla Farmers Cooperative <input type="checkbox"/> Ntale Farmers Cooperative <input type="checkbox"/> Organic Farmers Cooperative <input type="checkbox"/> RFCU- Rwenzori Farmers Corporative Union

LABEL	TYPE	VALUES
		<input type="checkbox"/> Other buyer (please specify): _____
IV.1.18 Do you usually sell to the same buyers every harvesting season?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.19 To whom of these buyers did you sell the largest volume of vanilla? (select only one)	Select	<input type="checkbox"/> Agri Exim/ Varun Bhassin <input type="checkbox"/> Amfri Farms/ Nazzim Shivji/Lilian Anguparu <input type="checkbox"/> Coetzee Organic (U) Ltd/ Gordon Wood Jones <input type="checkbox"/> Delicate Vanilla & Cocoa Ltd <input type="checkbox"/> DSTA Uganda Ltd <input type="checkbox"/> Esco Uganda Ltd <input type="checkbox"/> Essence of Africa Ltd <input type="checkbox"/> Gourmet Gardens Ltd/ Clemens Fehr <input type="checkbox"/> Harvest Trading Company Ltd <input type="checkbox"/> Jaysem Investments Ltd/ Sematimba Sulta <input type="checkbox"/> NEI Natural Extracts Industries Ltd <input type="checkbox"/> Nillavan Ltd/Ritah Young <input type="checkbox"/> Ndali Estate Ltd/ Lulu Sturdy <input type="checkbox"/> Olam company <input type="checkbox"/> Origin Products - Trading as Enimiro Ltd/ David Wright <input type="checkbox"/> Pearl of Africa Natural Spice Exporter/ Mansoor Nadir <input type="checkbox"/> Savvy Saucy Spicy Trading Co. Ltd <input type="checkbox"/> Taimex (U) Ltd/ Tamale Ismail/Tamale Musoke <input type="checkbox"/> Tambisa Uganda Limited/ Tamale Isa <input type="checkbox"/> Touton <input type="checkbox"/> Uganet Rwenzori <input type="checkbox"/> Uvan Ltd/ Aga Sekalala Snr <input type="checkbox"/> Vanaroma Ltd/ Mary Kiddu <input type="checkbox"/> Vita Plus Ltd/Kenneth Shaka <input type="checkbox"/> Bwera Farmers Cooperative <input type="checkbox"/> Kasanze Vanilla Growers Cooperative <input type="checkbox"/> Mubuku vanilla farmers' Association <input type="checkbox"/> Mughete Vanilla Farmers Cooperative <input type="checkbox"/> Ntale Farmers Cooperative <input type="checkbox"/> Organic Farmers Cooperative <input type="checkbox"/> RFCU- Rwenzori Farmers Corporative Union <input type="checkbox"/> Other buyer (please specify) _____

LABEL	TYPE	VALUES
IV.1.20 What proportion of your vanilla did you sell to number one buyer?	Number	Percentage:
IV.1.21 Why did you choose to sell to them? (select all that apply)	MSelect	<input type="checkbox"/> Price offered <input type="checkbox"/> Distance to selling place <input type="checkbox"/> Long-term relationship established <input type="checkbox"/> Quality requirements <input type="checkbox"/> Quantity requirements <input type="checkbox"/> Payment terms and modalities <input type="checkbox"/> Provided complementary services (harvesting, transportation...) <input type="checkbox"/> Provided training or technical assistance <input type="checkbox"/> Provided inputs (vines, compost...) <input type="checkbox"/> Gave interest free loan <input type="checkbox"/> Paid for transportation costs <input type="checkbox"/> Guaranteed the price paid in advance <input type="checkbox"/> Guaranteed the volume bought in advance <input type="checkbox"/> Gave a price premium/bonus <input type="checkbox"/> Gave tokens (calendars, t-shirts...) <input type="checkbox"/> Other incentives (assumes some costs...) <input type="checkbox"/> Lack of alternative buyers <input type="checkbox"/> Other (please specify) _____
IV.1.22 Average sale price for green vanilla	Number	Uganda Shillings/kg
IV.1.23 Was the price agreed upon beforehand with the buyer?	Select	<input type="checkbox"/> Yes, with the main buyer <input type="checkbox"/> Yes, with all buyers <input type="checkbox"/> Yes, with some buyers <input type="checkbox"/> No
IV.1.24 How did you get paid for your vanilla?	MSelect	<input type="checkbox"/> Cash <input type="checkbox"/> Bank account <input type="checkbox"/> Check <input type="checkbox"/> Mobile money account <input type="checkbox"/> Other (please specify)
IV.1.25 Did the buyer offer you a price premium for the quality of your vanilla?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.26 How much was the price premium you received?	Number	Ugandan shillings/kg

LABEL	TYPE	VALUES
IV.1.27 Did the buyer reduce the price paid for your vanilla because of low quality?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.28 How much was the price deduction?	Number	Ugandan shillings/kg
IV.1.29 How was the vanilla quality determined?	MSelect	<input type="checkbox"/> Vanillin content <input type="checkbox"/> Harvest time <input type="checkbox"/> Physical appearance of the beans <input type="checkbox"/> Length of the beans <input type="checkbox"/> Other (please specify)
IV.1.30 Did the buyer offer you a price premium for the volume of vanilla sold?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.31 How much was the price premium you received?	Number	Ugandan shillings/kg
IV.1.32 Did the main buyer offer you a price premium for loyalty?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.33 How much was the price premium you received?	Number	Ugandan shillings/kg
IV.1.34 Did the main buyer offer to buy your vanilla during the next harvest?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
Transport costs		
IV.1.35 Did you have to transport your vanilla harvest from your fields for selling it?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.1.36 How much did you pay to transport your vanilla from the field to the selling place?	Number	Ugandan shillings
IV.1.37 How many hours did it take to bring your produce to the selling place?	Number	Hours:
Evaluation of the vanilla production system		
IV.1.38 What did you do to evaluate the profitability and sustainability of your vanilla production and to improve it?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Kept records of the volume of crops harvested. <input type="checkbox"/> Kept records of all expenses incurred, including family labor. <input type="checkbox"/> Assessed total value of production and sales from their production system during the cropping season. <input type="checkbox"/> Assessed the net income from their production system during the cropping season.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Made production, financial and commercialization decisions based on the results achieved. <input type="checkbox"/> Assessed the positive and negative impacts of their production system practices on the environment. <input type="checkbox"/> Took actions to reduce or mitigate any negative impacts of their production system practices. <input type="checkbox"/> None of the above
IV.2 Fly harvest season (August 2020-January 2021)		
The following questions refer to the Fly harvest season from August 2020 to January 2021		
IV.2.0 Did you harvest your vanilla during the fly harvest season (August 2020 to January 2021)?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
Security costs		
IV.2.1 Did you guard your vanilla fields from theft?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.2 How many workdays of family labor did you use for guarding your vanilla fields?	Number	<input type="checkbox"/> Workdays
IV.2.3 How many months did you hire labor to guard your vanilla fields from theft?	Number	<input type="checkbox"/> Months
IV.2.4 How much did you pay to hire labor for guarding your vanilla fields?	Number	<input type="checkbox"/> Ugandan shillings/month
IV.2.5 Did you construct a fence to protect your vanilla fields from theft?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.6 What kind of fence did you use?	MSelect	<input type="checkbox"/> Live fence <input type="checkbox"/> Barbed wire fence <input type="checkbox"/> Razor wire fence <input type="checkbox"/> Wall fence <input type="checkbox"/> Other (please specify)
IV.2.7 Was the fence an effective measure to prevent theft in your vanilla fields?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No

LABEL	TYPE	VALUES
IV.2.8 How much did the fence cost?	Number	Ugandan shillings:
IV.2.9 When did you pollinate your vanilla vines for the Fly harvest (August 2020 to January 2021)?	MSelect	<input type="checkbox"/> December 2019 <input type="checkbox"/> January 2020 <input type="checkbox"/> February 2020 <input type="checkbox"/> March 2020 <input type="checkbox"/> April 2020 <input type="checkbox"/> May 2020 <input type="checkbox"/>
IV.2.10 When did you harvest your vanilla during the Fly harvest?	MSelect	<input type="checkbox"/> September 2020 <input type="checkbox"/> October 2020 <input type="checkbox"/> November 2020 <input type="checkbox"/> December 2020 <input type="checkbox"/> January 2021 <input type="checkbox"/> February 2021
IV.2.11 What actions did you take to ensure the quality of your vanilla during and after the harvest?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Harvested vanilla beans 8-9 months after pollination to achieve higher vanillin content. <input type="checkbox"/> Harvested vanilla beans before they split or mold. <input type="checkbox"/> Synchronized harvests with designated Ministry of Agriculture trading windows (harvest dates) to enhance sales of mature vanilla with high vanillin content. <input type="checkbox"/> Harvested selected and individual mature vanilla beans from a cluster rather than harvesting the whole cluster. <input type="checkbox"/> Used clean collection bags to reduce beans exposure to contaminants and contact with soil. <input type="checkbox"/> Minimized vanilla beans damage during harvesting by ensuring bags are not overfilled or stacked. <input type="checkbox"/> Stored vanilla beans in dry, cool conditions for less than 12 hours prior to collection. <input type="checkbox"/> Identified vanilla buyers prior to harvest for minimizing risk. <input type="checkbox"/> Coordinated beans collection with buyers to ensures that the vanilla beans maintain their quality during post-harvest. <input type="checkbox"/> None of the above
Vanilla harvest		
IV.2.12 What challenges did you face during the Fly harvest?	MSelect	<input type="checkbox"/> Vanilla theft <input type="checkbox"/> Pest and diseases <input type="checkbox"/> No pollination

LABEL	TYPE	VALUES
		<input type="checkbox"/> Flower abortion <input type="checkbox"/> Unpredictable or erratic rainfall <input type="checkbox"/> Drought <input type="checkbox"/> Flood <input type="checkbox"/> Lack of markets <input type="checkbox"/> Low prices <input type="checkbox"/> Price or market fluctuations <input type="checkbox"/> High labor costs <input type="checkbox"/> Illness <input type="checkbox"/> Accident <input type="checkbox"/> Death of a family member <input type="checkbox"/> Indebtedness <input type="checkbox"/> Limited access to inputs <input type="checkbox"/> Limited access to vanilla-specific extension services <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> None
IV.2.14 Volume of vanilla lost due to theft	Number	Kg:
IV.2.12 Volume of vanilla harvested during the Fly harvest (August 2020-January 2021).	Number	Kg:
IV.2.15 Volume of vanilla lost due to post-harvest handling	Number	Kg:
Vanilla sales		
IV.2.16 Volume of vanilla sold	Number	Kg:
IV.2.17 To whom did you sell your vanilla (mark all that apply)?	MSelect	<input type="checkbox"/> Agri Exim/ Varun Bhassin <input type="checkbox"/> Amfri Farms/ Nazzim Shivji/Lilian Anguparu <input type="checkbox"/> Coetzee Organic (U) Ltd/ Gordon Wood Jones <input type="checkbox"/> Delicate Vanilla & Cocoa Ltd <input type="checkbox"/> DSTA Uganda Ltd <input type="checkbox"/> Esco Uganda Ltd <input type="checkbox"/> Essence of Africa Ltd <input type="checkbox"/> Gourmet Gardens Ltd/ Clemens Fehr <input type="checkbox"/> Harvest Trading Company Ltd <input type="checkbox"/> Jaysem Investments Ltd/ Sematimba Sulta <input type="checkbox"/> NEI Natural Extracts Industries Ltd <input type="checkbox"/> Nillavan Ltd/Ritah Young

