SUSTAINABLE SCHOOL FEEDING INNOVATIONS IN KIGALI PROJECT

BASELINE SURVEY REPORT

Ministry of Education (MINEDUC)

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Summary

This report presents the findings of a baseline survey conducted for the Sustainable School Feeding Innovations in Kigali (SSFI) project. The three-year project, supported by Clifford Chance, aims to implement nutrition-sensitive school feeding innovations in Kigali city schools and surrounding communities. The project uses a value-chain-based approach to enhance skills in producing, utilizing, and supplying nutritious foods to schools and other markets in Kigali. The survey provides a baseline assessment of the state of the school feeding program in Kigali city schools. The survey sampled 195 schools with a school feeding program in three districts of Kigali city: Gasabo (75 schools), Kicukiro (65 schools), and Nyarugenge (55 schools). Respondents were mainly heads of schools, head teachers, and school accountants.

The baseline results include school ownership indicators, the number of students, the governance of the school feeding program, key school meals, cooking fuel, bean consumption, awareness and adoption of pre-cooked beans, school gardens, best agronomic practices, and climate knowledge. The project evaluation will assess changes over time in these benchmark indicators and compare the changes and impact in the schools that benefited from project interventions and those that did not.

According to the survey, the school feeding program is available in all 195 surveyed schools with 277,566 students (49.8% boys and 50.2% girls). Most schools are public or government-aided, mainly purely day schools (92.8%). The school feeding program is managed by the school feeding committee, which comprises two parents' representatives, the head teacher, the school secretary, two teachers' representatives, two representatives of students, the store manager, and a representative of cooks. The committee oversees the procurement process and food menus, ensuring the quality and quantities of food students eat are suitable, among other responsibilities. Key meals in the school feeding program are breakfast, lunch, and dinner for purely boarding and mixed schools and lunch only for purely day schools. The school feeding program is mainly funded by the government, contributing 89% of the cost, and parents contribute 11%.

Survey results also show that beans are the staple served in schools (97%), followed by rice (86%) and maize (71%), with beans being served mainly for lunch and supper. 100% of public and government-aided schools and 92% of private schools serve beans daily. The survey also revealed that firewood (85.6%) and charcoal (11.8%) are schools' main sources of cooking energy. Other sources of cooking energy are gas (4.6%) and pellets (0.5%). However, the survey also highlighted that there is a high cost attached to the high dependence on biomass fuel for cooking in Kigali schools, with up to 40 hours a week dedicated to cooking fuel and $29,453.4 spent for cooking wages, of which $19,770 is spent on cooking dry beans only per month. Dry beans are cooked 5 to 7 times per week, and at least 52 tons of dry beans are cooked weekly, taking 48.5 cubic meters of water to clean and cook beans daily in the 195 schools.

Among the schools surveyed, only 46% of school representatives are aware of pre-cooked beans, with two schools (both private) using pre-cooked beans in their meals, while the rest use dry beans. The low adoption of pre-cooked beans in schools is attributed to a lack of awareness of pre-cooked beans, little trust in the sustainability of the supply of pre-cooked beans, high prices, low availability, and little trust in the quality of pre-cooked beans.

73% (145 out of 195) of schools surveyed have school gardens established mainly for food production (89%) and teaching (11%). Beans are among the top three crops grown in school gardens, as are vegetables and bananas. However, their yield can't suffice the needs of schools even though some schools have up to 2 hectares of land. Capacity building on best agronomic

practices and climate-smart agriculture is recommended for school gardening to improve the yield of beans and vegetables, which are part of daily school meals.

The survey also found that the school feeding program contributes to attendance, reduced dropouts, completion of studies and ultimately improved nutrition of school children.

Keywords

School feeding, cooking fuel, pre-cooked beans, school garden, climate-smart agriculture, Kigali City

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Acronyms

CIAT	International Center for Tropical Agriculture
CoK	City of Kigali
HOSO	Head of Schools Organization
MINEDUC	Ministry of Education
ODK	Open Data Kit
PABRA	Pan-African Bean Research Alliance
RAB	Rwanda Agriculture and Animal Resources Board
SF	School Feeding
SFC	School Feeding Committee
SFP	School Feeding Program
SSFI	Sustainable School Feeding Innovations

Introduction

Sustainable School Feeding Innovations in Kigali (SSFI) is a three-year project supported by Clifford Chance, that has come to contribute to the Rwanda school feeding program' objectives towards improving schools kids' nutrition, health, and social protection and development[1]. The SSFI project aims to implement nutrition-sensitive school feeding innovations in Kigali city schools and surrounding communities. The project uses a value-chain-based approach to enhance skills to produce, utilize, and supply nutritious foods to schools and other markets in Kigali. The SSFI project is led by the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) through its bean program, the Pan-African Bean Research Alliance (PABRA). It is implemented in collaboration with public institutions such as the Ministry of Education (MINEDUC), The Rwanda Agriculture Board (RAB), the City of Kigali, and the private sector such as the Head of Schools Organization (HOSO), the Farm Fresh Company and other actors of the bean value chain in Rwanda.

The project aims to improve well-being within the schools and surrounding communities, focusing on six aspects of well-being: livelihoods, nutrition and food security, health, family relationships, education, environmental sustainability, and technological innovations. The SSFI project has five main objectives, which are:

- Improve school feeding through nutritious and environmentally friendly value-added processed foods.
- Facilitate the establishment of school-based agribusiness centers in a climate-smart manner.
- Promote agricultural knowledge sharing in schools and neighboring communities through training and behavioral change communications.
- Build and strengthen multi-stakeholder platforms to sustain the linkages between schools, communities, and traders.
- Advocate for policy around nutrition.

The project targets schools and farming communities in the three districts of Kigali city province. Schoolchildren (boys and girls) will be trained in school gardening and agribusiness skills. Within the communities, the project focuses on male and female youth who have access to farms or can undertake other food enterprise activities to gain agribusiness skills to engage in commercial food production to supply schools and markets in Kigali city. The SSFI project will also address the issue of environmental conservation through processed products that are easy to cook (less fuel and firewood use) and through product varieties that are climate bright (short cooking time, short maturity, and drought-tolerant).

The project will use facilitating dialogues, capacity-building (e.g., training, mentoring, etc.), advocacy and influencing policy, awareness-raising about nutritious foods, and providing advice, research, and technological innovations to implement the SSFI project successfully. The project also aims to promote digital technologies and mobile apps for agriculture advisory, climate advisory, market linkages, and information. Enhanced school feeding has multiple benefits on education (enhances enrollment), health, nutrition[2], social protection, and gender equality. It further benefits agricultural communities and workers through local product sourcing.

[1] Rwanda School Feeding Operational Guidelines, 2021

[2] Wall, C., Tolar-Peterson, T., Reeder, N., Roberts, M., Reynolds, A., & Rico Mendez, G. (2022). The impact of school meal programs on educational outcomes in African schoolchildren: A systematic review. International journal of environmental research and public health, 19(6), 3666.

Methods

The evaluation approach for the enhanced school feeding program is designed as a cohort study. It involves sampling participants and non-participants at baseline. The program includes pre-cooked bean use, participation in agribusiness training clubs, and multi-stakeholder platforms. Subsequent surveys will be conducted to measure changes in participation and its impact on school communities. The study is guided by the primary evaluation questions that the project aims to address. These questions help evaluate the effectiveness of the program.

These questions include:

a. To what extent does enhancing school feeding influence learning by school children?
b. How can school feeding innovations contribute to more efficient energy use and environmental conservation?
c. How can schools contribute to addressing entrepreneurship and gender gaps in schools and school communities?
d. To what extent does agribusiness training enhance schools and farming communities' capacities to produce food for schools and other markets in Kigali?
e. What is the role of digital technologies in contributing to the sustainability of production and market linkages by schools and school farming communities?
f. What is the role of multistakeholder platforms in scaling the school feeding innovations in Kigali?

To answer these questions, the evaluation approach will be based on a mixed-method design that combines quasi-experimental and descriptive techniques. The quasi-experimental design will include before and after comparisons and combining this latter approach with cross-section comparisons. The before and after comparisons will be used to assess changes over time in critical outcomes among the project participants and will help to understand how the project contributed to the observed changes in the targeted outcome indicators. Given that schools are expected to receive the interventions at different times of the project, the timing of access to the project interventions will be used to compare the before and after intervention.

Sampling strategy

The survey was conducted in Kigali city schools to assess the availability of government-approved school feeding programs. All schools and local communities around the schools in Kigali were considered for the study. However, the survey focused on 195 schools from three districts of Kigali: Gasabo, Kicukiro, and Nyarugenge. Out of these, 75 schools were sampled in the Gasabo district, 65 in the Kicukiro district, and 55 in the Nyarugenge district. The sample of respondents was selected based on their knowledge of the school feeding program in the schools. The targeted respondents included Principals, head teachers, school accountants, storekeepers, and school secretaries. Sampling was done according to the survey structure in the three districts of the city of Kigali, and data were collected from a sample of 195 schools which is 38% of all primary (377) and high (134) schools in Kigali city[3]. For more information, please refer to Table 1.

