WFP EVALUATION

Pilot Impact Evaluation of the Commodity Voucher Procurement Model in Burundi

Pilot impact evaluation assessment

August 2024

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Acknowledgements

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The study has been pre-registered in the American Economic Association Randomized Control Trials (AEA RCT) registry at: https://www.socialscienceregistry.org/trials/11995.

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Contents

List of figures

List of tables

Key takeaways

- The World Food Programme Office of Evaluation in partnership with the World Bank, conducted a pilot impact evaluation in the form of a lean impact evaluation to assess whether a decentralized Commodity Voucher (CV) procurement model impacts the performance of schools distributing meals (e.g., quantity, diversity, quality of meals) compared with the regular centralised procurement model.
- Findings indicate that the new commodity voucher model delivered a statistically significantly higher number of meal days compared with a centralised procurement model (on average, 13 days when children receive meals compared to 7.4 meal days per month).
- The increase in the number of meal days is mainly driven by the increased use of refined rice procured from local cooperatives. This translated into a reduction in school meal quality, as measured by the GDQS-Meal. However, in low food security settings like Burundi, where ensuring caloric sufficiency on a regular basis is crucial, the addition of refined rice may be considered an acceptable, albeit not ideal, compromise.
- The cost analysis reveals that, on average during the pilot, the CV model was less expensive than the centralised model (US$ 40.61 per child per year compared with US$ 46.85).
- Finally, the pilot gave increased confidence in the possibility of conducting a larger-scale impact evaluation aiming to assess the impact on the local economy (such as farmers' income and welfare and agricultural practices) as well as child outcomes.

1. Introduction

1. With an estimated 418 million children currently benefiting globally, school meals are one of the most widespread social safety nets in the world[1]. School meals can encourage the poorest families to send their children to school. Once in the classroom, school meals can also help to ensure children are well-nourished and ready to learn. Therefore, school meal programmes represent an opportunity to promote children's health, nutrition, education, and learning, including for girls.
2. At the same time, school meals are increasingly recognised as a key investment for governments to create a stable demand for locally produced food, support the creation of local jobs, and promote more sustainable food systems. If appropriately designed, school meal procurement creates an additional market for small-holder farmers[2]. While many governments are increasingly sourcing food for school feeding locally from smallholder farmers, with the aim of boosting local agriculture, empirical evidence on how to best design decentralised school meal programmes and their effects on the local economy is still limited.
3. The World Food Programme's (WFP) Office of Evaluations (OEV) and School-based Programme (SBP), in partnership with the World Bank's Development Impact (DIME) department, created the School-based Programme Impact Evaluation Window (World Food Programme, 2021), with the objective to contribute a portfolio of rigorous impact evaluations to the global evidence-base, while simultaneously supporting local evidence needs for WFP country offices.
4. This pilot impact evaluation employed a lean impact evaluation (IE) approach[3], and it contributes evidence to inform how to design decentralised school meals programmes. It uses an experimental impact evaluation design to assess whether a decentralized Commodity Voucher (CV) procurement model impacts the performance of schools distributing meals (e.g., quantity, diversity, quality of meals) compared with the usual centralised procurement model. It also estimates the relative cost of the two delivery models, explores the characteristics of the children's learning and nutritional outcomes enrolled in the project, and explores the characteristics of the cooperatives enrolled in procuring the food.
5. The results from this pilot IE also informed the scale-up of the CV model in Burundi, which started in January 2024. The scale-up is also the focus of a larger-scale impact evaluation

[1] WFP. 2022. *State of School Feeding Worldwide 2022*. Rome, Italy: World Food Programme. Available online: https://www.wfp.org/publications/state-school-feeding-worldwide-2022 (accessed June 2024)

[2] Research consortium for School Health and Nutrition. 2023. School Meals and Food Systems: Rethinking the consequences for climate, environment, biodiversity and food sovereignty, Working paper

[3] Lean impact evaluations are conducted using an experimental design to test alternative implementation modalities. Rather than focusing on outcomes, lean impact evaluations focus on comparing output-level data and mainly rely on already existing monitoring systems for data collection. This has the advantage of minimizing data collection costs, while providing reliable evidence on the implementation. Data on final outcomes collected during a pilot are not large enough to make any causal claim.

studying the impacts of the decentralised procurement model on children and the local economy[4].

6. This brief is intended to provide a short summary of the findings of the pilot impact evaluation. It begins by describing the evaluation context and programme in Section 2. It then describes the evaluation questions and design in Section 3. Results are presented in Section 4, including impact on service delivery, cost-efficiency analysis, summary statistics for children's and farmers' outcomes, and a revised feasibility assessment for the large-scale impact evaluation. Section 5 provides conclusions based on findings.

2. Context and programme description

2.1. Context

7. Burundi is a landlocked country in east-central Africa, with an area of 27,834 km2 and an estimated population of 12,309,600. According to the "Institut de Statistiques et d'Etudes Economiques du Burundi (ISTEEBU)" in 2020, 2,568,616 (21%) of the population is aged between 7 and 15 years old.. In 2022, Burundi was the poorest country in the world, as measured by GDP per capita according to World Bank data[5]. The Country's average GDP per capita was expected to reach 240.00 USD by the end of 2022, according to Trading Economics global macro models and analysts' expectations.

8. The school meals programme was first initiated by the Government of Burundi in 2008 when the northern provinces of Burundi were hit by a drought. WFP started providing support for the implementation of the programme in 2013. According to the National School Canteens Department, in 2018, it was estimated that 528,541 children in 703 preschools and primary schools were assisted by the programme out of a total of more than 2.4 million children.

9. The Government of Burundi established the National School Feeding Program (Programme National d'Alimentation Scolaire – PNAS), to bring all education stakeholders together around school feeding. Supported by WFP, the PNAS considers school feeding as an opportunity for rural socio-economic transformation and human capital development. The PNAS considers policies formulated by various sectors with cross-cutting interests in school feeding, like education, health, social protection, agriculture and livestock, rural development, finance, and the environment.