LABEL	TYPE	VALUES
		<input type="checkbox"/> Ndali Estate Ltd/ Lulu Sturdy <input type="checkbox"/> Olam company <input type="checkbox"/> Origin Products - Trading as Enimiro Ltd/ David Wright <input type="checkbox"/> Pearl of Africa Natural Spice Exporter/ Mansoor Nadir <input type="checkbox"/> Savvy Saucy Spicy Trading Co. Ltd <input type="checkbox"/> Taimex (U) Ltd/ Tamale Ismail/Tamale Musoke <input type="checkbox"/> Tambisa Uganda Limited/ Tamale Isa <input type="checkbox"/> Touton <input type="checkbox"/> Uganet Rwenzori <input type="checkbox"/> Uvan Ltd/ Aga Sekalala Snr <input type="checkbox"/> Vanaroma Ltd/ Mary Kiddu <input type="checkbox"/> Vita Plus Ltd/Kenneth Shaka <input type="checkbox"/> Bwera Farmers Cooperative <input type="checkbox"/> Kasanze Vanilla Growers Cooperative <input type="checkbox"/> Mubuku vanilla farmers' Association <input type="checkbox"/> Mughete Vanilla Farmers Cooperative <input type="checkbox"/> Ntale Farmers Cooperative <input type="checkbox"/> Organic Farmers Cooperative <input type="checkbox"/> RFCU- Rwenzori Farmers Corporative Union <input type="checkbox"/> Another buyer (please specify) _____
IV.2.18 Do you usually sell to the same buyers every harvesting season?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.19 To whom of these buyers did you sell the largest volume of vanilla? (select only one)	Select	<input type="checkbox"/> Agri Exim/ Varun Bhassin <input type="checkbox"/> Amfri Farms/ Nazzim Shivji/Lilian Anguparu <input type="checkbox"/> Coetzee Organic (U) Ltd/ Gordon Wood Jones <input type="checkbox"/> Delicate Vanilla & Cocoa Ltd <input type="checkbox"/> DSTA Uganda Ltd <input type="checkbox"/> Esco Uganda Ltd <input type="checkbox"/> Essence of Africa Ltd <input type="checkbox"/> Gourmet Gardens Ltd/ Clemens Fehr <input type="checkbox"/> Harvest Trading Company Ltd <input type="checkbox"/> Jaysem Investments Ltd/ Sematimba Sulta <input type="checkbox"/> NEI Natural Extracts Industries Ltd <input type="checkbox"/> Nillavan Ltd/Ritah Young <input type="checkbox"/> Ndali Estate Ltd/ Lulu Sturdy

LABEL	TYPE	VALUES
		<input type="checkbox"/> Olam company <input type="checkbox"/> Origin Products - Trading as Enimiro Ltd/ David Wright <input type="checkbox"/> Pearl of Africa Natural Spice Exporter/ Mansoor Nadir <input type="checkbox"/> Savvy Saucy Spicy Trading Co. Ltd <input type="checkbox"/> Taimex (U) Ltd/ Tamale Ismail/Tamale Musoke <input type="checkbox"/> Tambisa Uganda Limited/ Tamale Isa <input type="checkbox"/> Touton <input type="checkbox"/> Uganet Rwenzori <input type="checkbox"/> Uvan Ltd/ Aga Sekalala Snr <input type="checkbox"/> Vanaroma Ltd/ Mary Kiddu <input type="checkbox"/> Vita Plus Ltd/Kenneth Shaka <input type="checkbox"/> Bwera Farmers Cooperative <input type="checkbox"/> Kasanze Vanilla Growers Cooperative <input type="checkbox"/> Mubuku vanilla farmers' Association <input type="checkbox"/> Mughete Vanilla Farmers Cooperative <input type="checkbox"/> Ntale Farmers Cooperative <input type="checkbox"/> Organic Farmers Cooperative <input type="checkbox"/> RFCU- Rwenzori Farmers Corporative Union <input type="checkbox"/> Other buyer (please specify) _____
IV.2.20 What proportion of your vanilla did you sell to number one buyer?	Number	Percentage:
IV.2.21 Why did you choose to sell to them? (select all that apply)	MSelect	<input type="checkbox"/> Price offered <input type="checkbox"/> Distance to selling place <input type="checkbox"/> Long-term relationship established <input type="checkbox"/> Quality requirements <input type="checkbox"/> Quantity requirements <input type="checkbox"/> Payment terms and modalities <input type="checkbox"/> Provided complementary services (harvesting, transportation...) <input type="checkbox"/> Provided training or technical assistance <input type="checkbox"/> Provided inputs (vines, compost...) <input type="checkbox"/> Gave interest free loan <input type="checkbox"/> Paid for transportation costs <input type="checkbox"/> Guaranteed the price paid in advance <input type="checkbox"/> Guaranteed the volume bought in advance <input type="checkbox"/> Gave a price premium/bonus

LABEL	TYPE	VALUES
		<input type="checkbox"/> Gave tokens (calendars, t-shirts...) <input type="checkbox"/> Other incentives (assumes some costs...) <input type="checkbox"/> Lack of alternative buyers <input type="checkbox"/> Other (please specify) _____
IV.2.22 Average sale price for green vanilla	Number	Ugandan Shillings/kg
IV.2.23 Was the price agreed upon beforehand with the buyer?	Select	<input type="checkbox"/> Yes, the main buyer <input type="checkbox"/> Yes, with all buyers <input type="checkbox"/> Yes, with some buyers <input type="checkbox"/> No
IV.2.24 How did you get paid for your vanilla?	MSelect	<input type="checkbox"/> Cash <input type="checkbox"/> Bank account <input type="checkbox"/> Check <input type="checkbox"/> Mobile money account <input type="checkbox"/> Other (please specify)
IV.2.25 Did the buyer offer you a price premium for the quality of your vanilla?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.26 How much was the price premium you received?	Number	<input type="checkbox"/> Ugandan shillings/kg
IV.2.27 Did the buyer reduced the price paid for your vanilla because of low quality?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.28 How much was the price deduction?	Number	<input type="checkbox"/> Ugandan shillings/kg
IV.2.29 How was the vanilla quality determined?	MSelect	<input type="checkbox"/> Vanillin content <input type="checkbox"/> Harvest time <input type="checkbox"/> Physical appearance of the beans <input type="checkbox"/> Length of the beans <input type="checkbox"/> Other (please specify)
IV.2.30 Did the buyer offer you a price premium for the volume of vanilla sold?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.31 How much was the price premium you received?	Number	<input type="checkbox"/> Ugandan shillings/kg
IV.2.32 Did the main buyer offer you a price incentive for loyalty?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No

LABEL	TYPE	VALUES
IV.2.33 How much was the price premium you received?	Number	<input type="checkbox"/> Ugandan shillings/kg
IV.2.34 Did the buyer offer to buy your vanilla during the next harvest?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
Transport costs		
IV.2.35 Did you have to transport your vanilla harvest from your fields for selling it?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
IV.2.36 How much did you pay to transport your vanilla from the field to the selling place?	Number	<input type="checkbox"/> Ugandan shillings
IV.2.37 How many hours did it take to bring your produce to the selling place?	Number	Time:
Evaluation of the vanilla production system		
IV.2.38 What did you do to evaluate the profitability and sustainability of your vanilla production and to improve it?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Kept records of the volume of crops harvested. <input type="checkbox"/> Kept records of all expenses incurred, including family labor. <input type="checkbox"/> Assessed total value of production and sales from their production system during the cropping season. <input type="checkbox"/> Assessed the net income from their production system during the cropping season. <input type="checkbox"/> Made production, financial and commercialization decisions based on the results achieved. <input type="checkbox"/> Assessed the positive and negative impacts of their production system practices on the environment. <input type="checkbox"/> Took actions to reduce or mitigate any negative impacts of their production system practices. <input type="checkbox"/> None of the above
MODULE V: OTHER IMPORTANT CROPS IN THE VANILLA-BASED PRODUCTION SYSTEM		
<ul style="list-style-type: none"> The following questions refer to the additional costs you incurred and the additional income from the other main crops in your vanilla fields during the last two harvests (Fly: August-January 2020 and Main: February-July 2021). 		
V4. Alternative Crop #1: Production costs, production, and sales		
Planting costs - Alternative Crop #1		
V4.1 Did you plant/establish this crop during the last two vanilla harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
V4.2 Did you purchase seed or planting materials?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No

LABEL	TYPE	VALUES
V4.3 How much did you pay for the seed or planting materials?	Number	Ugandan shillings
V4.4 How many workdays of family labor did you use in planting this crop?	Number	Workdays
V4.5 How many workdays of hired labor did you use in planting this crop?	Number	Workdays
V4.6 How much did you pay on average for the hired labor?	Number	Ugandan shillings/workday
Cost for controlling pests and diseases - Alternative Crop #1		
V4.7 Did you monitor and/or control pests or diseases that affect this crop during the last two harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
V4.8 How much did you spend on products to control pests or diseases for this crop?	Number	<input type="checkbox"/> Ugandan shillings
V4.9 How many workdays of family labor did you use to monitor and control pest or diseases for this crop?	Number	<input type="checkbox"/> Workdays
V4.10 How many workdays of hired labor did you use to monitor and control pest or diseases for this crop?	Number	<input type="checkbox"/> Workdays
V4.11 How much did you pay on average for the hired labor?	Number	<input type="checkbox"/> Ugandan shillings/workday
Harvesting costs - Alternative Crop #1		
V4.12 Did you harvest this crop during the last two vanilla harvests?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
V4.13 How many workdays of family labor did you use to harvest this crop?	Number	<input type="checkbox"/> Workdays
V4.14 How many workdays of hired labor did you use to harvest this crop?	Number	<input type="checkbox"/> Workdays
V4.15 How much did you pay for the hired labor?	Number	<input type="checkbox"/> Ugandan shillings/workday
Transport costs - Alternative Crop #1		
V4.16 Did you transport your harvest to the selling point?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
V4.17 How much did you pay to transport your crop from the field to the selling place?	Number	Ugandan shillings

LABEL	TYPE	VALUES
Production and Value of Sales - Alternative Crop #1		
V4.20 Volume of alternative crop #1 consumed	Number	Units:
V4.21 If you have consumed part or all the production, at what price could you have purchased the product in your community?	Number	Ugandan shillings/unit
V4.18 How much did you get from the sale of this crop during the last year?	Number	Ugandan shillings
V5. Alternative Crop #2: Production costs, production, and sales (questions the same for Alternative Crop #1)		
V6. Alternative Crop #3: Production costs, production, and sales (questions the same for Alternative Crop #1)		
V7. Alternative Crop #1: Production costs, production, and sales (questions the same for Alternative Crop #1)		
MODULE VI: FINANCIAL COMPETENCIES ASSESSMENT		
<ul style="list-style-type: none"> The following questions refer to the actions you took during the last two harvests (Fly: August-January 2021 and Main: February-July 2021) to manage your finances, save, and take loans 		
VI.1 Effective Financial Management Competency		
VI.1.1 What did you do to manage your finances?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Registered their income and expenses throughout the year. <input type="checkbox"/> Identified their cash flow throughout the year. <input type="checkbox"/> Identified times during the year when they could save. <input type="checkbox"/> Identified times during the year when they will need loans. <input type="checkbox"/> Established their financial goals. <input type="checkbox"/> Identified unnecessary expenses that could be avoided, and the money saved. <input type="checkbox"/> Prioritized expenses. <input type="checkbox"/> Prepared a weekly budget. <input type="checkbox"/> Followed their planned budget. <input type="checkbox"/> None of the above
VI.2 Saving for a Purpose Competency		
VI.2.1 What did you do to save during last two vanilla harvests?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Set a purpose for saving. <input type="checkbox"/> Specified the amount to be saved. <input type="checkbox"/> Specified the frequency of their savings. <input type="checkbox"/> Identified a place to save. <input type="checkbox"/> Saved the amount planned. <input type="checkbox"/> Saved regularly at the planned frequency. <input type="checkbox"/> Saved more when there is an income surplus. <input type="checkbox"/> Established an emergency fund.