[3] 2021/22 Education Statistical Yearbook School year ended in July 2022

Table 1: Sample distribution of the survey

	Type of school			
District	Private	Public	Government supported	Total
Gasabo	2	42	31	75
Kicukiro	29	24	12	65
Nyarugenge	19	22	14	55
Total	**50**	**88**	**57**	**195**

Table 2. presents the number of students disaggregated by sex and type of school. Boys and girls were almost equally distributed in all kinds of schools, purely day schools, purely boarding schools and mixed day and boarding schools, with slightly fewer boys (49.8%) than (50.2%) in all schools.

Table 2: Total number of girls and boys by type of school

Type of school	Girls	Boys	Total
Purely day school	133,551	131,914	265,465
Purely boarding school	1,211	780	1,991
Mixed day and boarding	4,685	5,425	10,110
Total	**139,447**	**138,119**	**277,566**

Survey instruments and data analysis.

A questionnaire was created to gather information about schools, including their type, number of students (by gender), school feeding program, types of meals and wages for meal preparation, cooking energy, use of dry beans in meals, and awareness and opinions on pre-cooked beans. In addition, the questionnaire collected data on water availability and usage in schools, environmental factors related to the use of biomass for cooking, school gardening, best agronomic practices, and climate knowledge.

The project team reviewed and approved the questionnaire in collaboration with MINEDUC, HOSO, and the City of Kigali. The questionnaire was then translated into the Open Data Kit (ODK) system and used to train enumerators. Representatives from MINEDUC, the City of Kigali, HOSO, and Farm Fresh provided feedback on the questionnaire, which was used to improve the survey tool and ensure the quality of data collected by the enumerators using tablets.

Data was collected in November 2023 using ODK software. The CIAT team ensured data availability and quality by checking the collected data transmitted online to the CIAT data server. After gathering all the school data, the dataset was cleaned and prepared for analysis using the STATA statistical software package.

Results

School information and characteristics

Socio-economic information and school characteristics were collected to better understand the dynamics of the school feeding program at the school level. The information is presented in Table 1. The schools were categorized into three types based on ownership: Private, Public, and Government-supported. Out of the total sample of schools, a significant portion (45%) were significant, followed by government-supported schools. Most schools (92.8%) were classified as purely day schools, with mixed day and boarding schools comprising only 6.2% of all schools. Mere 1% of all sampled schools were boarding schools (Table 3).

Table 3: Type of school

	Number of schools
Purely day school	181
Purely boarding school	2
Mixed day and boarding	12
Total	195

Table 4 provides important information about the characteristics of schools, such as the number of students disaggregated by gender and whether they are boarding or day students. According to the survey results, female students (50.2%) slightly outnumber male students (49.8%) across all three districts. Additionally, the data shows that only a small percentage of students (3%) are accommodated in boarding schools, while the majority (97%) attend schools on a day program basis.

Table 4: Average and total number of students per school

	Mean	Min	Max	Obs	Total all schools
By sex					
Girls	715	7	3,177	195	139,447
Boys	708	0	3,412	195	138,119
Boarding vs day school					
Boarding	573	92	1,091	14	8,020
Day	1,397	5	6,589	193	269,546
Total	1,423	103	6,589	195	277,566

As the project is related to school feeding, it was crucial for those responsible for feeding the kids to ensure that their nutritional requirements were met and oversee the cooking activities.

School caterers included storekeepers, head cooks, and kitchen supervisors. We collected information on the caterers' level of education, age, and gender. Table 5 shows that the number of female caterers (38%) is less than that of male caterers (62%) in all categories of schools. Moreover, the results demonstrate that the average age of male caterers is 36 years, while female caterers have an average age of 42.

Table 5: Gender of school caterer

		Female	Male	Total
Purely day school	n	66	115	181
	%	36.46	63.54	100
Purely boarding school	n	1	1	2
	%	50	50	100
Mixed day and boarding	n	5	7	12
	%	41.67	58.33	100
Overall	n	72	123	195
	%	36.92	63.08	100

It was noted that the education level of caterers was collected and analyzed. The findings showed that a significant proportion of school caterers had completed their university studies (42.6%), followed by those who had attained primary education (28.7%) and high school education (21.5%). Other caterers had varying levels of education, including culinary arts, catering, kitchen training, a master's degree in education management, and other related fields. The high level of education of caterers may imply good management of kitchen activities[4] and improved quality of schools' meals and services at school level[5].

Table 6: Education level of caterer

	Female	Male	Total
Primary	11.1	39.0	28.7
High School	30.6	16.3	21.5
Partial university	8.3	2.4	4.6
University	45.8	40.7	42.6
Other*	4.2	1.6	2.6

School feeding program (SFP)

- School feeding program governance

The government of Rwanda established the School Feeding Programme (SFP) to improve the nutritional status of school children, enhance their brain development and capacity to learn, and

[4] Raulio, S., Roos, E., & Prättälä, R. (2010). School and workplace meals promote healthy food habits. Public health nutrition, 13(6A), 987-992.

[5] Eves, A., Corney, M., Kipps, M., & Noble, C. (1997). Nutrition knowledge of caterers and constraints to offering more healthy meals. International Journal of Hospitality Management, 16(4), 403-417.

encourage school attendance. The SFPs were established in pre-primary, primary and high schools, and governing structures were defined and established through the MINEDUC. Each school has an SFP governed by a School Feeding Committee (SFC) composed of nine members, including two representatives of parents (male and female), a headteacher as secretary, two representatives of teachers (male and female), two representatives of students (male and female), a store manager, and a representative of cooks. The SFC is established according to the Rwanda School Feeding Operational Guidelines (2021).

This study found that an SFC leads 80% of SFPs in schools, while a small number of schools (5%) have no specific committee that governs the SFP. Another 15% of respondents suggested that the school governing board led the SFP in their schooling board. The SFP governing committees have an equal distribution of female and male members (50/50) in all schools.

- **School meals served in school.**

To understand the meals served in schools and their nutritional value, the study asked questions on the types of meals served, staples served, and foods served at breakfast, lunch, and dinner in the SFPs of schools. The results showed that all-day schools serve lunch (100%), while only 24% serve breakfast, which is only at the pre-primary level. Respondents confirmed that the availability of schools' meals has contributed to increased levels of school attendance, completion of studies, students' enrollment, and overall health of school kids. These results suggest that the availability of a school feeding program may by itself influence kids' enrollment, school retention and attendance level[6]. Regarding the type of staples served at meals in the SFP, beans are the most served staple food in almost all schools (public, private, and government-supported schools), with 97%, followed by rice (86%) and maize (71%). The dominance of beans in schools' meals might be justified by its high protein and essential minerals such as ion, calcium, zinc and phosphorus that contribute to health of school kids and makes beans an integral part of school meals in many other countries including Mexico[7] and Ghana[8]. Other foods served include Irish potatoes, sweet potatoes, cassava, and others (vegetables, porridge, etc.). All government-aided schools serve beans in their meals. (See Table 7 for more information.)

Table 7: Staples served in the schools.

	Private (n=50)	Public (n=88)	Government-aided (n=57)	Overall	
	% of schools serving			n (schools)	%
Beans	92	99	100	190	97
Rice	96	84	81	168	86
Maize	48	83	74	139	71
Irish potatoes	60	1	5	34	17
Sweet potatoes	30	11	12	32	16
Others	26	10	16	31	16

[6] Lawson, Ty M. "Impact of school feeding programs on educational, nutritional, and agricultural development goals: a systematic review of literature." (2012).

[7] Finkelstein, J. L., Mehta, S., Villalpando, S., Mundo-Rosas, V., Luna, S. V., Rahn, M., ... & Haas, J. D. (2019). A randomized feeding trial of iron-biofortified beans in school children in Mexico. Nutrients, 11(2), 381.

[8] Abizari, A. R., Buxton, C., Kwara, L., Mensah-Homiah, J., Armar-Klemesu, M., & Brouwer, I. D. (2014). School feeding contributes to micronutrient adequacy of Ghanaian schoolchildren. British Journal of Nutrition, 112(6), 1019-1033.

Cassava	12	9	11	20	10

Beans and vegetables are the most commonly served foods for breakfast, lunch, and dinner, with 24% of meals including beans and 24% of including vegetables. Rice and maize are common, while porridge (84%) is mostly eaten for breakfast (Table 8).

Table 8: Foods served for breakfast, lunch, and supper.