10. In 2018, the Government of Burundi adopted a National School Feeding Policy, validated by the Council of Ministers under the name of the National School Feeding Program to continue the school feeding programme to reach universal coverage in 2032. The National School Feeding Program is a key tool for the Burundian Government to achieve the objectives of the National Development Program (NDP) and to contribute towards Sustainable Development Goals. The Government of Burundi is strongly committed to investing in human capital,

[4] WFP. 2024. Impact evaluation of the Home-grown school feeding Commodity Voucher model in Burundi. Inception Note. Available online: https://www.wfp.org/publications/burundi-home-grown-school-feeding-programme-impact-evaluation (accessed July 2024)

[5] World Bank, 2022. World Development Indicators DataBank, https://databank.worldbank.org/source/world-development-indicators (accessed July 2024).

having identified school feeding as the largest social safety net programme for vulnerable children in Burundi.

2.2. Programme description

11. The Burundi WFP Country Office (CO), in close partnership with the Government of Burundi, provides daily nutritious meals and snacks to approximately 739,000 schoolchildren in 885 public schools in the eight provinces of Cibitoke, Bubanza, Bujumbura, Gitega, Ngozi, Kirundo, Muyinga and Makamba. The school meals are based on a centralised procurement model, where WFP procures food and delivers them to schools through its cooperating partners (World Vision International, Caritas, Welthungerhilfe). The meal's composition consists of a combination of imported and local cereals, beans, fortified vegetable oil, iodized salt, and yellow split peas. Meals are cooked and distributed by parents who volunteer on a rotational basis.
12. With the aim to increase the proportion of locally produced school meals, WFP, in partnership with cooperating partners, National School Canteens Department, Directions Provinciale de l'Education (DPE), piloted a new Commodity Voucher (CV) procurement model in 3 provinces in the first and second term of the school year 2022 – 2023, from November 2022 to June 2023.
13. The new procurement model aims to work with local small holder farmers cooperatives to supply food to schools. Under this new CV procurement model, WFP makes a transfer to the DPE in each participating province, which will issue a restricted tender process to purchase from local cooperatives. Awarded cooperatives deliver food directly to schools. Meals are then cooked and distributed by parents who volunteer on a rotational basis, like in the centralized model. This new model has the potential to develop local/provincial markets in predominantly agricultural communities and may have a positive impact on local cooperatives and smallholder farmers.

3. Questions and design

3.1. Evaluation questions

14. There is a pressing need for rigorous evidence to inform programmes and governments on the trade-offs in the design and implementation of school meal programmes. For example, while centralised procurement processes might provide greater control over the quality, diversity, and fortification of ingredients in menus, decentralised procurements, have the advantage of being close to schools and, therefore, may be able to deliver meals in a short turnaround time. However, if cooperatives have limited capacity to produce and distribute food to schools, the number of days when children receive school meals might be fewer under the new model.
15. The primary goal of this pilot IE is to assess whether and how the CV procurement model impacts the performance of school meal delivery (e.g., quantity, quality, and diversity of

meals[6]) compared with the centralised procurement system. The pilot IE focuses on the following questions:

- What is the impact on **school meal quantities (school feeding days)** of procuring food commodities using a CV decentralised model compared with the centralised model?
- What is the impact on **school meal diversity (quantities of food categories distributed during school meals)** of procuring food commodities using a CV decentralised model compared with the centralised model?
- What is the impact on **school meal quality (using the Global Diet Quality Score (GDQS)-Meal score, as well as reporting issues with commodity distribution)** of procuring food commodities using a CV decentralised model compared with the centralised model?

16. The secondary goal of this pilot IE is to conduct a cost-efficiency analysis comparing the two alternative models.

17. The third and final goal of this pilot IE is to assess the feasibility of a full-scale impact evaluation, which evaluates the impact on the local economy (such as farmers' income and welfare and agricultural practices) as well as child outcomes. Given the limited scope of the intervention, lack of comparison, and limited sample sizes, this pilot IE was not expected to have sufficient statistical power to be able to assess the impact of the intervention on all these dimensions at this stage. A larger-scale impact evaluation started in January 2024 with the aim of answering these questions[7].

3.2. Evaluation design

18. The pilot impact evaluation (IE) employed a lean impact evaluation approach. It uses an experimental design, randomly assigning 95 schools in three provinces (Bubanza, Bujumbura, and Muyinga) into two groups. In the first group (hereafter referred to as the CV Schools), 50 schools were assigned to transition to the new decentralised CV model and were mapped to 12 farmer cooperatives. In the second group (hereafter referred to as the Centralised Schools), 45 schools continued receiving food from the status quo centralised procurement system.

19. All the schools and children continued receiving school feeding.

3.3. Data sources

20. The following data sources were employed:
    - **Administrative data** from WFP monitoring forms were digitized for the months of September 2022 – June 2023, including indicators on the stock of commodities, food distribution, and meal attendance. Two **school surveys** were conducted in February and June 2023 with 95 headteachers to collect indicators on school facilities,

[6] Diversity of meals refers to the range of food commodities provided in school meals. While both procurement models include the same food groups—such as cereals, pulses, oil, and salt—the specific commodities within each group may vary based on supply availability.

[7] WFP. 2024. Impact evaluation of the Home-grown school feeding Commodity Voucher model in Burundi. Inception Note. Available online: https://www.wfp.org/publications/burundi-home-grown-school-feeding-programme-impact-evaluation (accessed July 2024)

enrolment, delivery of commodities, quality of food stock, biofortification, and experience with using the WFP School Connect app. This includes all the schools enrolled in the pilot sample.

- **Child outcome** indicators were collected in the month of June 2023, sampling 10 children each from 95 schools resulting in 950 child surveys. These interviews included indicators for nutrition, cognitive tests, and reading and mathematical ability.
- **Cooperative outcome** indicators were collected by interviewing all 12 cooperative heads which provided commodities to the 50 schools in the new model. Interviews collected information on organisations' membership, collective production, sales, experiences working with DPEs and the WFP, and challenges to distribution.
- **Administrative accounting and procurement data** from the WFP Budget and Programming Unit. Additional administrative documents, including DPE contracts with smallholder framers, local cooperatives, and lab food quality testing records, were also used to conduct cost efficiency analysis.