LABEL	TYPE	VALUES
		<input type="checkbox"/> None of the above <input type="checkbox"/> Not applicable
VI.2.2 Which of these financial services did you access? (select all that apply)	MSelect	<input type="checkbox"/> A bank account <input type="checkbox"/> Mobile money <input type="checkbox"/> SACCO <input type="checkbox"/> Other (please specify)
VI.3 Borrow Wisely Competency		
VI.3.1 What did you consider before accessing loans and what did you do to access and manage them?	Semi-structure interview type question, open-ended question, and probing, with MSelect responses	<input type="checkbox"/> Identified their borrowing needs. <input type="checkbox"/> Evaluated available borrowing options. <input type="checkbox"/> Assessed their capacity to repay loans. <input type="checkbox"/> Applied for needed loans. <input type="checkbox"/> Used the loans for their intended purpose. <input type="checkbox"/> Repaid the loans on time <input type="checkbox"/> None of the above <input type="checkbox"/> Not applicable
VI.3.2 Did you access financing for your agriculture activities from formal financial institutions?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
VI.3.3 How much did you accessed during your last two harvests (Main and Fly)?	Number	<input type="checkbox"/> Ugandan shillings
MODULE VII: AGRICULTURAL MARKETING COMPETENCIES ASSESSMENT		
<ul style="list-style-type: none"> The following questions refer to the actions you took during the last two harvests (Fly: August-January 2021 and Main: February-July 2021) to sell your crops 		
VII.1 Market Opportunities Prioritization Competency		
VII.1.1 Did you prioritize crops based on identified and evaluated market opportunities?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
VII.1.2 What did you do to identify and prioritize market opportunities?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Interacted with a diverse group of potential buyers. <input type="checkbox"/> Identified products that buyers want to buy. <input type="checkbox"/> Described buyers' requirements for prioritized products (e.g., quantity, quality...). <input type="checkbox"/> Described buying conditions for prioritized markets (e.g., pricing, form, and timing of payment...). <input type="checkbox"/> Assessed family labor needed to access identified market opportunities.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Assessed input needed to access identified market opportunities. <input type="checkbox"/> Assessed opportunity cost of engaging in identified market opportunities. <input type="checkbox"/> Evaluated how long it will take to start getting an income from identified products and/or markets. <input type="checkbox"/> Assessed the level of risk of different market opportunities. <input type="checkbox"/> Engaged with other farmers to identify opportunities for collective marketing. <input type="checkbox"/> Contributed to the evaluation of market opportunities with other farmers. <input type="checkbox"/> Engaged in the prioritization of market opportunities with other farmers. <input type="checkbox"/> None of the above
VII.2 Effective Business Planning Competency		
VII.2.1 Are you a member of a farmer organization?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
VII.2.2 Does your farmer organization engage in collective marketing?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
VII.2.3 Did you sell some or all your vanilla through your farmer organization?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
VII.2.4 What percentage of your vanilla harvest did you sell through your farmer organization?	Number	Percentage:
VII.2.5 What did you do to plan for collective marketing with other farmers?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Described the functions of the actors engaged in prioritized value chains. <input type="checkbox"/> Contributed to the analysis of bottlenecks for engaging with prioritized markets. <input type="checkbox"/> Contributed to the analysis of constraints for engaging women and youth with prioritized markets. <input type="checkbox"/> Contributed to the analysis of opportunities for engaging women and youth with prioritized markets. <input type="checkbox"/> Engaged in the design of production, postharvest and marketing plans. <input type="checkbox"/> Assessed the risk of implementing different production, postharvest and marketing activities.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Engaged in the design of actions to mitigate or manage identified risks. <input type="checkbox"/> Estimated the financing needs to engage with prioritized markets. <input type="checkbox"/> Sought finance needed to engage with prioritized markets. <input type="checkbox"/> Estimated the profitability of engaging with prioritized markets. <input type="checkbox"/> Contributed to the farmer organization's business vision <input type="checkbox"/> Contributed to the farmer organization's assessment of potential business relations and partnerships. <input type="checkbox"/> Provided inputs for the preparation of the business plan. <input type="checkbox"/> None of the above
VII.3 Successful Business Implementation Competency		
VII.3.1 How did you contribute to the implementation of the collective marketing plan?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Planned their production, postharvest and marketing activities based on the farmer organization's business plan. <input type="checkbox"/> Planned their finances based on the farmer organization business plan. <input type="checkbox"/> Implemented practices needed to meet buyers' requirements. <input type="checkbox"/> Agreed to the terms of the contracts with buyers. <input type="checkbox"/> Sold the agreed volume of produce through the farmer organization. <input type="checkbox"/> Committed to complying with agreements made with buyers. <input type="checkbox"/> Kept records on their production, costs, sales, and profits. <input type="checkbox"/> None of the above
VII.4 Periodic Business Performance Review Competency		
VII.4.1 What did you do to evaluate the results of the last two vanilla harvests?	MSelect Semi-structure interview type question, open-ended question, and probing.	<input type="checkbox"/> Evaluated their production, productivity, and product quality. <input type="checkbox"/> Calculated their production costs. <input type="checkbox"/> Included family labor in the calculation of their production costs. <input type="checkbox"/> Evaluated the total value of sales from their production system. <input type="checkbox"/> Evaluated their income and profit from their production system. <input type="checkbox"/> Contributes to the evaluation of the farmer organization sales, income, and profit. <input type="checkbox"/> Identified opportunities to improve results in the next production season.

LABEL	TYPE	VALUES
		<input type="checkbox"/> Identified opportunities to improve results in the next marketing cycle. <input type="checkbox"/> Identified opportunities to improve results for women and youth. <input type="checkbox"/> Contributed to the revision of the farmer organization collective marketing plan <input type="checkbox"/> None of the above
THANK-YOU AND CLOSURE		
<ul style="list-style-type: none"> • Thank you for participating in this initiative! • We appreciate very much the time you took to show me your vanilla fields and for sharing how you are implementing the different practices and the results you are having. 		

Tool 2: VANILLA PRODUCERS' HOUSEHOLD SURVEY

LABEL	TYPE	VALUES
MODULE 1: INTRODUCTION AND CONSENT		
Interviewer Name:	Text	
Date	Date	
Data is collected as part of:	Select	<input type="checkbox"/> Baseline <input type="checkbox"/> Midterm <input type="checkbox"/> Endline
<ul style="list-style-type: none"> Greetings, my name is _____, I am working for _____ who is conducting a household survey for the “VINES” project that CRS and Technoserve is starting to implement with support from the US Department of Agriculture to enhance vanilla farming and business over the next few years. You have already been registered as a VINES project participant and the objectives of this interview are to: <ol style="list-style-type: none"> Better understand women role in agricultural, and specifically vanilla, production, other income generation activities, and decision-making. Evaluate if vanilla producers are achieving or not a living income, which means a decent income to provide for household needs. This information will be very important to plan for the different project activities and ensure that they address the different needs and priorities of vanilla producers’ households. The information collected from you will be combined with information from other vanilla producers’ households who will be participating in the project, and we will not disclose your name and what you have told us to others. Understanding that your information will not be shared, by accepting to participate in this interview, you hereby consent to the collection, sharing, processing and use of your personal data as required for the implementation of the “VINES” project. 		
1.1 Do we have your consent?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No
<ul style="list-style-type: none"> We would greatly appreciate it if you would be able and willing to share with us not more than one hour for this interview. We ask you to be honest as there are not right or wrong answers, and your experience as a vanilla producer is unique. You should not hesitate to say you do not understand a question, or if you don’t want to answer, just let me know and I will go on to the next question or you can stop the interview at any time. 		
S1. Does the vanilla farmer have a spouse or another person who makes decisions in the household?		<input type="checkbox"/> Yes <input type="checkbox"/> No

LABEL	TYPE	VALUES
S2. Who is being interviewed?		<input type="checkbox"/> Primary respondent (vanilla farmer registered in the project) <input type="checkbox"/> Secondary respondent (spouse)
1.1 Vanilla Producer ID <i>Primary respondent</i>	ID	
1.2 First name of <i>Secondary respondent</i>	Text	
1.3 Surname (family name) of <i>Secondary respondent</i>	Text	
1.4 Age of respondent:	Int	
1.5 Gender of respondent:	Select	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Does not respond
MODULE II (A-WEAI G2): ROLE IN HOUSEHOLD DECISION MAKING AROUND PRODUCTION AND INCOME GENERATION		
2.1 Did you participate in the following activities in the past 12 months?	MSelect	<input type="checkbox"/> Food crop farming (crops grown primarily for household food consumption) <input type="checkbox"/> Cash crop farming (crops grown primarily for sale in the market BUT NOT VANILLA) <input type="checkbox"/> Vanilla production and marketing <input type="checkbox"/> Livestock farming <input type="checkbox"/> Poultry farming <input type="checkbox"/> Apiculture (bee keeping)Non-farm economic activities (running a small business, self-employment, buy-and-sell) <input type="checkbox"/> Wage and salary employment (work paid for in cash or in-kind) <input type="checkbox"/> Fish and fishpond culture
2.1.1 Food crop farming (crops grown primarily for household food consumption)		
2.1.1.1 When decisions are made regarding food crop farming, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.1.2 How much input did you have in making decisions about food crop farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.1.3 To what extent do you feel you can make your decisions regarding food crop farming if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent