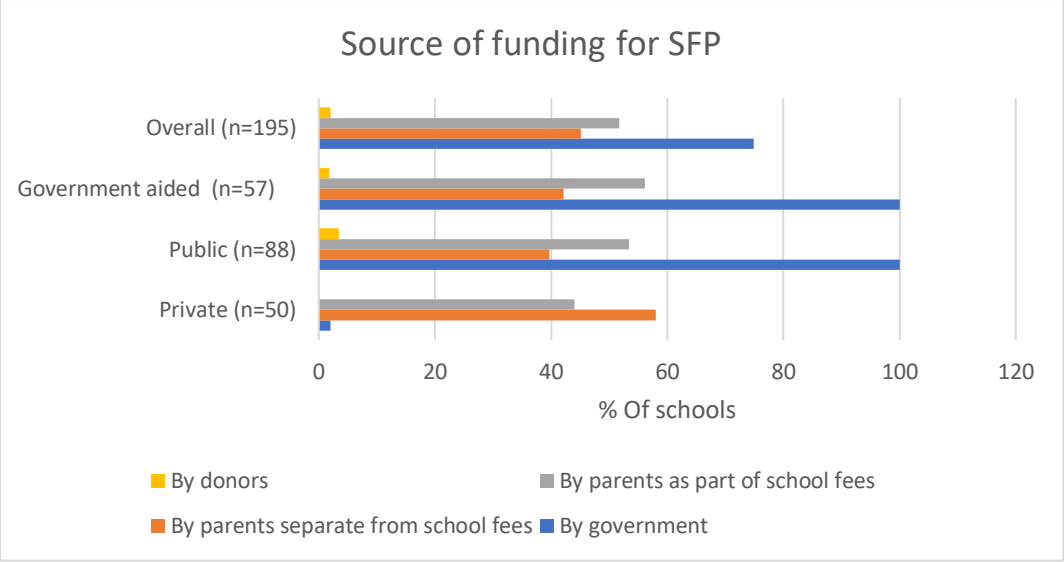
	Breakfast	Lunch	Super	Total
Beans	3.39	25.75	29.79	24.41
Vegetables	5.08	25.75	27.66	24.41
Rice	3.39	25.47	21.28	23.7
Maize meal	3.39	22.9	21.28	21.45
Porridge	84.75	0.14	0	6.04
Total	100	100	100	100

- ## School feeding program funding

The School Feeding Program (SFP) receives funding from the government (89%) and parents' contributions (11%). A study was conducted to assess different funding sources at the school level. The study revealed four funding sources: donors, parents (separate from school fees), parents (as part of school fees), and the government. The high contribution of government in the school feeding program suggests that an important contribution in school kids' families financial situation is established since the money that were to be used to buy food during the school day is saved and used for other needs of the family[9]. Figure 1 shows that all public and government-aided schools receive support for the SFP from the government. In contrast, only a few private schools receive government aid for the program.

Figure 1: Source of funding for School Feeding programme

[9] Cohen, J. F., Hecht, A. A., McLoughlin, G. M., Turner, L., & Schwartz, M. B. (2021). Universal school meals and associations with student participation, attendance, academic performance, diet quality, food security, and body mass index: a systematic review. Nutrients, 13(3), 911.



- **Schools' procurement processes**

The survey results showed that only a quarter of schools have procurement policies, with more public and government-aided schools following them. In contrast, over half of private schools do not have procurement policies when purchasing beans (as shown in Table 9).

Table 9: Are there procurement policies dictating the process to be followed in procuring beans?

	% No	% Yes
Private	58.0	42.0
Public	17.1	83.0
Government aided school	8.8	91.2
Total	25.1	74.9

The following (Table 10) summarizes the responses from a survey in which respondents were asked if any civil society organizations influence their schools' procurement process. The results indicate that only a small number of schools have such influences, mostly from religious entities, NGOs, or parent organizations.

Table 10: Which civil society organisations have an influence on your procurement process?

	Number of schools	% of schools (n=195)
Religious entity	5	2.56
NGO	2	1.03
Parents Association	**12**	**6.15**
District	1	0.51

Beans in the school feeding program and cooking processes.

According to survey results, beans are a crucial part of school meals in 95% of schools. Some schools serve beans up to 5 times a week, while others serve them up to 7 times a week for lunch and supper. The pot size used to cook beans depends on the number of students. Six schools use a pot size of more than 700 litres, 12 use a pot size of 700 litres, 52 use a pot size of 500 litres, 54 use a pot size of 300 litres, 46 use a pot size of 200 litres, and 25 use a pot size of fewer than 200 litres. This indicates that beans are a vital part of school meals.

When asked about the types of beans they purchase for use in schools, only two private schools purchase pre-cooked beans, while the remaining schools purchase dry beans. A total of 912 staff from 195 schools are involved in cooking school meals, resulting in an average of 5 cooking staff per school.

- ### Dry beans cooking

According to the survey results, beans are a popular staple food in all surveyed schools in Kigali city. They are a crucial source of protein and are widely consumed. To determine the cost of serving beans in schools, we asked questions about how beans are procured, their purchase price, the types of beans purchased, the quantities cooked, the wages paid to workers who cook them, the availability in markets, and how frequently they are served.

Day schools have an average of 5 staff involved in cooking, mixed day and boarding programs have an average of 6, and pure boarding schools have 10 staff involved in cooking. This correlates positively with the number of meals served each school type (Table 11).

Table 11: How many staff are involved in cooking?

	Min	Max	Obs	Mean	Total all schools
Purely day school	1	18	181	5	824
Purely boarding school	9	11	2	10	20
Mixed day and boarding	2	12	12	6	68
Overall	1	18	195	5	912

The survey found that $29,453 or 35,344,046 Rwandan francs are spent monthly on paying cooking workers, as shown in Table 12. This amount is mostly used by day schools, mixed schools and boarding schools, which comprise 91% of the total. The amount spent on cooking workers is directly related to the number of students in the school and the type of accommodation the school provides. Additionally, the survey found that 195 schools spend up to 23 million Rwandan francs each month on workers who prepare beans, as shown in Table 13.

*Table 12: Amount spent on wages for cooking workers per month, USD**

	Mean USD per school per month	Total all schools (USD)	Mean RWF per school per month	Total all schools (RWF)
Purely day school	148.1	26,805.2	177,714	32,166,256
Purely boarding school	289.1	578.1	346,872	693,744
Mixed day and boarding	172.5	2,070.0	207,004	2,484,046
Overall	151.0	29,453.4	181,252	35,344,046

*1 USD=1200 RWF

Table 13: Amounts spent on workers who prepare dry beans (USD and RWF per month)

	Mean USD/month	Total USD all schools	Mean RWF/month	Total RWF
Private	117.9	5,425	141,520	6,509,940
Public	93.2	8,012	111,790	9,613,951
Government aided school	111.2	6,336	133,399	7,603,720
Overall	104.6	19,770	125,526	23,724,437

The prices for purchasing dry beans did not vary significantly among different school categories and were found to range between 950 and 2,000 Rwandan francs per kilogram (Table 14). However, the frequency of buying dry beans differed between private and public/government-aided schools. The results indicate that most schools buy dry beans once a month, while others buy them on a per-term basis (once every three months) (Table 15).

Table 14: Price of dry beans RWF/KG

	Mean RWF/KG	Min	Max	Std. dev.
Private	1,326	950	2,000	233.3432
Public	1,384	1,200	1,700	102.4371
Government aided schools	1,382	1,050	2,000	142.8235
Overall	1,369	950	2,000	156.1608

Table 15: How frequently do you buy beans?

	Private	Public	Government aided	Total
Daily	8.3	2.3	3.5	4.2

Weekly	12.5	2.3	0.0	4.2
Monthly	62.5	85.2	84.2	79.3
Other*	16.7	10.2	12.3	12.4

According to the survey, when asked about the markets from where dry beans are purchased, 78% of schools buy dry beans from the suppliers they have contracts with, 13% buy from spot markets, and the remaining schools receive dry beans from other sources such as the City of Kigali or district offices (as indicated in Table 16).

Table 16: In which type of market do you get your beans?

	Private	Public	Government aided	Total
Spot market	44.0	1.1	5.3	13.3
Contract market	46.0	93.2	82.5	78.0
Others*	14.0	5.7	12.3	9.7

In total, 52.5 tons of dry beans are cooked every week across 195 schools. The amount of dry beans cooked varies between private, public, and government-aided schools. Public schools have the largest share (55%) of dry beans cooked in a week, followed by government-aided schools (37%), and private schools have the smallest share (8%).