4. Results

4.1. Impact on school meal delivery

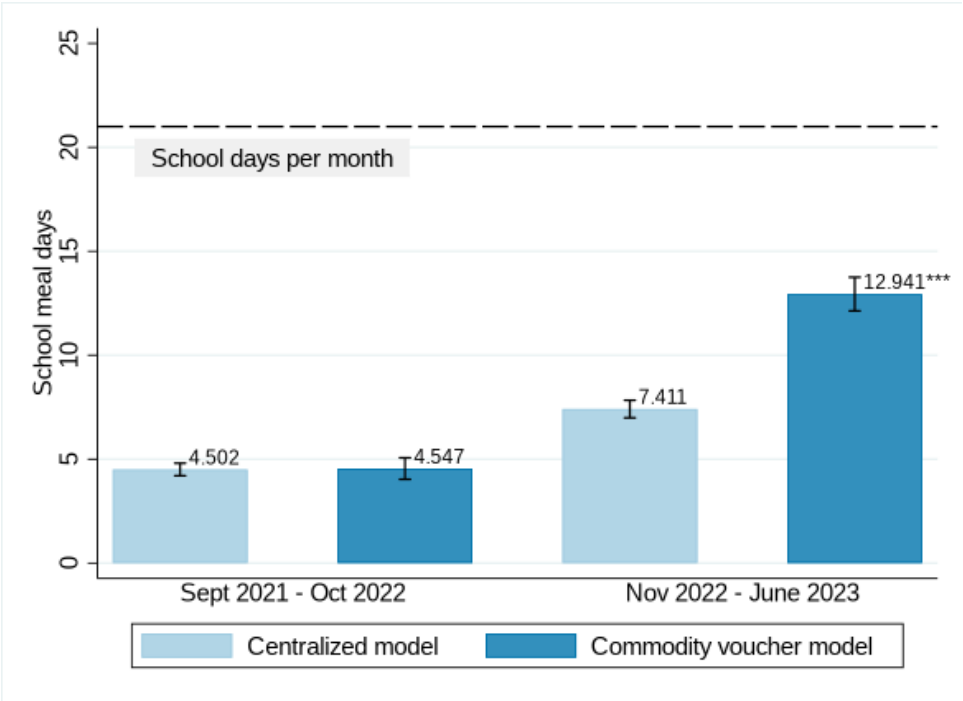
21. This section presents findings that assess whether the new commodity voucher procurement model impacts the performance of school meal delivery (e.g., quantity, quality, and diversity of meals) when compared with the centralised procurement system.

School meal quantity

22. **The CV model was successful in increasing overall school feeding days by an average of 75%**, as shown in Figure 1.

23. In the 2021/22 school year, prior to the CV model's introduction, children typically had school meals for 4-5 days monthly. During the school year 2022/23, after the introduction of the CV model, the number of days when children received meals in the schools randomly assigned to the Centralised Schools increased to 7.4 days per month on average. This increase is likely to have been a result of the lifting of Burundi's import ban on maise in September 2022. On the other side, in the schools randomly assigned to the CV Schools, the number of days when children received school meals increased to an average of 12.94 days per month. This change represents a near-tripling of school-feeding days relative to the previous school year and a near-doubling relative to the comparison group continuing in the centralised model in the same school year.

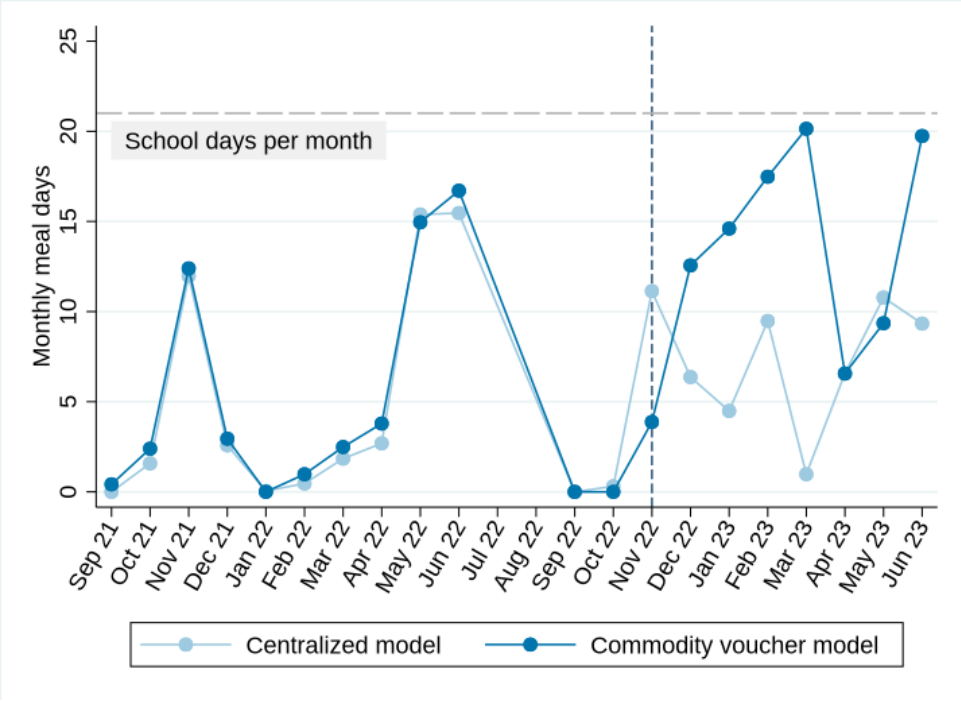
Figure 1: Average number of school feeding days per group and before/after the introduction of the new model



24. A more nuanced picture emerges when investigating school-feeding days over time separately for the two randomly assigned groups of schools, as presented in Figure 2. Before the implementation of the CV model started in November 2022, the number of days when children received school meals varies greatly from month to month, ranging from 0 days in some months to 15 days in others. Reassuringly, the two groups follow very similar trends over time during this pre-intervention period, which supports the validity of the comparison between the two groups.

25. After introducing the CV model in 50 schools in November 2022, the trends for the CV Schools and Centralised Schools clearly diverges. While the number of days when children received school meals in the Centralised Schools never exceeds 11 days per month in this post-intervention period, the number of meal days for the CV Schools consistently increases and reaches almost 100% coverage in the months of March and June. The drop in number of days when children received school meals in the CV Schools in April and May 2023 can be explained by the contract extension negotiations between the DPE and small holder farmers local cooperatives that took place during these months.