LABEL	TYPE	VALUES
		<input type="checkbox"/> To a high extent
2.1.1.4 How much input did you have in making decisions on the use of income generated from food crop farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.2 Cash crop farming (crops grown primarily for sale in the market)		
2.1.2.1 When decisions are made regarding cash crop farming, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.2.2 How much input did you have in making decisions about cash crop farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.2.3 To what extent do you feel you can make your decisions regarding cash crop farming if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent
2.1.2.4 How much input did you have in making decisions on the use of income generated from cash crop farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.3 Vanilla production and marketing (land preparation, planting, weeding, pruning, pollination, shade management, paste and disease management, soil and water management, harvesting, and selling vanilla)		
2.1.3.1 When decisions are made regarding vanilla production and marketing, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.3.2 How much input did you have in making decisions about vanilla production and marketing?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.3.3 To what extent do you feel you can make your decisions regarding vanilla production and marketing if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent

LABEL	TYPE	VALUES
		<input type="checkbox"/> To a high extent
2.1.3.4 How much input did you have in making decisions on the use of income generated from vanilla production and marketing?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.4 Livestock farming		
2.1.4.1 When decisions are made regarding livestock farming, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.4.2 How much input did you have in making decisions about livestock farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.4.3 To what extent do you feel you can make your decisions regarding livestock farming if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent
2.1.4.4 How much input did you have in making decisions on the use of income generated from livestock farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.5 Poultry farming		
2.1.5.1 When decisions are made regarding Poultry farming, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.5.2 How much input did you have in making decisions about Poultry farming.	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.5.3 To what extent do you feel you can make your decisions regarding Poultry farming, if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent

LABEL	TYPE	VALUES
2.1.5.4 How much input did you have in making decisions on the use of income generated from Poultry farming?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.6 Apiculture (bee keeping)		
2.1.6.1 When decisions are made regarding apiculture (bee keeping), who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.6.2 How much input did you have in making decisions about apiculture (bee keeping),	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.6.3 To what extent do you feel you can make your decisions regarding apiculture (bee keeping), if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent
2.1.6.4 How much input did you have in making decisions on the use of income generated from apiculture (bee keeping)?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.7 Non-farm economic activities (running a small business, self-employment, buy-and-sell)		
2.1.7.1 When decisions are made regarding non-farm economic activities, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.7.2 How much input did you have in making decisions about non-farm economic activities?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.7.3 To what extent do you feel you can make your decisions regarding non-farm economic activities if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent

LABEL	TYPE	VALUES
2.1.7.4 How much input did you have in making decisions on the use of income generated from non-farm economic activities?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.8 Wage and salary employment (work paid for in cash or in-kind, including both agriculture and other wage work)		
2.1.8.1 When decisions are made regarding wage and salary employment, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.8.2 How much input did you have in making decisions about wage and salary employment?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.8.3 To what extent do you feel you can make your decisions regarding wage and salary employment if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent
2.1.8.4 How much input did you have in making decisions on the use of income generated from wage and salary employment?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.9 Fishing or fishpond culture		
2.1.9.1 When decisions are made regarding fishing or fishpond culture, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.9.2 How much input did you have in making decisions about fishing or fishpond culture?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.9.3 To what extent do you feel you can make your decisions regarding fishing or fishpond culture if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent

LABEL	TYPE	VALUES
2.1.9.4 How much input did you have in making decisions on the use of income generated from fishing or fishpond culture?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.10 Major household expenditures (land, housing, transportation, children schooling)		
2.1.10.1 When decisions are made regarding major household expenditures, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Other non HH member
2.1.10.2 How much input did you have in making decisions about major household expenditures?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.10.3 To what extent do you feel you can make your decisions regarding major household expenditures if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent
2.1.11 Minor household expenditures (food for daily consumption or other household needs)		
2.1.11.1 When decisions are made regarding minor household expenditures, who is it that normally takes the decision? (select all that apply)	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non HH member
2.1.11.2 How much input did you have in making decisions about minor household expenditures?	Select	<input type="checkbox"/> No input or input in few decisions <input type="checkbox"/> Input into some decisions <input type="checkbox"/> Input into most or all decisions <input type="checkbox"/> No decision made
2.1.11.3 To what extent do you feel you can make your decisions regarding minor household expenditures if you want(ed) to?	Select	<input type="checkbox"/> Not at all <input type="checkbox"/> Small extent <input type="checkbox"/> Medium extent <input type="checkbox"/> To a high extent
MODULE III (A-WEAI G3(A)): ACCESS TO PRODUCTIVE CAPITAL		
3.1 Does anyone in your household currently have any of the following items?	MSelect	<input type="checkbox"/> Agricultural land (pieces/plots) <input type="checkbox"/> Large animals (oxen, cattle, goats and pigs) <input type="checkbox"/> Small animals and birds (chicken, ducks, rabbits) <input type="checkbox"/> Fish pond, fish stock, fishing equipment)

LABEL	TYPE	VALUES
		<input type="checkbox"/> Farm tools (hand tools, animal-drawn plough...) <input type="checkbox"/> Mechanized farm equipment (tractor-plough, power tiller, treadle pump...) <input type="checkbox"/> Non-farm business equipment <input type="checkbox"/> Large assets (house, car, motorcycle, bicycle...) <input type="checkbox"/> Furniture (sofa sets, wooden foldable chairs, wooden forms...) <input type="checkbox"/> Television <input type="checkbox"/> Radio <input type="checkbox"/> Small assets (, kitchen utensils, cookware...) <input type="checkbox"/> Cell phone <input type="checkbox"/> Other land not used for agricultural purposes (pieces, plots, residential or commercial land)
3.2 Do you own any of the agriculture land?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.3 Do you own any of the large animals?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.4 Do you own any of the small animals?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.5 Do you own the fishpond, fish stock or fishing equipment?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.6 Do you own any of the farm tools?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.7 Do you own any of the mechanized farm equipment?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.8 Do you own any of the non-farm business equipment?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.9 Do you own any of the large assets?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly

LABEL	TYPE	VALUES
		<input type="checkbox"/> No
3.10 Do you own the furniture?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.11 Do you own the television?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.12 Do you own the radio?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.13 Do you own any of the small assets?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.14 Do you own the cell phone?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
3.15 Do you own any of the other land not used for agricultural purposes?	Select	<input type="checkbox"/> Yes, solely <input type="checkbox"/> Yes, jointly <input type="checkbox"/> No
MODULE IV (A-WEAI G3(B)): ACCESS TO CREDIT		
4.1 Formal financial institutions (banks, microfinance institutions)		
4.1.1 Would you or anyone in your household be able to take a loan or borrow cash/in-kind from a formal financial institution if you/they wanted to?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
4.1.2 Has anyone in your household taken any loans or borrowed cash/in-kind from a formal financial institution in the past 12 months?	Select	<input type="checkbox"/> Yes, cash <input type="checkbox"/> Yes, in-kind <input type="checkbox"/> Yes, cash and in-kind <input type="checkbox"/> No <input type="checkbox"/> Don't know
4.1.3 Who made the decision to borrow from a formal financial institution?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member

LABEL	TYPE	VALUES
4.1.4 Who made the decision about what to do with the money / item borrowed from a formal financial institution most of the time?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member
4.2 Informal saving and loan schemes (merry go, tontines, funeral societies)		
4.2.1 Would you or anyone in your household be able to take a loan or borrow cash/in-kind from an informal saving and loan schemes if you/they wanted to?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
4.2.2 Has anyone in your household taken any loans or borrowed cash/in-kind from an informal saving and loan schemes in the past 12 months?	Select	<input type="checkbox"/> Yes, cash <input type="checkbox"/> Yes, in-kind <input type="checkbox"/> Yes, cash and in-kind <input type="checkbox"/> No <input type="checkbox"/> Don't know
4.2.3 Who made the decision to borrow from an informal saving and loan schemes?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member
4.2.4 Who made the decision about what to do with the money / item borrowed from an informal saving and loan schemes most of the time?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member
4.3 Friend, relatives, or other individual money lenders		
4.3.1 Would you or anyone in your household be able to take a loan or borrow cash/in-kind from friends, relatives of other individual money lenders if you wanted to?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
4.3.2 Has anyone in your household taken any loans or borrowed cash/in-kind from friends, relatives of other individual money lenders in the past 12 months?	Select	<input type="checkbox"/> Yes, cash <input type="checkbox"/> Yes, in-kind <input type="checkbox"/> Yes, cash and in-kind <input type="checkbox"/> No <input type="checkbox"/> Don't know
4.3.3 Who made the decision to borrow from friends, relatives of other individual money lenders?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member

LABEL	TYPE	VALUES
		<input type="checkbox"/> Non-HH member
4.3.4 Who made the decision about what to do with the money / item borrowed from friends, relatives of other individual money lenders most of the time?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member
4.4 Formal saving and loans groups (VSLAs, SILC, SACCOs)		
4.4.1 Would you or anyone in your household be able to take a loan or borrow cash/in-kind from a formal savings and loans group if you wanted to?	Select	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Maybe
4.4.2 Has anyone in your household taken any loans or borrowed cash/in-kind from a formal savings and loans group in the past 12 months?	Select	<input type="checkbox"/> Yes, cash <input type="checkbox"/> Yes, in-kind <input type="checkbox"/> Yes, cash and in-kind <input type="checkbox"/> No <input type="checkbox"/> Don't know
4.4.3 Who made the decision to borrow from a formal savings and loans group?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member
4.4.4 Who made the decision about what to do with the money / item borrowed from a formal savings and loans group most of the time?	MSelect	<input type="checkbox"/> Self <input type="checkbox"/> Spouse <input type="checkbox"/> Other HH member <input type="checkbox"/> Non-HH member
MODULE V (A-WEAI G4): TIME ALLOCATION		

Appendix IV: Vines Project Baseline Evaluation Terms of Reference

USDA UGANDA VINES PROJECT

Award Dates: October 1, 2020 – September 30, 2025

Strategic goal: Make Uganda the world’s next leading supplier of high-quality vanilla

Estimated Funding: US\$ 13 Million

Implementing Organizations: Catholic Relief Services in consortium with TechnoServe, Frontier Co-op, Sustainable Vanilla Initiative (SVI) and Purdue University

Target: 16,200 vanilla farmers, 15,820 jobs and 836 MSMEs

Zone of Intervention: Central and Western Regions of Uganda

Donor Agency: United States Department of Agriculture Food for Progress (USDA FFPr)

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Abbreviations

AEA	American Evaluation Association
CoP	Chief of Party
CRS	Catholic Relief Services
EP	evaluation plan
FFPr	Food for Progress
FO	foundational result
FSMA	Food Safety Modernization Act
HAACP	Hazard Analysis and Critical Control Points
IR	intermediate result
M&E	monitoring and evaluation
MEAL	monitoring, evaluation, accountability and learning
PII	personal identifiable information
PMP	performance monitoring plan
PPE	personal protection equipment
NGO	non-governmental organization
NRM	natural resources management
SME	small and medium enterprise
SO	strategic objective
SoW	scope of work
SVI	Sustainable Vanilla Initiative
TNS	TechnoServe
TOC	theory of change
ToR	terms of reference
USDA	United States Department of Agriculture
VANEX	Ugandan Vanilla Exporters Association

1. Background

Catholic Relief Services (CRS) is an international non-governmental organization (NGO) supporting relief and development work in over 100

countries around the world. CRS carries out the commitment of the Bishops of the United States to assist the poor and vulnerable overseas. CRS' Catholic identity is at the heart of our mission and operations, serving people on the basis of need, regardless of creed, ethnicity or nationality. CRS works through local church and non-church partners to implement its programs.