Table 17: Kilograms of dry beans cooked per week

	Mean KGs	Min	Max	Obs	Total Kgs
Private	85	0	420	50	4,229
Public	328	5	910	88	28,893
Government aided school	341	25	1250	57	19,441
Overall	270	0	1250	195	52,563

Cooking fuel

Cooking fuel is crucial to the School Feeding Program (SFP). Schools usually purchase cooking fuel, and this study examines the costs, time spent on procuring fuel, the type of fuel used, and the perception of firewood as a cooking energy source. The study also collected water availability, water usage, the quantity used for cooking beans, and the price of water in schools.

Figure 2 presents respondents' feedback on the staff responsible for cooking fuel. The results show that private schools have more staff responsible for procuring cooking fuel than public and government-aided schools. The results also reveal that private schools spend up to 40 hours per week on cooking fuel attendance, while public schools spend 25 hours and government-aided schools spend 30 hours (Table 18).

Figure 2: Are there staff responsible for cooking fuels only?

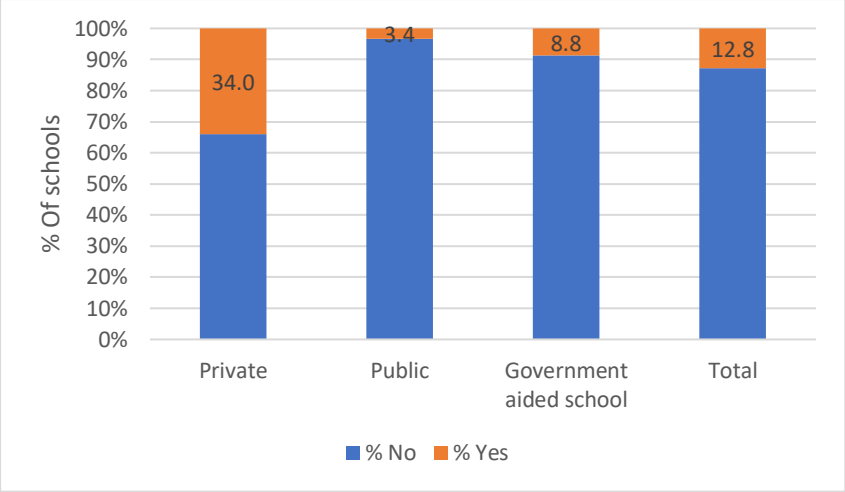


Table 18: Number of hours dedicated to fuel attendance per week

	Mean	Min	Max
Private	15	2	40
Public	14	1	25
Government aided schools	23	1	30

The study found that firewood is the primary fuel for cooking in general and cooking dry beans in particular in more than 85% of the schools surveyed. Charcoal is the second most used fuel (11.8%). Gas and briquettes/pellets are the least used, with gas being mainly used in private schools and pellets being used in only one public school (Table 19). The study also revealed that firewood is used when dry in 81% of schools, while the remaining 19% use it when wet. The above results suggest that there is a high dependance on biomass fuel including firewood and charcoal which contribute to higher emissions of greenhouse gases in the air that affect health[10], disturbs the environment through tree cutting and later contributes to climate risks[11]

Table 19: Type of fuel used to cook dry beans.

	Private	Public	Government	Overall	
	Percent of schools			Number of schools	% of schools (n=195)
Firewood	52.0	97.7	96.5	167	**85.6**
Charcoal	42.0	1.1	1.8	23	**11.8**
Gas	16.0	0.0	1.8	9	4.6
Briquette/pellets	0.0	1.1	0.0	1	0.5

[10] Atmowidjojo, Amelia Christina, et al. "Cooking Practices in Institutional Settings in Indonesia and Cambodia." (2022).

[11] Gioda, Adriana. "Residential fuelwood consumption in Brazil: Environmental and social implications." Biomass and Bioenergy 120 (2019): 367-375.

According to this survey, when people were asked about their thoughts on using wood fuel for cooking, 28% of respondents believed it was easily available at markets. However, 82% said that the cost of wood fuel at the markets was quite high. Additionally, 58% of respondents agreed that transporting fuel wood from markets to schools was expensive. The survey also revealed that the prices of fuel wood per unit varied between 7,590 and 56,000 Rwandan francs for firewood (per cubic meter), between 10,000 and 16,000 Rwanda francs for charcoal (per bag), and 170 Rwandan francs for briquettes (per kg). You can find more details in Table 20.

Table 20: Prices of fuel

	Mean RWF/unit	Min	Max
Firewood (metric tons)	23,946	7,590	56,000
Charcoal (bags)	12,455	10,000	16,000
Briquettes (kgs)	170	170	170

Water availability and use

Water availability is a critical factor in the success of a school feeding program. It is essential to ensure that meals are cooked and cleaned properly. This study evaluated the availability of water at schools and the associated cost of water consumption, particularly in the preparation and cooking of dry beans. The results indicate that clean water is available daily in all private schools, 84% public schools, and 71% government-aided schools. The study also found that all 195 schools consumed over 48 cubic meters of water daily to clean beans, with public schools using the most significant amount of water, followed by government-aided schools and then private schools. (Refer to Table 21 for details).

Table 21: Quantity of water used to prepare dry beans

	liters/ day cleaning beans	Liters per day cooking beans	Total liters/school/day	Number of schools	Total litres in all schools
Private	44.5	94.6	139.1	46	6,399
Public	96.6	178.2	274.8	86	23,634
Government aided school	110.1	216.8	326.9	57	18,631
Overall	88.3	168.7	256.9	189	48,561

Respondents revealed that the high cost of fuel and water relates with the long cooking time and the number of times meals must be prepared. This was highlighted particularly on maize and beans meals which take longer time to cook. Other studies have highlighted the same cases in the school feeding program and mentioned it as one of key challenges that the school feeding program faces[12]

Pre-cooked beans awareness and use

We introduced pre-cooked beans to the School Feeding Program (SFP) in Kigali as part of this project intervention. This is aimed at enhancing the availability of nutritious foods for school children while also contributing to reducing biomass fuel consumption in Kigali city schools. The ultimate goal is to reduce the negative impact of biomass fuel consumption on the environment and natural resources.

A study evaluated respondents' awareness, perception, and willingness towards pre-cooked beans in the SFP. The study results indicate that only 46% of respondents know pre-cooked beans in all schools (Table 22). Of those aware, 64.4% have received information about pre-cooked beans from the producers. Other sources of information include radio, friends and relatives, TV, and social media, among others.

Table 22: Are you aware of precooked beans?

	% No	% Yes
Private	54.0	46.0
Public	50.0	50.0
Government aided schools	59.7	40.4
Total	53.9	46.2

The survey on perceptions of pre-cooked beans included questions on the willingness to pay 1,000 Rwandan francs per one kg of pre-cooked beans, availability of pre-cooked beans on markets, distance of the markets from schools, and the ability to pay. The results indicate that 43% of respondents agreed to pay 1000 Rwandan francs per kilogram of pre-cooked beans, 39% disagreed, and 18% were neutral. Of the respondents, 36% confirmed they could pay 1000 Rwandan francs per kilogram of pre-cooked beans, while 49% suggested that pre-cooked beans are unavailable at their local markets. Furthermore, 49% confirmed that the demand for pre-cooked beans is far from their institutions. Please note that these results are summarized in Table 3.

Table 23: Respondents' perception of pre-cooked beans

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am willing to pay 1000 Rwf per kilogram of pre-cooked beans	25	14	18	28	15
I am able to pay for precooked beans	24	20	21	22	14

[12] Desalegn, Tsion A., Samson Gebremedhin, and Barbara J. Stoecker. "Successes and challenges of the Home-grown School Feeding Program in Sidama Region, Southern Ethiopia: a qualitative study." Journal of Nutritional Science 11 (2022): e87.

Precooked beans are not available in local markets	16	17	16	30	19
The precooked bean market is far from the institution	13	16	19	33	18

The survey asked participants about their schools' use of pre-cooked beans. Questions included whether the school has used pre-cooked beans, their willingness to use them, and reasons for wanting or not wanting to use them. The results, presented in Table 24, show that only 17% of schools have used pre-cooked beans in their School Feeding Program.

Table 24: Has the institution used pre-cooked beans?

	% No	% Yes
Private	82.0	18.0
Public	83.0	17.1
Government aided school	82.5	17.5
Total	82.6	17.4

More than 80% of schools do not use pre-cooked beans. One of the main reasons for this is the lack of information about pre-cooked beans, as reported by 50% of the schools surveyed. In addition, 18% of the schools have low trust in the sustainability of pre-cooked beans, and 16.4% of schools believe that pre-cooked beans are expensive. Further, 5% of the respondents confirmed that their schools are not responsible for procuring beans, but the city of Kigali is. This data is presented in Table 25.