Figure 2: Number of school meals days, changes over time (September 2021-June 2023), by group



School meal diversity

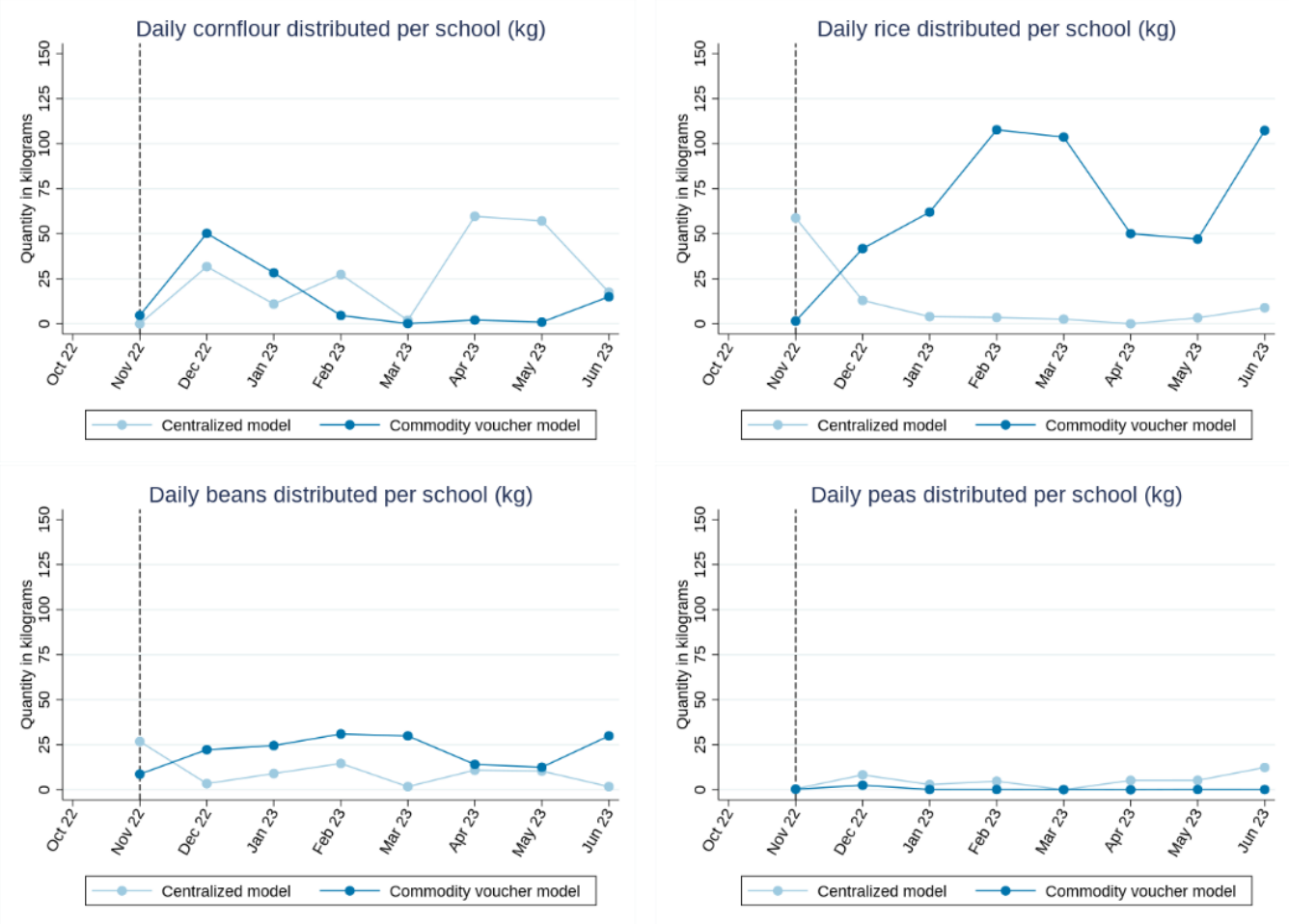
26. The digitised monthly monitoring reports show that **the increase in school-feeding days for the CV Schools is mainly driven by an increase in rice distribution** and, to a lesser extent, bean distribution. After introduction of the CV model, Figure 3 shows the average quantity in kilogram that schools distributed for school meals of cornflour, rice, beans, and peas, over time and separated by CV Schools and Centralised Schools. The figure shows that rice gradually replaced maize flour distribution in the CV Schools, with the rice quantity increasing from almost 0 kg per month in November 2022 to up to 100 Kgs per month in June 2023.

27. The decision to switch from maize to rice appears to be driven by three main considerations. First, by the local supply chain's capacity within the CV model. As only one miller was available in CV model communities, this created bottlenecks in the maize procurement process, compared with rice, which didn't require processing. Second, by considerations on food safety with rice experiences fewer post-harvest losses than maize,[8] making it more reliable for cooperatives to supply to schools. Third, considerations on seasonality, as rice has a longer growing season than maize, thereby increasing the available stock.

28. In the CV Schools, the quantity of beans distributed also doubled between November 2022 and June 2023, though from a lower level than rice to about 30kg per school (except for the April and May, the re-negotiation period with local cooperatives).

[8] Estimation by the African Postharvest Losses Information System (APHLIS) https://www.aphlis.net/en/data/tables/dry-weight-losses/BI/all-crops/2022. Accessed May 2024.

Figure 3: Distribution of commodities in schools, changes over time (November 2022-June 2023), by group



School meal quality

29. **However, school meal quality – as measured by the Global Diet Quality Score Meal (GDQS-Meal) - decreased in the CV Schools**, primarily due to the increase in rice distribution mentioned above. The GDQS-Meal is a meal quality metric that includes both nutrient adequacy and the risk factors associated with non-communicable diseases (NCDs) in its design and scoring method[9]. Thus, healthy food groups contribute positively to the score, whereas unhealthy food groups contribute negatively.[10] In addition, points are awarded when fortified and biofortified foods are served, as well as for the diversity of food groups included in the meal.[11]

[9] Bell, W., Blakstad, M., Deitchler, M., & Milani, P. (2023). Measuring and Improving the Quality of School Meals: The Global Diet Quality Score (GDQS)-Meal and Menu Metrics. *Current Developments in Nutrition*, *7*, 100902. https://doi.org/10.1016/j.cdnut.2023.100902