CRS has worked in Uganda since 1965, initially providing emergency assistance to Sudanese refugees living in the north. Over the years, CRS has expanded its programming to also address development needs in Western, Central, and Eastern Uganda. CRS' projects in Uganda currently include food and nutrition security, resilience, agriculture and livelihoods, health, microfinance, OVC, peacebuilding, youth, emergency and COVID-19 responses. CRS Uganda implements its programs through partnerships with local organizations, including the Catholic Church, other faith-based organizations and community entities for maximum impact and sustainability. CRS Uganda employs around 190 staff and has its main office in Kampala, with sub-offices in Moroto, Yumbe, and Hoima.

2. VINES Project Information

VINES, a five year (2021-2025), \$13 million, USDA FFPr project, is being implemented by CRS, TechnoServe (TNS), Frontier Co-op, Purdue University, and the Sustainable Vanilla Initiative (SVI) to make Uganda the world's next leading supplier of high-quality vanilla. VINES goal is to increase and improve the supply of high-quality vanilla by improving the productivity of vanilla-based agroforestry systems with 16,200 farmers (Strategic Objective 1); and to enhance vanilla quality and compliance with food safety standards with 30 vanilla processing firms, and expand global trade in vanilla to meet growing international demand (Strategic Objective 2).

PROJECT OBJECTIVES

Table 1 describes the project Intermediate Results (IRs) and Foundational Results (FRs). The project Results Framework is included in Annex 1.

STRATEGIC OBJECTIVES	INTERMEDIATE / FOUNDATIONAL RESULTS
SO1: Increased Agricultural Productivity	1.1: Improved Quality of Land and Water Resources
	1.2: Increased Use of Improved Agricultural Techniques and Technologies
	1.3: Improved Farm Management (Operations, Financial)
	1.5: Enhanced Mixed-Cropping in Agroforestry Systems
SO2: Expanded Trade of Agricultural Products (Domestic,	2.1: Increased Value Added to Post-Production Agricultural Products
	2.2: Increased Access to Markets to Sell Agricultural Products
	2.3: Improved Transaction Efficiency

Regional, International)	and	1.4.1 / 2.4.1: Increased Capacity of Government Institutions
		1.4.2 / 2.4.2: Improved Policy and Regulatory Framework
Foundational results		1.4.3 / 2.4.3: Increased Access to Improved Market and Climate Information
		1.4.4: Improved Capacity of Key Groups in the Agriculture Production Sector / 2.4.4: Improved Capacity of Key Organizations in the Trade Sector
		1.4.5 / 2.4.5: Increased Leverage of Private-Sector Resources

Implementing partners and roles

To achieve the project goal, strategic objectives and intermediate results, CRS has established a Consortium of public and private partners, including leading international vanilla buyers such as Frontier Co-op, Virginia Dare, Ben & Jerry's, and Sustainable Vanilla Initiative (SVI) to upgrade the Ugandan vanilla industry and establish it as a sustainable and solid foundation for consistent supply of significant volumes of high-quality vanilla.

This consortium of market leaders and experts will be linked to 30 high potential Ugandan vanilla processing companies, organized as the Ugandan Vanilla Exporters Association (VANEX). CRS and VANEX have established strong working relationships with the GoU and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), and will continue to build on these relationships to complement VINES activities to revitalize the vanilla sector.

The VINES project aims to double average vanilla yields from 0.25 to 0.50 kg/vine, increase average farm production from 65kg to 150kg, improve vanilla quality and safety, deepen market linkages and by creating a new brand for Ugandan vanilla, will generate the essential "market pull" to enable Uganda to increase vanilla exports from 50 MT to 350+ MT. This will directly transform the lives of 16,200 farmers, 356 self-employed service and input providers, 480 processors' employees, and will generate 15,820 new on-farm seasonal and permanent processing jobs to reach 32,856 vanilla stakeholders; providing international buyers with a new origin that will help to stabilize the extreme price volatility that has plagued the global market for this unique spice.

CRS is the technical and management lead, providing technical leadership in farm productivity, access to vines for expanding vanilla production, building extension for mixed-crop agroforestry systems, savings-led finance, farmer relations with buyers, impact investment and work with SVI on policy implementation.

Frontier Co-op will lead in food safety, product quality, handling, storage, curing, packaging, compliance with FSMA/HAACP, certifications, traceability, and branding.

TNS will lead in market analysis, business planning, farmer business capacity building, microentrepreneur training, input supply and business relationship management.

Purdue University is the program's learning partner and will conduct research to examine the effectiveness of different business models on retention of good market relationships with farmers, and on the return on investment to processors that invest in quality and food safety compliance.

Theory of change

The overall VINES Theory of Change (TOC) postulates that **IF** (1) vanilla farmers sustainably increase their production by planting more vanilla, and access sustainable advisory services that enable farmers to use appropriate inputs, apply climate smart agroforestry systems to raise productivity per vine and diversify their income using mixed-cropping systems that restores land and mitigates climate risks, **THEN vanilla farmers will sustainably increase productivity while managing risk** (Results Framework #1, Component 1); and

IF (2) vanilla farmers can protect mature beans, and limit the risk of theft, and build effective business relations with processors, who procure mature beans, based on quality premiums, and that vanilla processors use traceable supply chains, and certified processing methods, that provides high vanillin content cured vanilla that is compliant with modern international food safety regulations; **THEN a safe, clean and pure vanilla supply will be offered to international markets** (Results Framework #2, Component 2); and

IF (3) industry institutions can deliver critical services such as capacity building and financial services to vanilla market actors, and create a common value proposition for the sector, articulated through a national brand, and processors build long lasting relationships with international buyers in high value markets; **THEN vanilla supply chain actors will strengthen market conditions** (Results Framework #2, Component 3); and

IF (4) the Government of Uganda (GoU) regulates trading practices that protects farmers from theft, safeguards working conditions especially for children and enforces harvesting dates to promote quality (Foundational Results); **THEN** the supply of high-quality vanilla will be increased, vanilla quality will be enhanced for compliance with food safety standards, and **the global trade of vanilla will be expanded to meet growing international demand.**

Strategy

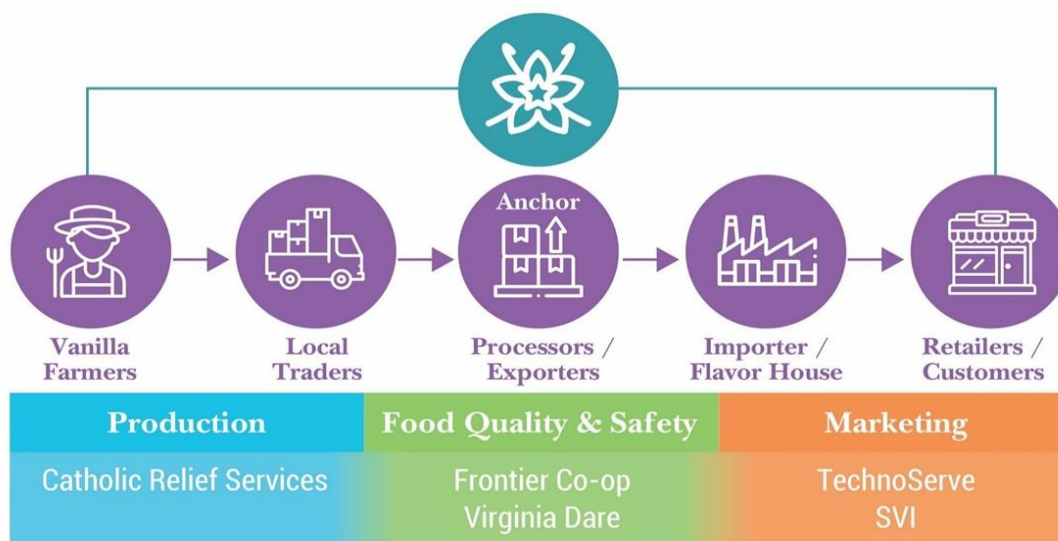
The VINES project strategy is comprised of two self-reinforcing approaches: (1) targeted interventions with high potential processors focused on addressing

challenges with production, food safety, and market linkages, and (2) sector-wide interventions that seek to support the broader set of actors and address key issues such as industry consolidation, better handling practices, and strengthening the policy environment. These approaches will be interwoven throughout six project activities, ensuring targeted production interventions are paired with comprehensive sector level trainings and reform.

Targeted processor supply chain approach

Typically, vanilla supply chains in Uganda are managed by “anchor” vanilla processing companies who each support a discreet supply chain (Figure 1). The anchor processors buy green vanilla from local traders and hundreds/thousands of farmers. The processors then cure the vanilla and sell to international buyers who supply in markets such as the US. International buyers undertake further value addition of the vanilla and market a range of vanilla products, including extracts, flavors, foods, drinks, and cosmetics to the American food industry and onwards to millions of customers.

Figure 47. Vanilla value chain and project partners’ roles



To ensure sustainable market linkages, VINES will support upgrading of high potential processors and their business partnerships, which will grow during and after the project. For rapid start-up, the project will commence supply chain upgrading with three leading processors. These processors, already linked with major US buyers, have established buyer/seller relationships with roughly 8,500 farmers. This work will start with a rigorous supply chain analysis to prioritize critical constraints and develop upgrading plans from farm to market. Tailored technical assistance along the chain will be provided from the VINES consortium to address bottlenecks. CRS and TNS will strengthen or build dedicated extension teams and input suppliers that will link the target processors with 16,200

segmented farmers: 3,350 high producers, 9,150 upcoming farmers, and 3,700 new farmers. Based on the learning with the first three supply chains, targeted supply chain upgrading will be expanded to other processors, using a Vanilla Innovation and Expansion Fund. Starting in year two, other VANEX processor members will be able to apply to the Fund to support their supply chain upgrading plans and access tailored technical assistance. The fund will support cohorts of three processors per year (Figure 4) who are linked “upstream” to at least another 7,700 farmers and linked “downstream” to a range of international buyers, such as those working through SVI. The four cohorts will reach 12 processors and up to 16,200 farmers.

Sector-wide approach

VINES will also provide sector-wide technical assistance to a broader set of vanilla stakeholders. This approach will focus on critical pre-competitive areas such as (1) increasing access to quality inputs; (2) building the capacity of extension agents and microentrepreneurs; (3) sector coordination through VANEX; (4) brand building to increase long-term customer demand; and (5) strengthening government policy to support sector discipline, security, and growth. Sector

wide training will support extensions teams, and micro-entrepreneurs who will be linked to vanilla processors. The extension teams will in turn build the capacity of farmers using fee-for-services that offer new skills to help farmers boost production, improve quality, and build market competitiveness.