Table 25: Reasons for not utilising pre-cooked beans

	n	% of schools (n=195)
No information about precooked beans	98	50.3
Negotiating contact with a new supplier is costly	15	7.7
Precooked beans are expensive	32	16.4
Precooked beans are not available	19	9.7
Precooked bean packaging is not convenient	16	8.2
No trust in precooked bean sustainability	35	18.0
Precooked beans are of poor quality	17	8.7
The pre-cooked beans cooking process is complicated	9	4.6
Precooked beans are not energy-efficient	6	3.1
Precooked beans are not timesaving	7	3.6
Other, specify	10	5.1

According to Table 26, 61.6% of public schools will use pre-cooked beans in the future. However, less than half of private and government-aided schools responded positively, 48.8% and 44.7%, respectively. Out of those who haven't adopted pre-cooked beans, about 53% are willing to do so in the future, with a higher percentage from public schools.

Table 26: Is the institution willing to use precooked beans in the future?

	% No	% Yes
Private	51.2	48.8
Public	38.4	**61.6**
Government aided school	55.3	44.7
Total	46.6	53.4

According to the results, the primary reasons for wanting to use pre-cooked beans are that they can solve the problem of wood fuel availability (27.7% of schools), they are cost-saving (25.6% of schools), and they are easy to use (20% of schools).

School gardens

The SSFI in the Kigali Project aims to improve children's access to healthy food by utilizing the best agronomic and climate-smart agriculture practices to enhance school food production. To assess the current status of school gardens, data was collected on the availability of school gardens, motivation for having school gardens, challenges faced by the schools in using school gardens, need for training on agriculture, the people involved in school gardening, crops produced in the gardens, and how the produce is managed. Results show that 73% of all schools have school gardens, with 46% of private schools, 85% of public schools and 79% of government-aided schools having school gardens. According to Table 27, the primary motivations for having school gardens are food production (88.8% of all schools) and teaching and co-curricular activities (5.6% each).

Table 27: Motivation for having a school garden

	Number of schools	%
Teaching	8	5.6
Co-curricular activities	8	5.6
Food production	127	88.8
Total	143	100.0

According to the survey, 85% of respondents agreed that school gardens can be used as learning points. Among these respondents, 76% agreed that the gardens can be used for biological

lessons. Regarding using school gardens to teach health and nutrition lessons, around 63.6% of respondents said they sometimes link gardening to health and nutrition, but not always. The survey also revealed that 66% of respondents sometimes use school gardens to illustrate climate and environmental issues, while only 7% do it often. These findings are summarized in Table 28.

Table 28: How often do you link school gardening to health and nutrition during lessons?

	N	%
Never	9	6.29
Rarely	9	6.29
Sometimes	91	63.64
Often	25	17.48
Always	9	6.29

To gather information about how various school garden activities are carried out, we posed questions such as how planting, watering, pest control, and fertilization are done in these gardens. The respondents confirmed that over 90% of schools manually plant and water the gardens. Pest control is also mostly done by hand in 65% of schools, while 35% use spraying equipment. Only a few schools (2%) use sprinkler irrigation to water the garden.

Regarding the source of manure, the results presented in Table 29 indicate that almost 60% of school gardens' manure is purchased, and 43% is produced within the schools. Other sources of manure include parents and Nkunganire[13]

Table 29: Source of manure used in school gardens

Source of manure used	Number of schools	% of schools (n=127)
Produced in school	55	43.31
Parents	10	7.87
Purchased	76	59.84
Other	5	3.94

When the respondents were asked about their challenges in utilizing the school gardens, they listed the lack of materials and resources as the main challenge (65%). This was followed by the lack of knowledge about school gardening (41%) and the lack of time for gardening (30%). Other challenges include limited land for gardening and climate-related challenges such as irregular rainfall (14%), as shown in Table 30.

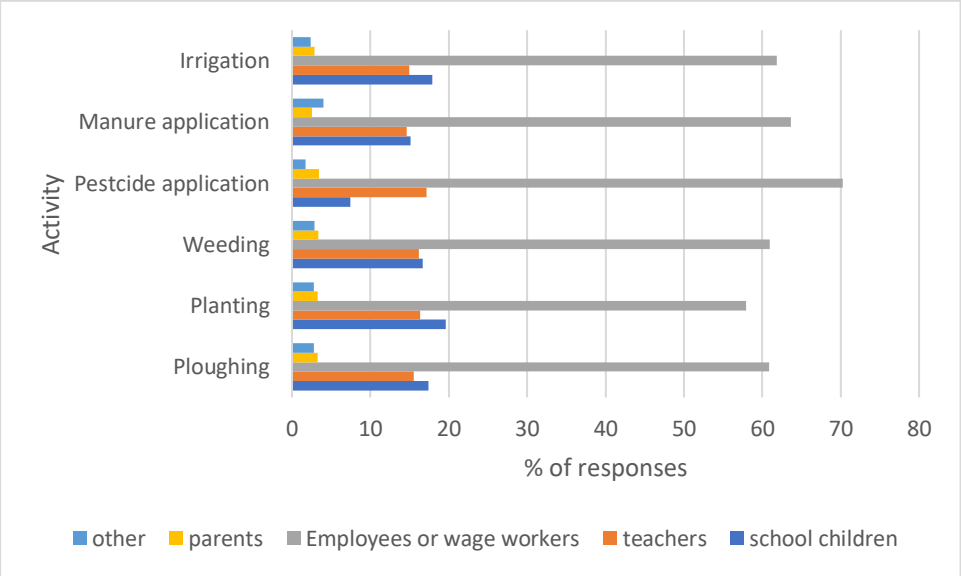
[13] 'Smart Nkuganire' (SNS) platform; an innovative tool to link and empower stakeholders involved in the subsidy programme that handles fertilizers, improved seeds, pesticides, mechanization and small-scale irrigation technology.

Table 30: What challenges do you face when using the school gardens?

	Number of schools	% of schools (n=143)
Lack of knowledge	59	41.3
Lack of time	43	30.1
Lack of materials/resources	93	65.0
Other*	20	14.0

It was found that 77% of respondents agreed that training in agriculture would enhance the use of school gardens. To gather more information about the different activities carried out in school gardens and the individuals involved, questions were asked regarding the practices implemented in the school gardens and the groups of people participating in gardening. According to Figure 3, wage workers are the most actively involved in the activities, followed by school children and teachers.

Figure 3: Who works in the school garden, and what are the activities carried out in the school garden?



The survey asked the participants about the crops grown in school gardens during seasons, namely, Season A and Season B. According to the results, most schools grow vegetables in both seasons, with 97% and 96% growing vegetables in Season A and B, respectively. Other commonly grown crops are beans and bananas, as reported in Table 31. The survey also revealed that around half of the private schools rotate their crops, while only about one-third of public and government-aided schools do so.

Table 31: Crops produced in the school garden by season

	Season A		Season B	
	Number of schools	% of schools (n=143)	Number of schools	% of schools (n=143)
Maize	13	9.09	9	6.29
Beans	16	11.19	11	7.69
Bananas	15	10.49	14	9.79
Sweet potatoes	4	2.8	4	2.8
Potatoes	1	0.7	3	2.1
Vegetables	139	97.2	137	95.8
Cassava	4	2.8	4	2.8
Other specify	2	1.4	6	4.2

The survey asked respondents, including private, public, and government-aided school representatives, about their knowledge of climate change and its usage. The results reveal that 19.6% of all respondents have no knowledge of climate change and do not use it. 70.6% have little knowledge, while only 9.8% have enough knowledge to use it effectively. These findings are summarized in Table 33.

Table 32: How much do you know/use climate change knowledge?

How much do you know/use climate change knowledge?	None	Little	A lot
Private	34.8	52.2	13.0
Public	8.0	82.7	9.3
Government aided schools	31.1	60.0	8.9
Total	19.6	70.6	9.8

Even though very few respondents have enough knowledge about climate, most of them understand the importance of protecting the environment to some extent and apply some environment-friendly practices in school gardening, including:

- Reducing water use by planting drought-resistant or native plants and using drip irrigation (57%)
- Avoiding harmful pesticides and chemicals through integrated pest management (48%)
- Limiting waste by reusing materials for compost and other inputs and replenishing soil using cover crops and rotations (57%).

Table 33 presents the quantity of crops harvested from school gardens in season A of 2023. It shows that 88,587 kgs of vegetables were harvested from all schools that planted vegetables, followed by bananas with 5,322 kgs, sweet potatoes with 3,050 kgs, and beans with 2,700 kgs. Other crops planted that season include maize, potatoes, cassava, coffee, and avocado. The results also indicate that all the harvests are used in school, except for two reported cases where the produce from maize and cassava was sold in the nearby market.