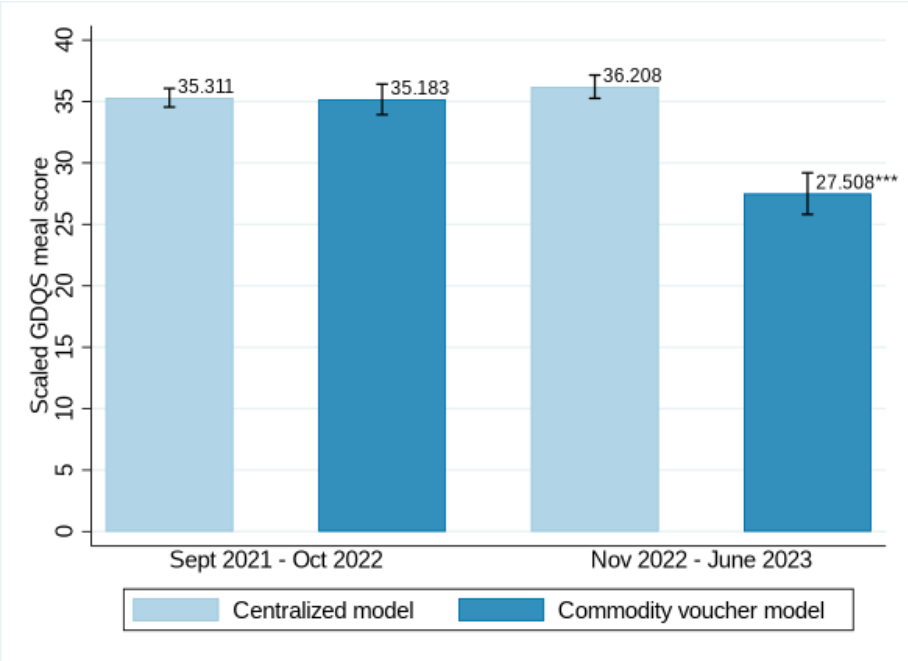
[10] 25 food groups are included in the calculation (16 healthy groups, 7 unhealthy groups, 2 groups that are unhealthy if consumed in excessive amounts). For each food group, points are assigned depending on the cooked quantities consumed (in grams), in line with epidemiological evidence on health benefits or risks of each food group.

[11] GDQS-Meal points are given based on grams per day cutoffs for each food group, which have been validated for adults. Cutoffs for children of various age groups (24-59 months, 5-9 years, and 10-14 years) are still under development.

30. As Figure 4 shows, there was no difference in GDQS-Meal for both groups of schools before the start of the CV model in November 2022. However, after the introduction of the new model, CV Schools observed a reduction in their GDQS-Meal. Further investigation shows that this reduction in GDQS-Meal for CV Schools was driven by a reduction of fortified maize consumption which was replaced by refined rice, which counts as an unhealthy food group in the GDQS-Meal metric.

31. It is important to note that the GDQS-Meal only captures a snapshot of meal quality when a meal is provided and does not account for the frequency of consumption or consider daily caloric intake sufficiency. In a context of low food security like Burundi, where ensuring sufficient caloric intake for children regularly is crucial, the compromise between quantity and quality may be less important. Therefore, the finding of a reduction in school meal quality associated with the CV model should be read in the context of an increase in the school meal distribution described above.

Figure 4: Average Global Diet Quality Score Meal (GDQS-Meal) per group and before/after the introduction of the new model



Commodity quality

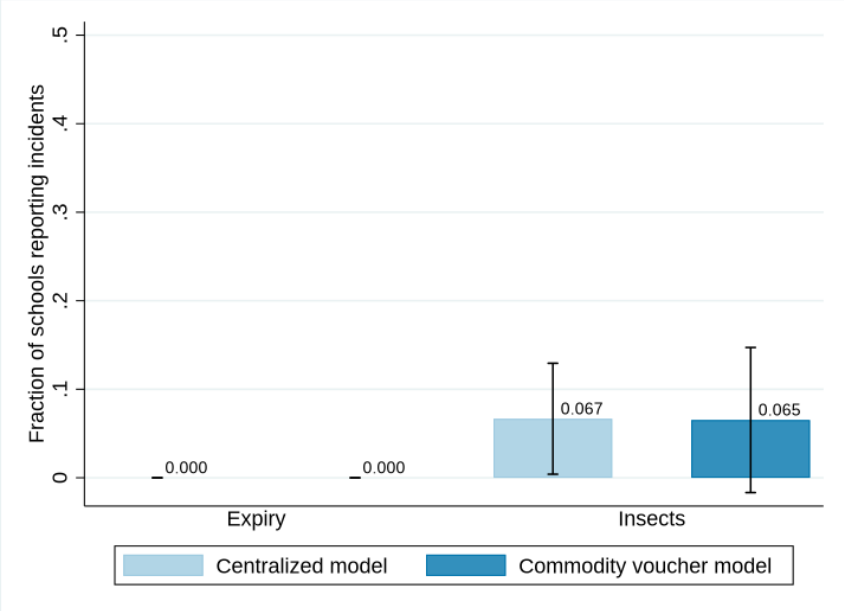
32. A frequent concern with local food procurement is about possible food safety issues, as locally procured and produced commodities may go through less stringent food safety controls relative to internationally imported food. In this context, the local commodities procured through the CV model underwent laboratory testing locally at the Burundi Bureau of Standards and Quality Control (BBN) to ensure that its moisture content and aflatoxin levels (among others) are safe for consumption. For the first deliveries of cooperatives, BBN sampled each commodity in each of the cooperatives' storage rooms and tested them in November 2022. No tests were implemented for the second deliveries in April 2023. In

Updated analysis will be conducted as soon as the updated cutoff points are determined. This, however, is unlikely to affect the GDQS-Meal comparison between the two procurement models in this impact evaluation.

comparison, commodities procured as part of the centralised model underwent laboratory tests at international laboratories in Mombasa, Kenya.

33. This evaluation finds no difference in food safety concerns reported by headteachers in the two models. Findings from Figure 5 indicate that no schools report commodities being past their expiry date in either of the two groups. In both groups, 6-7% of schools reported finding insects in the commodities, with no difference between the two groups. Food safety remains of the highest concern, and all efforts and systems should remain in place to ensure adequate testing under each model.