Geographic regions and target project participants

Processors buy vanilla from more than 50 districts. However, the highest concentration of vanilla production is in High Production districts and Medium Production districts as shown in **Table 2**, where the targeted processor supply chain approach will be implemented. The different type and number of project participants and shown in **Table 3**.

CATEGORY		TARGET DISTRICTS FOR VANILLA INTERVENTIONS
High production districts		Budibugyo, Kasese, Bunyangabo, Rubirzi, Ibanda, Mukono and Buikwe.
Medium production districts		Ntoroko, Kagadi, Kabarole, Kyenjojo, Mbarara, Sheema, Bushenyi, Luweero, Gomba, Kayunga, Rakai, Masaka, Lwengo, Kalungu, Bukomansimbi and Mityana.
Nationwide Coverage		All vanilla farmers, input suppliers, and processors will benefit from sector-wide activities such as improved quality, brand development improved policy.

Table 49: Vines Project Participants

INTERVENTION STRATEGIES / ACTIVITIES	TYPE OF PROJECT PARTICIPANT	NUMBER OF PARTICIPANTS
1. Targeted supply chain upgrading		
Cohort 1 - Initial 3 supply chains: 1) UVAN Ltd 2) ESCO Uganda Ltd 3) Rwenzori Farmers Cooperative Union	High-producing farmers	2,150
	Upcoming farmers	4,650
	New farmers	1,700
9 New supply chains: Vanilla Innovation and Expansion Fund forecast farmers (2 nd , 3 rd and 4 th cohort farmers)	High-producing farmers	1,200
	Upcoming farmers	4,500
	New farmers	2,000
Total directly participating farmers		16,200
2. Specific sector-wide training courses		
Youth micro-entrepreneurs		245
Extension agents		75
Private service providers (SILC)		36
Processors' employees		480
Total directly participating off-farm supply chain actors		836
3. Savings and Internal Loans Communities (SILC) (layered)		
Total directly participating farmers	SILC members / farmers	(16,000)
4. Sector-wide brand building, policy and regulatory framework development		
Total impacted directly	Farmers and supply chain actors	17,036

3. Purpose and Scope of the Assessment

The VINES project Evaluation Plan (EP) aims to contribute to project performance by ensuring the achievement of the project results, strategic objectives, and goal. The plan is guided by USDA Monitoring and Evaluation (M&E) Policy, including the Code of Federal Regulations (CFR) section 1499.12 that apply for US Department of Agriculture and specifically the Food for Progress (FFPr) Program, and is compliant with the International Food Assistance Division (IFAD) Monitoring and Evaluation Policy; and it also follows CRS Monitoring, Evaluation, Accountability and Learning (MEAL) Policies and Procedures (MPPs) that reflect good practices for gender-responsive MEAL and the integration of accountability and learning into this process.

The project's evaluation process involves three phases: a baseline assessment, a midterm, and a final evaluation. CRS is seeking an independent consulting firm to lead the **VINES project baseline assessment** to assess and report on the

situation before the beginning of project implementation. These terms of reference (ToR) outline the conditions, responsibilities, and tasks that the independent consulting firm, in Uganda, will undertake to conduct the baseline assessment has the following three specific objectives:

To establish and verify initial baseline values for the full set of performance indicators (see Annex 2) as the starting comparison point for measuring progress against performance indicators.

To provide relevant and current contextual information to ensure the validity of the critical assumptions stated in the project TOC for interpretation of midterm and final evaluation findings.

To identify opportunities to adjust the project design, monitoring plan and targets before project implementation starts, as needed.

In addition, the baseline assessment will respond to the evaluation criteria and specific questions contained in Table 50.

Table 50: Baseline Assessment Questions

CRITERIA	QUESTION
Project relevance	<p>To what extent does the project design address the needs of the Uganda’s vanilla sector and those of the different actors involved in the value chain, with a special focus on female and male vanilla producers, private service providers, and youth microentrepreneurs?</p> <p>What adjustments to project design should the project consider for addressing the needs of the sector more effectively, and those of the different participants, to enhance project relevance and ensure responsiveness to critical constraints?</p>
Project implementation	<p>Are there any risks or challenges that may impact delivery of the project goal, strategic objectives and intermediate results, and what actions can the project take to mitigate these risks or challenges from the outset?</p> <p>Which planned interventions are likely to be the most critical and/or effective in achieving the program’s intermediate results and strategic objectives?</p> <p>Are there any potential negative impacts or unintended consequences of specific interventions that the project should consider, and how might they be addressed or mitigated?</p>
Sustainability and Impact	<p>Which priority project activities will require clear roadmaps and exist strategies from the outset to ensure sustainability?</p> <p>Are there specific constraints or barriers the project should be mindful of that could limit project participants and the sector from sustaining gains?</p>

The external evaluator should be very familiar with the project’s results framework (Annex 1), the performance indicators table (Annex 2), the evaluation plan (Annex 3), and the performance monitoring plan (PMP – Annex 4), USDA

M&E Evaluation Policy (Annex 5), USDA/FAS Food Assistance Evaluation Policy, section 508 (Annex 6). All evaluation reports will be reviewed in line with CRS checklist for reviewing USDA evaluation reports (Annex 7). In addition, the consultant must follow CRS MEAL Guidance under Covid-19 (Annex 8).

4. Approach and Methodology

The independent consultancy firm will assess the specific performance non-zero value indicators (Annex 2) from the data sources, and by applying the data collection methods and collection tools specified in **Table 51, following** the VINES Performance Monitoring Plan (PMP – Annex 4). USDA will review and approve the evaluation report according to The Time Frame Specified in Their Monitoring and Evaluation Policy.

Table 51: Data Sources, Methods, Collection Tools and Indicators For The Baseline Assessment

DATA SOURCES	METHODS	COLLECTION TOOLS	INDICATORS
Sample of vanilla producers who will start participating in Year 1	On-farm survey for profitability assessment	Tool 1, Modules 1.1A and 1.1B designed in CommCare forms	#1. Yield of targeted agricultural commodities among program participants with USDA assistance
			#2. Value of annual sales of farms and firms receiving USDA assistance
			#3. Volume of commodities sold by farms and firms receiving USDA assistance
			#10. Number of hectares under improved management practices or technologies that promote improved climate risk reduction and/or natural resources management with USDA assistance
			#11. Number of hectares under improved management practices or technologies with USDA assistance
			#12. Number of individuals in the agriculture system who have applied improved management practices or technologies with USDA assistance
			#13. Farmer's gross margin per hectare obtained with USG assistance
			#16. Number of individuals accessing agriculture-related financing as a result of USDA assistance
			#23. Farmgate price paid to producers for green vanilla

			#35. Value of agriculture-related financing accessed as a result of USDA assistance
			#39. Number of farmers who access climate information for decision-making
			#40. Number of farmers and firms who access market information for decision-making
Sample of vanilla producers who will start participating in Year 1	On-farm semi-structured interview documented in Multiple-choice questions	Tool 1, Module 1.2 designed in CommCare forms	#19. Number of farmers who have reached at least a functional level of "land restoration and climate-risk management" and of "vanilla-based agroforestry management" competencies as a result of USDA assistance
			#20. Number of farmers who have reached at least a functional level of financial and marketing competencies as a result of USDA assistance
DATA SOURCES	METHODS	COLLECTION TOOLS	Indicators
Sample of vanilla producer households who will start participating in Year 1	Household survey	Tool 2, Modules 2.1 and 2.2 designed in CommCare forms	#5. Daily per capita expenditures (as a proxy for income) in USG-assisted areas
			#44. Abbreviated women's empowerment in agriculture index
			#45. Percentage (%) of livelihood service participant HHs with at least one child engaged in child labor
			#46. Percentage (%) of livelihood service participant HHs with all children of compulsory school age regularly attending school
Processing firms who will start participating in Year 1	SME survey	Tool 4: SME Survey Questionnaire	#21. Number of farmers receiving price premiums for vanilla quality and/or certification
			#24. Cured vanilla Uganda export price FOB
			#25. Volume of vanilla shipped to international markets
			#26. Volume of vanilla shipped that is rejected for not meeting quality or food safety standards
			#27. Percentage of the volume of vanilla harvested that preserves its quality through post-harvest handling, curing and storage

			#28. Number of international buyers purchasing vanilla from Uganda
			#31. Number of processors who implemented practices to meet export quality standards for vanilla
			#32. Number of processors who implemented at least 2 improved vanilla post-production, processing or handling practices
			#35. Value of agriculture-related financing accessed as a result of USDA assistance
			#40. Number of farmers and firms who access market information for decision-making
Supply chain actors	Supply chain actors' workshops and key informant interviews: LINK methodology	Tool 5: Scorecard design in a CommCare form	#29. Quality and inclusiveness of buyer-seller relations
Key informants and secondary information	Context and policy analysis	Tool 6: Paper-based tools	#37. Number of vanilla ordinances enforced
			#38. Number of policies, regulations and/or administrative procedures in each of the following stages of development as a result of USDA assistance

The proposed data collection methods will require primary data collection from the different specified sources as well as the collection of secondary baseline data for context variables that include: 1) international and national vanilla prices, 2) Madagascar vanilla production trends and prices to account for market risk, 3) historic climate trends and seasonal climate data to account for productivity risk; 4) Uganda agriculture and trade policy framework and strategy, and agriculture ordinances to account for the policy environment in which VINES will be implemented; and 5) child labor practices in Uganda.

DATA COLLECTION TOOLS THAT WILL BE PROVIDED BY CRS

CRS will provide the independent consultancy firm with collection tools 1, 2 and 5, which are explained below. The consultant will review, and revise them as needed, in coordination with CRS. Once these tools are revised and finalized, CRS will provide the data collection forms in the CommCare mobile platform, leveraging digital systems to improve speed, efficiency and accuracy, and to reduce loss of information

TOOL 1: VANILLA PRODUCERS' ON-FARM SURVEY

This survey is designed using tested questionnaires that will be adjusted to collect the data needed to evaluate the indicators related to vanilla producers' competencies, production, productivity, production costs, sales and profit, and will include two modules:

MODULE 1.1: Production-system-based profitability assessment

MODULE 1.2: Competencies' assessment interviews

TOOL 2: VANILLA PRODUCERS' HOUSEHOLD SURVEY

This survey is designed to collect data for the indicators related to vanilla farmers' household consumption expenditures as a proxy for income, and gender-based dynamics to evaluate women empowerment in agriculture as well as child labor, and will include two modules:

MODULE 2.1: Abbreviated daily per capita expenditures

MODULE 2.2: Abbreviated women empowerment in agriculture index (Malapit, 2015)

TOOL 5: LINK METHODOLOGY SCORECARD

The Link Methodology Scorecard is intended to assess value chain actors' relations and will enable the program to evaluate the quality and inclusiveness of buyer-seller trading relations within new business models. This methodology is based on facilitated group discussion and semi-structured interview with supply chain actors. More information on the Link Methodology can be found in Lundy et. al, 2012. This will require to conduct:

At least 30 semi-structured interviews with different supply chain actors, 10 for each of the supply chains: i) Uganda Vanilla Growers Association (UVAN) direct-buyer relationship, ii) Rwenzori Farmers' Cooperative Union (RFCU) farmer cooperative model, and (iii) ESCO's dual product buying model.