Table 33: Quantity of crops harvested from school gardens season A

	Number of schools	Mean kgs	Total KGs
Maize	12	140	1,680
Beans	15	180	2,700
Bananas	14	380	5,322
Sweet potatoes	4	763	3,050
Potatoes	1	20	20
Vegetables	137	647	88,587
Cassava	3	92	275
Coffee	1	905	905
Avocado	1	3,000	3,000

Conclusion

This report presents the results of a study conducted to evaluate the effectiveness of the school feeding program in Kigali city schools. The study focused on various indicators such as access to nutritious food, the use of biomass fuel, awareness and adoption of pre-cooked beans, and access to knowledge of agronomy and climate-smart agriculture practices in school gardens. Data were collected from 195 schools and analysed to generate results that provided important insights into the capacity of schools to provide nutritious foods to school children, the ability to adopt pre-cooked beans, and the capacity to use school gardens to improve school children's nutrition.

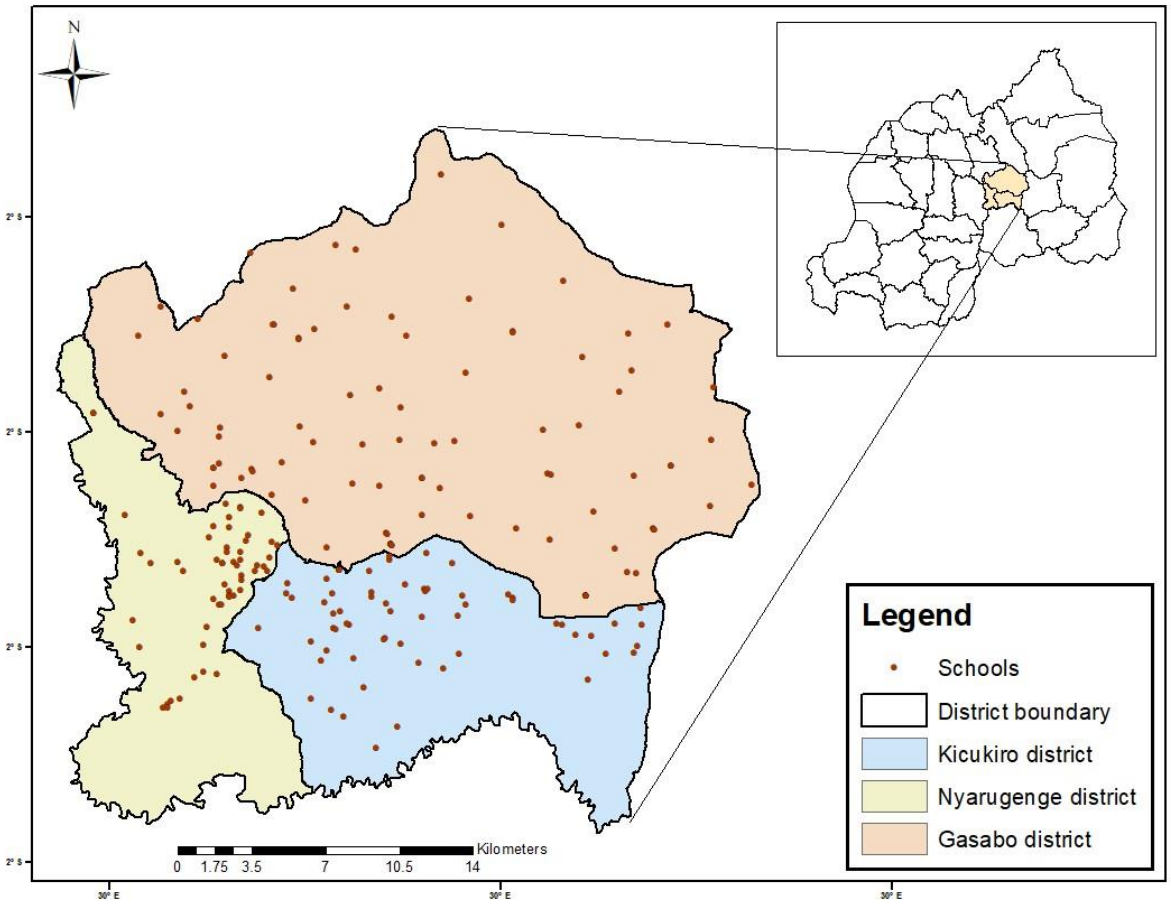
The study found that all the schools had a school feeding program, and 277,566 students were enrolled and served lunch daily. Beans were cooked and served in 97% of the schools, except for a few private schools that did not serve beans. On average, beans were served five days a week, totaling over 52 tons of dry beans per week in 195 schools. This translated to 59,982 USD used to buy dry beans weekly in these schools. It was found that approximately 24 million Rwandan Francs (19,770 USD) was spent monthly to pay workers who cooked beans using wood fuel (firewood and charcoal). The study found that school representatives perceived wood fuel as expensive and not readily available in Kigali. More than 50% of the school representatives interviewed were unaware of pre-cooked beans, while the rest perceived such beans as not readily available, expensive, and not having a sustainable supply.

The study found that about 73% of the schools had school gardens, mainly used to produce vegetables, with only a few producing beans. Paid-wage workers mainly supplied labour in the school gardens. Some of the challenges and limitations highlighted by the study included the high dependency on biomass as the source of cooking energy, low access to information about pre-cooked beans, low access to knowledge related to school gardening, and limited access to climate-related knowledge to improve school gardens' management and resilience to climate risks.

The study recommended training on agronomy and climate-smart agriculture to improve the school feeding program in Kigali city schools. This included promoting high-iron beans and adopting nutrition-rich, environment-friendly, and cost-effective food products such as pre-cooked beans.

Annexes

Annex 1. Map of the survey sites



Annex 2. List of surveyed schools

	Name of school
1	AGAPE School
2	APADERWA
3	APPEK St. Joseph
4	Apade
5	Blessing nursery and primary school
6	Centre Scolaire Georges Defour
7	Centre Scolaire de Kabeza(CSK)
8	College de BUTAMWA
9	College sait Andre
10	Day spring
11	E.P Muhazi

12	E.P Murambi
13	EBENEZER ACADEMY
14	ECD CEAPS
15	ECDF CENTER KARAMA
16	ECOLE MATERNEL ET PRIMAIRE DE BIRYOGO
17	EP BIRYOGO
18	EP BISENGA
19	EP BUTAMWA
20	EP BWERAMVURA Catholique
21	EP GASAGARA
22	EP GASHARU
23	EP GATSATA CATHOLIQUE I
24	EP GICACAII
25	EP Gakorokombe
26	EP Gatsata II
27	EP Gitega
28	EP INTWALI
29	EP JURWE
30	EP Jali Catholique
31	EP KAMUYANGE
32	EP KARAMA
33	EP KARAMA EPR
34	EP KIMIHURURA
35	EP Kagarama
36	EP Kagina
37	EP Kamuhoza
38	EP Karama
39	EP Kariyeri
40	EP Kigarama
41	EP Kinunga
42	EP MBANDAZI
43	EP Mbabe
44	EP Muganza
45	EP Muhima
46	EP Munini
47	EP NGARA
48	EP NYACYONGA
49	EP NglRyi Catholique
50	EP Nkuzuzu
51	EP Nyaburiba
52	EP Nyagahinga
53	EP Nyakabanda
54	EP Nyange
55	EP RWEZERO
56	EP Rugarama

57	EP TABA
58	EP kacyiru I
59	EP kibagabaga
60	EPKacyirul
61	ES EFFOTEC
62	ESCAF
63	ESPAK
64	ESSA Nyarugunga
65	Eagle spirit academy
66	Ecole International Chez les Bien Aimes
67	Ecole Jesus Eucharistique
68	Ecole Primaire international La Divine
69	Ecole Primarie De KAGASUNZU
70	Ecole Privee Marie Auxiliatrice(EPMA)
71	Ecole Secondary St Joseph Travailleur
72	Ecole christ Ressuscite
73	Ecole les alouettes de Sainte Thérèse
74	Ecole primaire Nyamweru
75	Ecole primaire St. Vincent de Paul
76	Ecole primaire de Gatare
77	Ep Cyaruzinge
78	Ep Gahanga 2
79	Ep Mulinja
80	Ep Nunga
81	Ep. kigabiro
82	Future Rwanda School
83	G .S kimironko I
84	G S Camp Kanombe
85	G.S APE Rugunga
86	G.S Cyahafi TESS
87	G.S Gasabo
88	G.S Gicaca I
89	G.S Gikomero
90	G.S Kibara
91	G.S Rutunga
92	G.S kabuga catholic
93	G.S kacyiru II
94	G.S kimironko II
95	GISOZI I
96	GS AGATARAMO
97	GS APACE
98	GS APACOPE
99	GS Agateko
100	GS BUMBOGO
101	GS BUTAMWA