Figure 5: Reported incidence (September 2022-June 2023), by group



4.2. Cost efficiency analysis

34. This section presents the projected costs of providing meals for one child for one school year (i.e., the cost of feeding every day for 193 days) under the CV model and the status-quo centralized procurement model. The analysis is conducted on three accounting categories: the cost of buying commodities, transfer costs[12] and monitoring and implementation costs.[13,14] Costs are calculated using estimates provided by the Burundi CO's Budget and Programming Unit specifically for the schools included in the lean IE based on the commodities received.[15] Therefore, the costs of feeding may be different for other non-IE schools in the country.

[12] Transfer costs include ocean transport cost, customs clearance costs, handling costs, transport costs, storage costs, and commodity lab test cost.

13 Monitoring and implementation costs include M&E activity (post distribution) costs, and other implementation activities costs such as the CO field office cost. Monitoring costs are assumed to be fixed and do not increase with feeding days.

14 All calculations are done using an exchange rate of 2855 Burundi Francs per US dollar.

15 The monthly school feeding reports show that the CV model provided maize 15% of the time and rice 85% of the time, while the schools under the central procurement model received maize 68% of the time and rice 32% of the time. The proportion is kept constant for each model when projecting the cost to an annual number, namely, feeding a child for 193 school days per year (from the Burundi school calendar 2022-23). The crops that were not supplied to the study schools in this lean IE were not included in the cost calculation (i.e., yellow split peas and milk).

35. **Table 1 shows that the cost of providing school meals to a child for a year is estimated to cost $40.61 under the under the CV model, while it is estimated to cost $46.85 under the centralized procurement model.** The estimates are in line with other estimates conducted in the country.

36. The cost of buying commodities accounts for the largest share of the total spending ($37.03 out of $40.61 for the CV Schools and $30.07 out of $46.85 for the Centralised Schools). While the total amount spent on food commodities is higher under the CV model (mainly because schools under the CV model received rice more frequently as explained below), transfer costs to feed a child for one year are higher for the centralized procurement model ($2.49 in the CV model vs. $14.50 in the centralized procurement model). Note that the annual cost projection in Table 1 is based on the proportion of rice and maize provided during the pilot implementation period. Therefore, the spending on rice is mechanically higher under the CV model ($26.89 in the CV model vs. $12.84 in the centralized procurement model) because children in the CV model were mostly provided rice (85% of the feeding days), whereas children in the centralized procurement model mainly received maize (68% of the feeding days).[16] However, an important question is how much it would cost to procure exclusively rice or maize under the two different procurement models.

Table 1: Annual cost to feed one child in the pilot study (in USD)

	Commodity Voucher (15% maize + 85% rice)	*Centralized Procurement (68% maize + 32% rice)*
Maize	2.85	8.51
Rice	26.89	12.84
Beans	5.06	6.50
Vegetable oil	2.14	2.14
Salt	0.09	0.09
(1) *Commodity cost*	*37.03*	*30.07*
(2) *Transfer cost*	*2.49*	*14.50*
(3) *Monitoring cost*	*1.09*	*2.28*
Grand total (1)+(2)+(3)	**40.61**	**46.85**

37. Table 2 uses the unit price of crops under each procurement model and the daily food requirements of children (e.g., 150g of cereals per child per day) to convert the procurement cost to an annual figure per child, exclusively for each crop one at a time. When buying locally under the CV model, rice is approximately 64% more expensive than maize[17] ($31.64 vs $18.98), contributing to the high overall feeding costs ($42.51 for a year for rice vs. $29.85 for maize)[18]. Similarly, under the centralized procurement model, buying rice exclusively is

[16] We assume that beans are provided daily. The spending on beans is higher under the centralized procurement model because imported beans were more expensive than locally procured beans in school year 2022/2023.

[17] The choice of rice over maize was also driven by considerations around limited local procession capacity for maise and food safety considerations.

[18] The transfer costs and monitoring costs are assumed to be the same, and there is no crop-specific cost data available under the CV model.

over three times as high as buying maize alone ($39.67 vs. $12.58), resulting in an overall cost of $63.18 procuring exclusively rice and $39.04 procuring exclusively maize. In summary, holding the type of crops served constant, the CV model is cheaper by $20.67 per child when feeding rice only and cheaper by $9.19 per child when feeding maize only. However, the decision on whether to serve maize or rice also needs to account for considerations around availability, seasonality, and food safety. The programme learned during the pilot phase that only one miller was available in the centralized model, which created bottlenecks in the maize procurement process, compared with rice, which didn't require processing. Secondly, even if more expensive, rice typically experiences fewer food safety issues and post-harvest losses than maize, making it relatively more reliable to supply to schools. Third, rice has a longer growing season than maize, thereby increasing the available stock.

Table 2: Cost simulations when exclusively buying rice or maize (in USD)

	Commodity Voucher		*Centralized Procurement*	
	Rice only (1)	Maize only (2)	Rice only (3)	Maize only (4)
Maize	-	18.98	-	12.58
Rice	31.64	-	39.67	-
Beans	5.06	5.06	6.50	6.50
Vegetable oil	2.14	2.14	2.14	2.14
Salt	0.09	0.09	0.09	0.09
(1) Commodity cost	*38.93*	*26.27*	*48.39*	*21.30*
(2) Transfer cost	*2.49*	*2.49*	*12.51*	*15.45*
(3) Monitoring cost	*1.09*	*1.09*	*2.28*	*2.28*
Grand total (1)+(2)+(3)	**42.51**	**29.85**	**63.18**	**39.04**

38. As the cost of commodities is a major determinant of the total feeding cost, this analysis includes a sensitivity check using different local prices of commodities. Table 1 results are based on the prices agreed between the DPEs and the cooperatives in the procurement contracts during the pilot period (i.e., FBu 1,800 for maize and beans and FBu 3,000 for rice). However, when using the prices agreed in early 2024 during the second phase of the CV model in Bubanza and Bujumbura (i.e., FBu 2,500 for maize, FBu 3,400 for beans, and FBu 4,400 for rice), the estimated spending under the CV model for feeding a child is $61.775 when feeding exclusively rice for a year and $41.748, when feeding exclusively maize for a year, reducing the difference in the feeding costs significantly relative to the centralized procurement model. This exercise demonstrates that **whether the CV model is more cost efficient than the central procurement model largely depends on the differences between local prices and central procurement prices**.