Three workshops with different supply chain actors, one for each of the above supply chains.

DATA COLLECTION TOOLS THAT WILL DESIGNED BY THE CONSULTANCY FIRM

The independent consultancy firm will be responsible for designing the following tools, which will be reviewed, and revised as needed, by CRS and TNS:

TOOL 4: SMALL AND MEDIUM ENTERPRISES (SME) SURVEY

The SME survey will involve the use of interview guides, and a form to review participating processing firms’ business records. The survey will be designed and conducted in consultation with TNS and will be conducted with the three supply chain partners (UVAN, RFU and ESCO) who are both vanilla processing and export firms. The consultant will need to engage with these three project private partners to present the security management and security protocols that will be used for ensuring that their sensitive business information will be protected. This will be essential to gain their confidence to share the needed data to evaluate the baseline indicators that depend on data collected from them.

TOOL 6: CONTEXT AND POLICY ANALYSIS

This will involve the needed tools to collect secondary baseline data on contextual variables, and to conduct semi-structured interviews with key informants. This will involve a maximum of 15 semi-structure interviews with key informants at the national, regional, and local levels.

SAMPLING STRATEGY AND SAMPLE SIZE

Baseline data will be collected from a total of 613 vanilla producers, of which 443 will respond to the vanilla producers’ on-farm survey (Tool 1) and 170 to the vanilla producers’ household survey (Tool 2) as shown in Table 53. Vanilla producers will be sampled from the targeted 15 vanilla producing districts (7 high producing districts and 8 medium producing district) from vanilla producer listings provided by the private sector partners for each supply chain using fractional interval systematic sampling to ensure that farmers are represented in the sample by their rough proportions in the underlying population, while ensuring that they have equal probabilities of selection into the sample thus eliminating the need to use sample weights at the analysis stage.

Table 52: Sample Size By Collection Tool And For Subsequent Vanilla Producers’ Cohorts

COLLECTION TOOL	SAMPLE SIZE
Tool 1: Vanilla producers’ on-farm survey	443
Tool 2: Vanilla producers’ household survey	170
TOTAL SAMPLE	613

The total sample size needed for Tools 1 and 2 was calculated using equation (2) in McConnell and Vera-Hernandez (2015) for continuous samples, using the standard 80% power and 5% significance level. The sample size for Tool 1 will fulfill the requirements of the special studies that will be conducted to address the selected learning questions. As the special study seeks to detect statistical differences volumes sold per farmer between supply chains; to detect a difference of 34 kg (10% of the final evaluation target of 335 kg increase in green vanilla

production for each of the project's 16,200 farmers) in FFPr Standard Indicator #19, at least 123 farmers need to be surveyed using a standard deviation of 93 kg/ farmer from RFCU and ESCO Uganda Ltd. records. Given that there are 3 supply chains, the recommended sample size is $123 \times 3 = 369$ producers. This estimated sample size is more than adequate to detect changes in all project indicators collected by Tool 1 for the performance evaluation between baseline study and endline evaluation.

As Tool 2 does not feed into the special study, the sample size for it is determined from the largest sample needed to detect a statistical change among the 4 indicators collected by it (see Table 2). Thus, to detect a difference from \$1.50 to \$2.80 in daily, per capita expenditures, 141 producer households should be surveyed. This assumes a standard deviation of \$3.87 (Zereyesus et al. 2017).

This sample size ($369 + 141 = 510$) is increased by 20%, giving a total of 613 vanilla producers to be surveyed at baseline. This will account for data that becomes unusable due to error or attrition, and to account for vanilla producers who are sampled and may drop out during the life of the project given that the evaluation approach requires panel data.

5. Ethical Considerations

The consultancy firm conducting the baseline assessment must maintain the integrity of the data collection and analysis process while adhering to USDA policies and procedures on evaluations, and committing to respect and enforce CRS research and evaluation ethical requirements for service providers in accordance with current MEAL Policies and Procedures.

For this purpose, the consultancy firm must:

Follow the American Evaluation Association (AEA) Guiding Principles for Evaluators <http://www.eval.org/p/cm/ld/fid=51>

Dependent upon participants in the evaluation, specify steps that will be taken to ensure informed consent, confidentiality, and protection of minors. Please refer to CRS' Protection Policy and Guidelines for Interviews for more information on this topic.

Specify steps taken to safeguard data collected and data management procedures to be used in the evaluation.

Follow maximum security protocols, established by CRS, for informants, and other vulnerable people to prevent the spread of COVID-19, and ensure compliance with these protocols.

6. Timeline and Deliverables

The baseline assessment will be conducted during the period of March 1 – May 14, 2021 (11 weeks) and is expected to follow the timeline outlined in Table 54, linking each activity with a deliverable.

Table 53: Baseline Assessment Key Activities, Schedule, And Deliverables

DATE	KEY ACTIVITY	DELIVERABLE
March 8-12, 2021	1. Prepare a detailed Scope of Work (SoW) for the baseline assessment.	An inception SoW detailing how the baseline assessment will be conducted, including a detailed work plan; and a description on how data will be collected, data quality assured, and how data collected will be managed, analyzed, and communicated.
March 15-19	2. Review, customize and develop the collection tools in coordination with CRS.	Data collection tools revised and completed for data collection.
March 22- April 2	3. Test and finalize the data collection tools.	Data collection tools ready for data collection.
March 22- April 2	4. Prepare for data collection and train data collectors.	Detailed data collection plan and instructions manual for data collectors.
April 5-April 23, 2021	5. Collect baseline data.	Cleaned datasets of the collected data in digital form (Excel and SPSS/Stata/R) that follow CRS data management and security protocols, ready for data analysis. Note: The Vines agroforestry team will be running early trainings on vine tutor planting in select geographies during the data collection phase. It is imperative that the consultant share its data collection schedule and coordinate with the Vines team, communicating when data collection in a specific district/region is fully complete. The Vines team will wait for confirmation before starting training to ensure that there is no contamination.
April 26- May 7, 2021	6. Analyze baseline data and facilitate collective interpretation with project stakeholders.	Draft summary of baseline findings in a PPT presentation to the project team, key members of CRS, consortium partners, and USDA.
May 10-14, 2021	7. Prepare the first draft of the baseline report.	First draft of the baseline report for internal CRS and consortium partners' review.
May 17-21, 2021	8. CRS and partners review the baseline report.	CRS and partners documented feedback on the first draft of the baseline report
May 24-28, 2021	9. Address CRS and partners feedback received and complete the final draft of the baseline report.	Final draft of baseline report that incorporates feedback/comments from CRS and consortium partners' internal review, submitted to USDA for review.
May 24-28, 2021	10. Finalize the PowerPoint	Final summary of baseline findings in PPT for presentation to the project team, key members of

	summary of baseline findings.	CRS, consortium partners private sector partners, USDA, GoU and other key project stakeholders.
May 31- June 4, 2021	11. Prepare a standalone baseline brief describing the key findings, and relevant recommendations.	A 2-3-page standalone brief describing the evaluation design, key findings, and other relevant considerations. It will serve to inform any interested stakeholders of the midterm evaluation, and should be written in language easy to understand by non-evaluators and with appropriate graphics and tables.
May 31- June 4, 2021	12. Prepare the datasets with the collected data and document them.	Comprehensive set of all final datasets (cleaned and validated) in Excel and SPSS/Stata/R for each collection tool, with corresponding documentation with coding, and corresponding data tabulation and analysis.

DATE	KEY ACTIVITY	DELIVERABLE
May 31- June 4, 2021	13. USDA reviews the final draft of the baseline report.	USDA documented feedback on the final draft of the baseline report.
June 7-11, 2021	14. Address USDA feedback received and finalize the baseline report.	Final baseline report that addresses USDA feedback submitted to USDA for approval.
June 7-11, 2021	15. USDA reviews the final draft of the 2-3-page standalone brief.	USDA documented feedback on the draft of 2-3-page standalone brief.
June 14-18, 2021	16. Address USDA feedback and finalize the 2-3-page standalone brief.	Final 2-3-page standalone brief that addresses USDA feedback submitted to USDA for approval.

Submitted datasets with the collected data must:

Be accompanied by their respective codebook/data dictionary.

Be saved in open-source file versions (.txt, .csv, .doc, etc.) if the consultant provides dta, .do, .sps, or .sav files

Include an identifier file that links respondent Personal Identifiable Information (PII) with ID numbers in the data file(s)

Include deidentified transcripts of selected interviews and focus groups and/or data files of coded sections of text from semi-structured interviews and focus group discussion.

Data analysis needs to be disaggregated as indicated in the PMP (Annex 4), and resulting tables need to include standard errors and 95% confidence intervals of the indicator estimates, and basic statistical analysis of indicator values by: 1)

by level of production and experience: high-producing farmers (>50 kg), upcoming farmers (≤50 kg) and new farmers that will join the project during project implementation years 2-4 in subsequent cohorts¹⁹ (3 strata); 2) **by type of supply chain:** Uganda Vanilla Growers Association (UVAN) direct-buyer relationship, Rwenzori Farmers' Cooperative Union (RFCU) farmer cooperative model and ESCO's dual product buying model (3 strata); and 3) **by geography:** high producing districts and medium producing districts - (2 strata).

The final report should include the following sections:

Executive summary (including brief introduction of program evaluated, key evaluation questions, findings, and conclusions)

Background

Baseline assessment design including assumptions and limitations

Methodology

Findings with visual aids and graphs

Conclusions, lessons learned and effective practices (if any)

Recommendations (should be clear, concise, relevant, specific and practical, following directly from findings and conclusions established in report)

Annex with a publishable SoW of the baseline assessment. The SoW will be redacted to exclude information proprietary to CRS, and any personal identifiable information (PII), if applicable.

Annex with final data collection tools and instructions for data collectors

Annex with description of team members' qualifications

Annex with additional methodological discussion/ robustness checks as needed

Annex with updated Indicators Performance Table (Annex 2)

The final report needs to be:

Free of typos or grammatical errors, should not contain any factual errors or inaccuracies, citations need to be properly used.

Free of personally identifiable information (PII) and proprietary information that directly or indirectly identifies an individual, and compliant with USDA/FAS Food Assistance Evaluation Policy, section 508 <https://section508.gov/create> (Annex 5).

A polished document, formatted and ready for publication.

¹⁹ Farmers who fall in this stratum will not be included in the baseline as they will only start joining the project in year 2 of project implementation, but a sample of these farmers will be added to the baseline sample as they join the project.

In addition, final reports should not allow for the identification of individual communities. Any list of communities provided should be included as in the report annex, so that it can be easily removed before submitting to USDA for external sharing.

As per USDA/FAS Food Assistance Evaluation Policy, all final evaluation reports will be made publicly available. The consultant shall submit a soft copy in PDF and Word format together with 3 color hard cover bound copies.

The consultancy agreement will contain a clear data rights clause, and the consultancy firm should obtain permission from CRS before sharing the final evaluation report with any external party, including posting it to their organization's website.