102	GS Busanza
103	GS CAMP KIGALI
104	GS Cyeru
105	GS Epa Saint Michelle
106	GS GIHOGWE
107	GS GISASA
108	GS GISOZI II
109	GS Gasogi
110	GS Gatenga I
111	GS Gishaka
112	GS Gitaraga
113	GS IFS
114	GS KABUYE CATHOLIQUE
115	GS KAGARAMA
116	GS KAGUGU CATHOLIQUE
117	GS KARAMA
118	GS KAYANGA
119	GS KIGALI
120	GS Kabusunzu
121	GS Kamashashi
122	GS Kimisagara
123	GS MUSAVE CATHOLIQUE
124	GS Masaka 1
125	GS NDERA Catholique
126	GS NYARURAMA
127	GS Nduba
128	GS Ntora
129	GS Nyarufunzo
130	GS Nyarugugu
131	GS Nzove
132	GS REMERA
133	GS RUDAKABUKIRWA
134	GS RUGANDO TSS
135	GS RWANKUBA
136	GS RWANYANZA
137	GS Remera Protestant
138	GS Rubingo
139	GS Rubirizi
140	GS SV Paloti Gikondo
141	GS Sabaganga
142	GS Sha
143	GS Ste Famille
144	GS kicukiro
145	GS murambi
146	GSM Gikumba
147	Gatenga II PS

148	Good Haven international school
149	Good foundation
150	Group Scolaire CYIVUGIZA
151	Group Scolaire Masaka
152	Groupe Scolaire KINYINYA
153	Groupe school muyange
154	Groupe scolaire Akumunigo
155	Groupe scolaire du mont kigali APACE
156	Groupe scolaire nyanza
157	Gs Gahanga 1 TSS
158	Gs Gako
159	Gs Jabana
160	Gs Kanyinya
161	Gs Karembure
162	Gs Remera Catholique
163	Gs Ruhanga
164	Gs Rwabutenge
165	Gs karembure
166	HVP Gatagara
167	Herithage
168	IMANZI CITY OF MAINZ
169	JERICHO School
170	Kagarama secondary school
171	Kanyinya TVET School
172	Kigali Adventist school
173	Kigali Pacific college
174	Kigali de la salle
175	LYCEE DE KIGALI
176	LYCEE NOTRE DAME DES CITEAUX
177	Le petit prince
178	Les Hirondelles de Don Bosco
179	Little Gems Academy
180	Mai Childhood Academy
181	Mére Agathe
182	Nonko Primary School
183	ODRBES-ECOLE DU SAINT ESPRIT
184	Rusororo
185	Rwiza Primary School
186	Saint Joseph integrated technical col..
187	Saint Nicolas primary school.
188	Samuduha integrated college(SICO)
189	St Charles Lwanga
190	St Emmanuel Complex School
191	St Vincent pallotti Masaka
192	St charles de jesus
193	Star school

194	Vineyard nursery and primary school
195	Vois Des Ange

Annex 3. Questionnaire for the baseline survey

SUSTAINABLE SCHOOL FEEDING INNOVATIONS IN KIGALI PROJECT

BASELINE SURVEY QUESTIONNAIRE

PARTNERS:

- The Ministry of Education (MINEDUC)
- The City of Kigali
- The International Centre for Tropical Agriculture (CIAT)/ Pan African Bean Research Alliance (PABRA)
- The Heads of Schools Organization (HOSO)
- The Farm Fresh

NOVEMBER 2023

Dear respondent,

This questionnaire is prepared to collect data for the Economic Analysis of Adopting Precooked Beans by Institutions in Rwanda study. This study aims to understand institutional consumers' perceptions of pre-cooked beans, the factors influencing their adoption, and the economic benefits of adopting them. Your most valuable contribution to the questions enclosed will be highly appreciated as this will inform policy towards reducing fuel wood consumption. You are promised confidentiality with the information you give since it will be used only for this study.

A. GENERAL INFORMATION

1. Profile

Date	
Questionnaire No	

District	
Sector	
Cell	
Name (s) of the Decision maker(s)- respondents 1	
Respondent - 2	
Respondent 3	
Positions	
Telephone Nos.	
Name of Enumerator	

2. **School information**

- Number of students (total)….
- Number of girls….
- Number of boys….
- Number of students (Boarding) ….
- Number of students (day school)…..
- What do say about the level of Absenteeism from 2022, 2023 (Increased, decreased, same, don't know)
- In 2023 absenteeism of boys compared to girls is (higher, lower, same, don't know)
- If day school, what meals are served in school (select as appropriate) ? 1. Breakfast 2. lunch 3dinner

B. CATERER'S/respondent's CHARACTERISTICS

Age of Caterer	…… years
Gender of caterer	1= Male 0= Female
Education level of caterer	1= High School 2= Partial university 3= University
Work experience of caterer	……years

- How many employees (Teachers, Administration, caretakers, cleaners, security guards,..) does the school have? (…….....# of male, …….....# of female)
- How many staff are involved in cooking and in the kitchen work?
- Number of Permanent workers? Total Cost of wages paid to permanent workers in RWF per month??
- Number of Temporary workers? Total cost of wages paid to temporary workers RWF per month?
- Type of School (day school, boarding, school day and boarding)

C. SOCIO-ECONOMIC FACTORS

1. When did the institution start operating?	
2. What is the type of institution?	1= Public 0= Private
3. Where is the institution located?	1= Urban 0=Rural
4. How many students does the institution have?	.....
5. What is the level of income of the institution per year? (in Rwf)	

- When did the school feeding programme start? (year)
- What governance/management structure(s) is responsible for school feeding program in your school? (Procurement committee; school governing committee/board; school feeding program/nutrition committee; no committee)
- How many female and male members are in each of the committee? (enter by committee)
- How is the school feeding program funded (allow for multiple selection)? (By government, by parents separate from school fees, by parents as part of school fee, by donors/NGOs, other (Specify))

- What are the major meals cooked in the school? (this table is pasted as a picture; open up the sub-questions). Add a question on Quantity cooked and the number of times serviced by each quantity cooked (e.g., lunch only, lunch, and dinner). For each type of cooking below, indicate also the fuel used as a question.
- Add: What time do you start preparing for each meal before you begin cooking/boiling?

Type of meal	Meals	Size of the pot [Litres]	Type of cooking	Starting time	Ending time	Served	Remarks
Breakfast	Porridge	200 & 300	Boiling	4:00	5:20	06:30	
			Simmer	5:20	6:00		
Lunch	Maize (Kawunga)	300 & 300	Boiling	9:00	10:30	13:00	Lunch
			Simmer	10:30	12:00	20:00	
	Beans	500	Boiling	20:00	5:00	13:00	Lunch
			Simmer	7:00	9:00	20:00	Supper
	Vegetables	300	FRY	10:00	10:30	13:00	
			FrY	16:00	16:30	20:00	
Super	Rice	700	Boiling	12:00	14:00	20:00	
			Simmer	14:00	16:00		

- Are there staff responsible for cooking fuels only? How many? Or how much time is allocated to fuel attendance?

D. INSTITUTIONAL FACTORS

1. Are beans a key meal of the institution	1= Yes, 0= No
2.	
3. What type of beans do you purchase in your organization? Different question?	1=Dry beans 2=Precooked beans
4. Who is involved in the bean procurement process? Decision maker	……..
5. Are there any procurement policies dictating the process to be followed in procuring beans? Who establishes n who enforces	1=Yes 0= No
6. Are you aware of precooked beans?	1= Yes; 0=No If 0, skip to
7. Where did you get the information about their existence? The main source of info	1= Radio 2= TV; 3= Internet 4= Producer 5= Friends and relatives 6= Other, *Specify,* ……..
8. Was this source sufficient?	1= yes 0= no If 0, skip to
9. Where did you get the information? *Encircle the right answer(s)*	1= Radio 2= TV; 3= Internet 4= Producer 5= Friends and relatives 6= Other, *Specify,* ……..
10. In which type of market do you get your purchases? Where? How?	1=Spot market 2= contract market 3= Others, *Specify*, …….
11. Do you pay for reinforcing contracts?	1=Yes 0=No If 0, skip to 11

12. How much do you pay for reinforcing contract? (in Rwf)	……
13. How much do you pay for loading beans after sale? (in Rwf)	……
14. How much do you pay for transporting dry beans from the market to the institution? (in Rwf)	…….....
15. How much do you pay for unloading dry beans? (in Rwf)	……
16. How much do you pay for storing dry beans in your organization? (in Rwf)	……
17. What is the distance from the institution to the market? (in Kilometers)	...……

E. ENVIRONMENTAL FACTORS

1. Is there any government policy dictating schools' procurement of food?	1=Yes 0=No
2. If yes, does the policy apply for private schools? (only for private schools)	1=Yes 0=No
3. How much do you know about environmental effects of cooking dry beans?	…….
4. Is there any civil society which has an influence on your procurement process?	1=Yes 0=No
5. If yes, which one?	1= religious entity 2= NGO 3= Parents Association 4= Other, *Specify*……..