4.3. Children's outcome – descriptive

39. This section presents a summary of the child educational and nutritional outcomes. As the sample size during the pilot was not sufficient to provide a statistically powered analysis to make comparisons between groups, the outcomes in this section are presented as descriptive statistics.

40. Table 3 indicates that attendance rates are overall high (with an average of 98%). On average, surveyed children are 11 years and have 4 siblings. On average, girls show higher scores in reading (measured with the Early Grade Reading Assessment, EGRA) compared with boys, while boys report higher scores in math (Early Grade Mathematics Assessment, EGMA) compared with girls. The dietary diversity score is very similar between genders, with about 4.4 food groups consumed (out of 12 food groups) in the last day.

Table 3: Child education and nutritional outcomes

	N	Mean	SD
Attendance rate	95	0.98	0.02
Age (in years)	939	11.19	1.49
Number of siblings	939	4.32	1.96
Boys			
EGRA score (% scaled) – boys	501	57.43	21.72
EGMA score (% scaled) – boys	501	67.47	14.51
Dietary Diversity Score (12 food groups) – boys	501	4.43	1.63
Girls			
EGRA score (% scaled) – girls	438	54.46	21.45
EGMA score (% scaled) – girls	438	70.09	13.60
Dietary Diversity Score (12 food groups) – girls	438	4.47	1.51

4.4. Farmers' outcome – descriptive

41. The evaluation conducted a survey with all 12 cooperatives that participated to the pilot. Table 4 provides summary information to better understand the characteristics of cooperatives that have been providing food to schools during this initial pilot phase. On average these cooperatives have been active for 13 years, and have more than 270 members, while the average number of active members is less than 50. Out of the twelve cooperatives involved in the pilot, nine produce maize, ten produce rice, and eleven produce beans. The average annual revenues per cooperative in 2022/23 is US$ 116,000. All twelve cooperatives are registered with a tax identification code, and they all maintain a transaction ledger. Eleven out of twelve cooperatives require a mandatory membership fee for registering farmers. Ten cooperatives have a bank account, eight own a storage space and eight have received support from WFP in the past (for example in the form of training, equipment, other). Finally, each cooperative made on average 2.5 deliveries per school from November 2022 to June 2023.

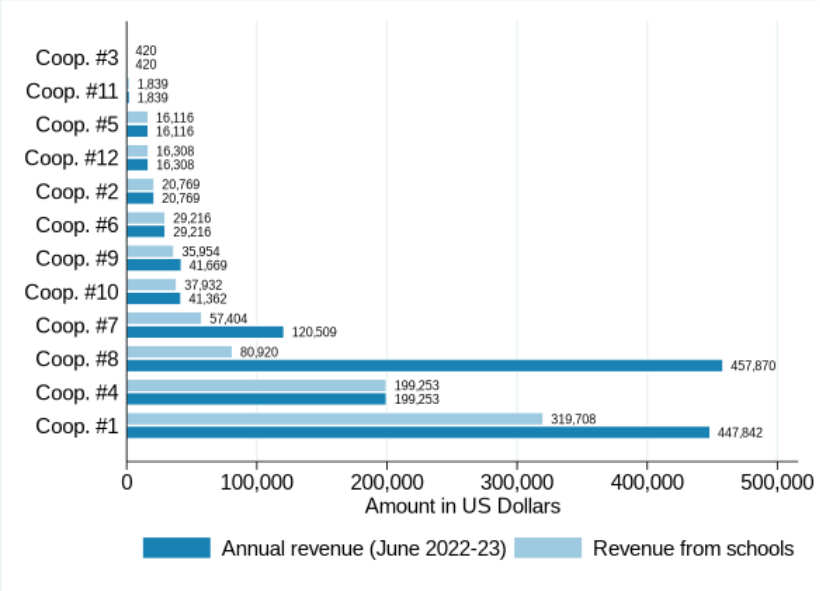
42. For 9 out of 12 cooperatives, almost all the revenue appears to come from sales to schools. **This indicates the significant potential market that school meals represent for local farmers and cooperatives.** At the same time, if schools' demand is large enough relative to the aggregate market demand, and supply cannot adjust in the short term, it is possible that

the large demand shock from schools' increases commodity prices in local output markets potentially creating unintended consequences for rural households who are mostly net buyers. For this reason, the large-scale impact evaluation that started in January 2024, will aim to assess the impacts on market prices as well as on cooperatives outcomes and their farmer members[19].

Table 4: Cooperative profile

	N	Mean	SD
Age of cooperative (in years)	12	12.92	6.13
Active members	12	47.25	64.68
=1 if cooperative has a female head/representative	12	0.25	0.45
Storage capacity in tons	12	1667.13	5773.36
Number of deliveries made	12	2.50	1.00
Satisfaction working with DPEs (0-10)	12	7.42	1.88
=1 if cooperative has a bank account	12	0.83	0.39
=1 if cooperative pools collective savings	12	1.00	0.00
=1 if cooperative received support from WFP	12	0.67	0.49
=1 if mandatory membership fee to join	12	0.92	0.29

Figure 9: Total annual revenues and revenues from schools by cooperative



4.5. Feasibility of scale-up and full impact evaluation

43. The third and final goal of this pilot IE is to assess the feasibility of scaling-up the programme and conducted a full-scale impact evaluation. Evidence generated during the pilot phase gave increased confidence to conduct a larger-scale impact evaluation that started in January

[19] WFP. 2024. Impact evaluation of the Home-grown school feeding Commodity Voucher model in Burundi. Inception Note. Available online: https://www.wfp.org/publications/burundi-home-grown-school-feeding-programme-impact-evaluation (accessed July 2024)

2024 and aims to assess the impact on the local economy (such as farmers' income and welfare and agricultural practices) as well as child outcomes.

44. First, the pilot gave confidence that the commodity voucher model was successful in procuring and delivering school meals to children and, therefore, could be used to assess the impact of the new procurement model on children's outcomes and the local economy. Second, it informed the design to be embedded into the programme scale-up while retaining the programme's principles. Finally, it provided the relevant estimates to inform power calculation analysis.