7. External Consultancy Firm Qualifications and Selection

MINIMUM REQUIREMENTS FOR CONSULTANCY FIRM

Consultancy firms interested in applying for this consultancy need to comply with the following minimum requirements:

A minimum of five years of experience in conducting evaluations of international agricultural development projects, with preferred experience in evaluating USDA or USG agricultural projects especially in Uganda.

Experience in evaluating agriculture and livelihoods projects.

A gender balance team of consultants and data collectors.

A team leader with a PhD or master's degree in (Agricultural) Economics, Agribusiness, or other socio-economic sciences with:

- At least 10 years of experience in value chain development, rural entrepreneurial development, inclusive businesses, and producer organization strengthening.
- Strong analytical skills to reach to concrete and useful findings and recommendations.
- Strong English writing and oral communication skills.
- Knowledge of IRB requirements and ethical considerations when working on sensitive topics such as gender relations, child labor, and private sector relationships.

A team with demonstrated experience and capacity to:

- Design and implement evaluation studies, including sampling, design of data collection tools for both quantitative and qualitative methods with necessary level of technical rigor.
- Manage human resources and logistics for managing large and complex data collection processes using different methods (surveys, semi-structure interviews and focus discussion) in a short period of time, and for designing and facilitating workshops.

- Use digital tool, ideally CommCare and PowerBi, for data collection, data quality assurance and reporting
- Conduct quantitative and qualitative data analysis with large amount of data including descriptive and inferential statistics.
- Conduct gender and culture-sensitive data collection processes in the Uganda context.

PROPOSAL SUBMISSION GUIDELINES AND EVALUATION CRITERIA

Interested consultancy firms should submit: 1) a technical proposal and budget for conducting this baseline assessment in no more than 20 pages; 2) reference letters for similar/related assignments undertaken in the last 5 years; 3) CVs of the team leader and all relevant team members; and 4) A sample of similar work undertaken by the consultancy firm.

Technical proposals should include/specify the following:

A description of the firm’s expertise and list of relevant evaluations/baseline surveys undertaken in the last 5 years (maximum 2 pages).

The consultant's understanding of the Terms of Reference, suitability of proposed evaluation design and corresponding delivery timeline (maximum 2 pages).

A description of the selected methods and corresponding collection tools that will be used (maximum 4 pages).

A detailed data analysis and reporting plan (maximum 2 pages)

A detailed implementation plan with all the activities that will be undertaken to fulfill the evaluation’s purpose, scope and objectives (4 pages).

The evaluation team composition (maximum 1 page)

A detailed budget with explanatory notes (maximum 5 pages).

The criteria for the evaluation of the consultancy firms’ proposals received and the score that will be given to each of these criteria is presented in **Table 7**.

Interested consultancy firms that meet the requirements should submit their technical and financial proposal to the Human Resource Office at ug_recruitment@crs.org with a copy to justus.atwijukire@crs.org no later than **March 18, 2021, 5:00 PM East Africa Time**.

Table 54: Proposals Evaluation Criteria

PROPOSAL EVALUATION CRITERIA	SCORE
Consultant's understanding of the ToR, suitability of proposed evaluation design and corresponding delivery timeline.	30%
Proposed data management, analysis and reporting plan.	10%
Previous experience in the evaluation of international agricultural development projects, with preferred experience in evaluating USDA or other USG agricultural projects, preferably in Uganda.	20%
Qualifications and relevant experience of the team lead.	10%
Relevant experience and expertise of other team members and degree to which they complement the qualifications and experience of the team lead.	10%
Evaluation budget for personnel, direct and indirect costs, and alignment with the proposed plan.	20%
TOTAL SCORE	100%

8. Evaluation Management and Coordination

This consultancy will be managed by the project Chief of Party (CoP) and the MEAL Manager who will be the focal points of communication with the consultancy firm. CRS Human Resources Department at the Kampala Office will be responsible for contracting the selected consultancy firm after a thorough and competitive bidding process.

ROLES AND RESPONSIBILITIES

The detailed roles and responsibilities of CRS and its Consortium partners for the effective implementation of this consultancy, and those of the contracted consultancy firm are outlined below.

CRS AND TNS

CRS and Consortium partner staff will support hired consultancy firm by providing the following:

All key project documents that are included as Annexes to this ToR: ANNEX 1: Project Results Framework; ANNEX 2: Performance Indicators Table; ANNEX 3: Evaluation Plan (EP); ANNEX 4: Performance Monitoring Plan (PMP); ANNEX 5: USDA's Food Assistance Indicators and Definitions and Monitoring and Evaluation Policy; ANNEX 6: CRS checklist for reviewing USDA evaluation reports; and ANNEX 7: CRS MEAL Guidance under Covid-19.

The following data collection tools: Tool 1: On-farm vanilla producers' survey, including Module 1.1 and 1.2; Tool 2: Vanilla producers' household survey, including Module 2.1 and 2.2; and Tool 5: Link methodology scorecard in Word and CommCare.

A database of registered vanilla farmers and households that were randomly selected to conduct the on-farm vanilla survey and the vanilla producers' household survey, including a breakdown of sampled vanilla farmers per district and subcounty.

A database with relevant contacts for the implementation of the baseline assessment: project consortia partners, private sector partners, and GoU organizations.

Tablets for digital data collection using CommCare.

Personal protection equipment (PPE) for all data collectors and the coordination team.

CRS MEAL staff will support the consultancy firm team to:

Field test the collection tools with the consultancy firm.

Train data collectors for ensuring the proper application of the data collection tools for data quality assurance.

Organize the agreed-upon meetings and workshops necessary for planning and implementing the consultancy, and for sharing and facilitating the collective interpretation of the study findings.

In addition, the CRS MEAL team will provide:

Agreed logistic support for conducting the baseline assessment

Overall supervision for the quality implementation of the baseline assessment.

PURDUE UNIVERSITY

To make sure that the baseline data collected is consistent and responds to the stated objectives of the special study that will be conducted by Purdue University and the proposed method, the research lead has reviewed the Performance Monitoring Plan (PMP), the Evaluation Plan (EP), including the sampling strategy and sample size, and this ToR. In addition, for the implementation of the baseline study, Purdue University will:

Review and contribute to improve the data collection tools designed.

Apply for the Institutional Review Board (IRB) and ensure their approval.

CONSULTANCY FIRM

Conduct all the activities specified in the timeline and deliverable section (Table 5) and submit the 11 deliverables as specified in the timeline.

Design the following collection tools: Tool 4: Small and medium enterprises (SME) survey and Tool 6: Context and policy analysis.

Lead the field test all the collection tools previously to the training of data collectors, and as part of the training of the data collectors.

Recruit and hire a team of data collectors to apply each of the data collection tools specified in Table 3 with the needed expertise to ensure the quality of the data collected. Data collector for the on-farm survey of vanilla producers must have technical knowledge and experience in agriculture production and marketing.

Provide data collectors with all needed data collection tools with their respective instruction manuals, and data collection materials.

Train, support and supervise data collectors, including periodic check-ins during data collection.

Data collection and data quality assurance.

Data analysis and reporting.

Report preparation and presentation of findings.

DURATION OF THE CONTRACT AND PAYMENT SCHEDULE

The consulting agreement will be valid for three months (March-May) from the signature of the contract and will be implemented during a period of thirteen weeks from March 5-May 28, 2021. The contract will also include provisions for the selected consultancy firm to also be contracted for conducting the midterm evaluation (March-May 2023) and the final evaluation (March-May 2025). The contract with the selected consultancy firm for conducting the midterm and final evaluations will be contingent on performance at the baseline assessment and midterm evaluation, respectively; and will need the consultancy firm to prepare specific SoWs for these evaluations that address the midterm and final evaluation ToR that will be prepared by the project, and approved by USDA.

The outbreak of Covid-19 in March 2020 has caused disruptions in the social, economic, technological, institutional realms of life in Uganda. The country tightly controlled response to the Covid-19 pandemic especially the total lockdown, night curfew and closed borders in the first few months of the outbreak seems to have had a more positive outcome by reducing the rates of infection. However, while the measures have succeeded in containing the outbreak, they have also caused significant damage to the economy and access to services. With the government easing of the local down, community infections have slightly increased. This is likely to affect program implementation. To mitigate this, all activities will have to be implemented in line with the Ministry of Health guidelines and standard operating procedures and protocols. CRS and the consultancy firm will continuously monitor this evolving and changing situation, making any necessary adjustments to this ToR by mutual agreement.

The consultancy firm will submit three invoices after completion of the deliverables specified in **Table 8** and for the specified proportion of the payment. Payments will be processed after completion of the following four action steps:

1. Submission of the deliverable by the consultancy firm;
2. Submission of an invoice specific to the submitted deliverables by the consultancy firm;
3. Approval of each deliverable by the VINES project Chief of Party (CoP); and

4. Approval of each invoice by CRS-Uganda.

Table 55: Payment Terms

PAYMENT	DELIVERABLES	PROPORTION OF PAYMENT
1	1. An inception SoW detailing how the baseline assessment will be conducted, including a detailed work plan, and how collected data will be managed, analyzed, and communicated.	40%
2	2. Data collection tools ready for data collection.	30%
	3. Detailed data collection plan and instructions manual for data collectors.	
	4. Cleaned datasets of the collected data in digital form (Excel and SPSS/Stata/R) that follow CRS data management and security protocols, ready for data analysis.	
	5. Draft Power Point summary of baseline findings with a presentation to the project team, key members of CRS, and consortium partners.	
	6. Final draft of the baseline report.	
3	7. CRS and partners documented feedback on the Final draft of the baseline report	30%
	8. Final baseline report submitted to USDA for approval that incorporates feedback/comments as appropriate.	
	9. Final Power Point summary of baseline findings with a presentation to the project team, key members of CRS, consortium partners, private sector partners, USDA, GoU and other key project stakeholders.	
	10. Two to three-page standalone brief report of the baseline assessment findings and recommendations.	
	11. Comprehensive set of all final datasets (cleaned and validated) in Excel and SPSS/Stata/R for each collection tool, with corresponding documentation with coding, and corresponding data tabulation and analysis.	
TOTAL		100%

9. Annexes

The annexes listed in Table 57 are attached as separate documents.

Table 56: List Of Annexes

#	CONTENT
1	Project results framework (graph and narrative)
2	Performance Indicators Table
3	Evaluation Plan (EP)
4	Performance Monitoring Plan (PMP)
5	USDA Monitoring and Evaluation Policy
6	USDA/FAS Food Assistance Evaluation Policy, section 508
7	CRS Checklist for Reviewing USDA Evaluation Reports
8	CRS MEAL Guidance under Covid-19
9	List of Vanilla Sampled Districts-Sub-counties for Baseline

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- Malapit** H, Kovarik C, Sproule K, Meinzen-Dick R, and Quisumbing A. 2015. Instructional guide on the abbreviated women's empowerment in agriculture index (A-WEAI). <https://www.ifpri.org/publication/instructional-guide-abbreviated-womens-empowerment-agriculture-index-weai> p74.
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