F. PERCEIVED CHARACTERISTICS OF PRE-COOKED BEANS

- On a scale of 1 to 5, please rate how much you agree with the following statements showing precooked beans perception: Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree.

Factor	Statement	Rate
1. Price	• I am willing to pay 1,000 Rwf per package of precooked beans	…….
	• I am able to pay	…….
2.	•	

3. Availability	• Precooked beans are not available in local markets	…….
	• The precooked bean market is far from the institution	…….

G. WILLINGNESS TO ADOPT

1. Has the institution adopted precooked beans?	1= Yes 0= No *If yes, skip to question 4*
2. Why has it not adopted them?	1. No information about precooked beans 2. Negotiating contact with a new supplier is costly 3. Precooked beans are expensive 4. Precooked beans are not available 5. Precooked beans packaging is not convenient 6. No trust in precooked bean sustainability 7. Precooked beans are of poor quality 8. Precooked beans cooking process is complicated 9. Precooked beans are not energy efficient 10. Precooked beans are not time-saving 11. Other, *specify* …….
3. Is the institution willing to adopt precooked beans in the future?	1= Yes 0= No *If 0, skip to question 5*
4. What motivates its willingness to adopt (or the adoption)? *Plz rank 2 by order*	1. Precooked beans are cost-saving 2. Precooked beans are ease to use 3. Precooked beans are nutritious 4. Precooked beans are of good quality 5. Precooked beans are energy efficient 6. Precooked beans can solve the problem of wood fuel availability 7. Precooked beans can solve the problem of water shortages 8. Other, specify ……. *Skip to the next section*
5. Why is it not willing to adopt precooked beans?	1. Precooked beans are costly 2. Negotiating contact with new supplier is costly 3. Precooked beans market is far from school

	4. Precooked beans are not nutritious 5. Precooked beans are of poor quality 6. Precooked beans cooking process is complex 7. Precooked beans packaging is not convenient 8. Precooked beans production is not sustainable 9. Precooked beans are not energy efficient 10. Other, *specify* ……

H. QUANTITIES AND COSTS OF DRY BEANS AND INPUTS USED FOR COOKING PER DAY

1. Dry beans	1.1. How many days of the week do you cook beans?	……
	1.2. How many times do you cook beans in a day?	……
	1.3. What quantity of dry beans do you cook per meal? (in Kg)	……..
	1.4. What is the unit price? (in Rwf)	……
	1.5. What is the frequency of buying dry beans?	1= daily 2= weekly 3= monthly 4= Other,
2. Fuel	2.1. Which type of fuel are you using to prepare dry beans? If firewood is used, do you use it when it is dry or wet? If dry, do you buy it when it is dry, or do you dry it yourself? What quantities of each fuel type do you buy each time? How long does it last before the next purchase?	1. Firewood 2. Charcoal 3. Gas 4. Electricity

	2.2. What is the amount of fuel you use to prepare each meal?	……..
	2.3. What is the amount of fuel you use to prepare dry beans per meal? (cubic meter)	……...
	2.4. What is the purchase cost per unit? (in Rwf)	……..
	2.5. How much do you pay for transport of fuel per unit? (not applicable for electricity)	…….
	2.6. How much do you pay to load fuel per unit? (not applicable for electricity)	…….
	2.7. How much do you pay to unload fuel per unit? (not applicable for electricity)	…….
3. Labour	3.1. How many people are involved in preparing beans?	……..
	3.2. How many hours do they work per day?	…….
	3.3. For how many hours do they prepare bean meals?	……..
	3.4. What is the wage of one person per month? (in Rwf) unit of payment	……..
4. Water	4.1. What is the quantity of water used to wash dry beans per day? (in cubic meter)	……..
	4.2. What is the quantity of water used for cooking dry beans per day? (in cubic meter)	……..
	4.3. What is the cost per unit? (in Rwf)	…….
5. Time	5.1. How much time does it take you to sort dry beans?	…….
	5.2. How much time does it take you to clean dry beans?	…….
	5.3. How much time does it take you to cook dry beans?	…….

I. CHALLENGES INVOLVED IN COOKING DRY BEANS

1. Wood fuel	1.1. What type of wood fuel markets are available to the institution?	1= formal 2= informal 3= both	Do you have contracts for supply?

	1.2. In which type of market do you purchase wood fuel?	1= formal 2= informal 3= both	Distance from the school
	1.3. Is wood fuel easily available in the market?	:1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree	How far do you source it?
	1.4. Is wood fuel highly priced?	1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree	How much?
	1.5. Does wood fuel involve high transport costs?	1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree	How much?
2. Water	2.1. Is clean water available on daily basis?	1=Yes, 0=No	Type of supply: tap, borehole etc
	2.2. If No, how many times in average in a week do you access clean water?	…….times	Where from? At what cost for each purchase?
	2.3. Does the price of water vary according to the quantity used?	1=Yes, 0= No	How does it vary?
	2.4. If yes, does this represent a big challenge to clean water consumption in your institution?	1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree	

SECTION 2: SCHOOL FARM AND GARDEN

- Size of school land
- Size of land put under farming.
- Main motivation for using school gardens (teaching, co-curricular activities, get food, incomes, other)
- How many teachers are involved in the school garden use/management?
- Are the gardens used as learning points? For which students: (grade/class level)
- How often do you link the school gardening to health and nutrition during lessons: (never, rarely, sometimes, often, to always)
- Do you have use the gardens for biological lessons?

- How often do you use the gardens for class lessons?
- How often do use the gardens to illustrate climate and environmental issues?
- What challenges do you face in making use of the school gardens? (lack of knowledge, lack of time, lack of materials/resources
- Would training on agriculture improve the use if the school gardens?
- What do you use to…the gardens:
    - (Plough (hand hoe, tractor, other)
    - Cultivate/weed (hand, herbicide, other)
    - Water the gardens (none, hand watering, sprinkler irrigation, other)
    - Planting (hand, seeder, other)
    - Cut grass (hand slasher, mechanized, other)
    - Control for pests (hand, spraying, other)
    - Harvest (hand, spraying, other)
    - Store produces (ordinary bags, improved bags, other)
- Manure
    - source
    - who supplies (own, elsewhere, none)
    - quantity,
- Who does the above tasks (school children, teacher, employees or wage workers, other)
- How do you use the garden produce (use in school, sell some, donate to others, other)
- If you sell, how much or what proportion?
- Do you do crop rotation? With which crops, for which seasons?
- What is practiced in the school gardens/farms in season A: which crops/activities are carried out?

Season A

Crops	Size of land	Season	Purpose	Harvest quantity	Use of harvest	Fertilizer/manure

- How much do you know/use climate change knowledge?
- What are some of the environmentally friendly practices used in school?
- Reducing water use by planting drought-resistant or native plants and using drip irrigation,

- Avoiding harmful pesticides and chemicals through integrated pest management
- Limiting waste by reusing materials for compost and other inputs and
- Replenishing soil through the use of cover crops and rotations etc.

THANK YOU FOR YOUR TIME AND CONTRIBUTION

Annex 4. Consent form

Certificate of informed consent for participation in a Baseline survey for the Sustainable School Feeding Innovations I Kigali Project

We are a group of researchers from various institutions including Rwanda Ministry of Education (MINEDUC), Head of Schools Organization (HOSO), The City of Kigali and the International Center for Tropical Agriculture (CIAT). We are currently conducting a baseline survey for the sustainable school feeding innovations in Kigali project which will looks at improving access to nutritious foods in schools of Kigali. The results of this study will enable us to provide information on benchmark outcome indicators for the sustainable school feeding innovations in Kigali project against which progress will be measured at the end of the 3-year project. As a part of this study, we are carrying out this survey, in which we would like you to take part. In this survey you will (1) be asked some questions about yourself (2) the school or household characteristics (3) information about the school feeding program including nutritious foods like beans and others. We will also need information on (4) cooking energy for schools and (5) information on the skills on best agronomic practices applied in school gardens and household farms to improve crop production. By participating in this survey, you are contributing immensely to the successful completion of this study.

The survey is anonymous, your answers will be treated in the strictest confidence and there are no right or wrong answers. We would be most grateful if you could take about a total of one hour to participate in this survey. Thank you in advance for your cooperation. *Participant's Consent:* I am over 21 years of age and agree to participate in this survey. I have been fully informed of this study and I am aware that should I not wish to continue participating in this study I can do so at any time and without giving a reason. This authorization is only valid for this study. I hereby consent to participation.

……..…….
……..…..

Signature or thumbprint of participant Name (in print)

……..
……..……...

Signature of enumerator Name (in print)

Date……..…….