45. A school-level randomized design was identified as the option with the highest likelihood of feasibility to embed a rigorous impact evaluation into the programme scale-up and assess the impact of the new procurement model on children's outcomes. The Burundi CO, in partnership with the Government of Burundi, expanded the new CV model to 87 randomly selected schools. The outcomes from schools and students in these randomly selected schools will be compared against other 86 randomly selected schools, which will continue delivering school meals using the centralized model. Power calculations using pilot data indicate that the experimental design can detect an increase of 2.7 school feeding days (40 percent) and 10.5 percentage points (13.7 percent) in attendance rates. The pilot findings show an increase from 7.3 to 13 meal days/month in the centralized procurement vs CV model schools (approximately 80 percent), suggesting that the design is powered to detect changes in school feeding days.

46. A cooperative-level randomized design was identified as the option with the highest likelihood of feasibility to embed a rigorous impact evaluation to assess the impact of the new procurement model on the local economy. In each of the provinces where the CV model is implemented, the DPEs are expected to launch a restricted tendering process to select the local cooperatives which will deliver food directly to schools. The cooperative-level design randomizes the offer of a contract within equally eligible offers. Despite the confidence in the Burundi CO to successfully support DPEs in conducting the tendering and procurement process, the extent to which eligible cooperatives applied and the number of equally eligible offers was unknown before the pilot. Power calculations using pilot data showed that this experimental design can detect a 26.3 percent increase in the share of sales revenue from selling to schools with a minimum detectable effect for sales revenue of US$24,889 (65.1 percent). The pilot identified that the average share from sales to schools was 85 percent and the average size of the initial contract was approximately US$44,000.

47. The details of the questions and design for the Impact Evaluation of the Home-Grown School Feeding Commodity Voucher model in Burundi are reported in the Inception Note[20].

[20] WFP. 2024. Impact evaluation of the Home-grown school feeding Commodity Voucher model in Burundi. Inception Note. Available online: https://www.wfp.org/publications/burundi-home-grown-school-feeding-programme-impact-evaluation (accessed July 2024)

5. Conclusions and considerations

48. Findings from this pilot impact evaluation indicate that Burundi's new commodity voucher model delivered a statistically significantly higher number of meal-days compared with a centralised procurement model (on average, 13 days when children receive meals compared to 7.4 meal days per month). In the CV model, schools are procuring from local markets and are, therefore, less prone to interruptions in the value chain. In particular, the increase in the number of days when children received school meals for the CV model is mainly driven by the increased use of refined rice procured from local cooperatives.

49. The increased use of refined rice, combined with a reduction of fortified maize, translated into a reduction in school meal quality, as measured by the GDQS-Meal. It appears that there is a trade-off between expanding the number of days when children received school meals and a reduction in the quality of school meals when meals are distributed. The programme is therefore encouraged to explore the optimal balance between school meal coverage and quality. Considerations around processing capacity, local market availability, production, processing, and food safety also play an important role in determining the optimal meal composition.

50. However, in low food security settings like Burundi, where ensuring caloric sufficiency on a regular basis is crucial, the addition of refined rice may be considered an acceptable, albeit not ideal, compromise. It's worth noting that the meal quality score could potentially be improved by using fortified rice or whole grains (e.g., brown rice) instead of refined rice or providing meals which include fruits or vegetables. The programme may, therefore, also consider transitioning to food commodities with higher nutritional value when locally available and possible. Such considerations should be made considering local production and processing capacity and food safety.

51. The cost analysis reveals that, on average, the CV model is less expensive than the centralised model (US$ 40.61 per child per year compared with US$ 46.85). These findings, however, largely depend on the differences between local prices and central procurement prices at the time of the study and the food composition of the menus under each model.

52. Evidence from the farmer cooperatives involved in the pilot shows that a significant portion of their revenue was generated from sales to schools. This shows the potential market that school meals represent for local farmers and cooperatives.

53. Finally, based on the evidence and lessons learned during this pilot IE, the WFP Country Office, and Office of Evaluation, in partnership with the World Bank's DIME team, agreed to assess the impact of a larger scale-up of the commodity voucher model in Burundi on children's nutrition, health, and education outcomes, and the local economy (i.e., smallholder farmers and cooperatives). Questions and designs are available in the inception note [21].

[21] WFP. 2024. Impact evaluation of the Home-grown school feeding Commodity Voucher model in Burundi. Inception Note. Available online: https://www.wfp.org/publications/burundi-home-grown-school-feeding-programme-impact-evaluation (accessed July 2024)

Annex 1: Regression estimates

Table 5 provides regression estimates corresponding to Figures 1, 4, and 5 using the following regression model:

$$Y_{it} = \beta_0 + \beta_1\ CV\ Model + \beta_2\ Post\text{-}treatment + \beta_3\ CV\ Model\ x\ post\text{-}treatment + V_1\ Schoolid + \varepsilon$$

Where Y_{it} indicates the outcome of school i at time t; *CV Model* is equal to 1 if the school was assigned to transition to the new decentralised CV model, 0 otherwise; *Post-treatment* equal to 1 if the observation is after the model was introduced, 0 otherwise; Fixed effects by farmer cooperative are absorbed, and standard errors are clustered at school level.

Table 5: Regression estimates

	Total number of school feeding days (Figure 1)	GDQS meal score (Figure 4)	Reported presence insects (Figure 5)
CV model	0.045	-0.129	-0.001
	(0.262)	(0.627)	(0.041)
Post-treatment	2.902***	0.911	
	(0.213)	(0.481)	
CV model x post-treatment	5.571***	-8.584***	
	(0.408)	(0.849)	
Control mean	4.5	35.3	0.1
Observations	1725	1121	95

Standard errors clustered at school level in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

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Acronyms

BL	Baseline
BBN	Burundi Bureau of Standards and Quality Control
COMET	Country Office Monitoring and Evaluation Tool
CV	Commodity Voucher
DDS	Dietary Diversity Score
DIME	Development Impact
DPE	Direction Provinciale de l'Education
EL	Endline
EOI	Expression of Interest
FCS	Food Consumption Score
FIES	Food Insecurity Experience Scale
GDQS	Global Diet Quality Score
HFs	High-frequency survey(s)
HGSF	Home-grown school feeding
IE	Impact Evaluation
OEV	Office of Evaluation
RCT	Randomized Control Trial
SBCC	Social and behavioural change communication
SBP	School-based Programmes
ToC	Theory of Change
WFP	World Food Programme
WB	World Bank

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