ESG from kernel to butter:
A scoring system at cooperative level

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Presentation of results – Kick-off meeting
May 7, 2025

Global Shea Alliance

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1. Context. Shea collector is not an easy job

Imagine every day…

- 1-2 hours walk to/from the collection area
- to fetch 30 kg nuts,
- Boiling them & surveying them dry (3-6 days)
- Shelling them → 10-15 kg kernels

…Worth 3 to 4€!

Shea collectors undergo tedious work to obtain a mildly valued product.

Furthermore, **post-harvesting operations account for 50 to 90% of the upstream CO_{2eq} emissions of shea butter**.

Post harvest nuts treatment alone is responsible for **2 to 4 kg CO2 emissions per kg butter**, ,while shea tree growth **captures around 3 kg CO2/kg butter**

Not to forget handcrafted shea butter production: energy-intensive process, time-consuming…

So there are good reasons to support shea collectors… but how to?

Cooperative organisation

Together, stronger

Empowerment and capacity building

Financial literacy, best practices

Collective storage capacity

Making traceability and price negotiation possible

Collective tools

Fetching, transporting & processing faster and better

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Under the ***Shea gets greener !*** project, SFC supported >30 shea nuts and butter cooperatives in Ghana, Côte d'ivoire and Mali.

In 2022-2024 the project fulfillments were:

Brought more than 17,000 collectors into new or existing shea cooperatives

>21,000 trainings delivered

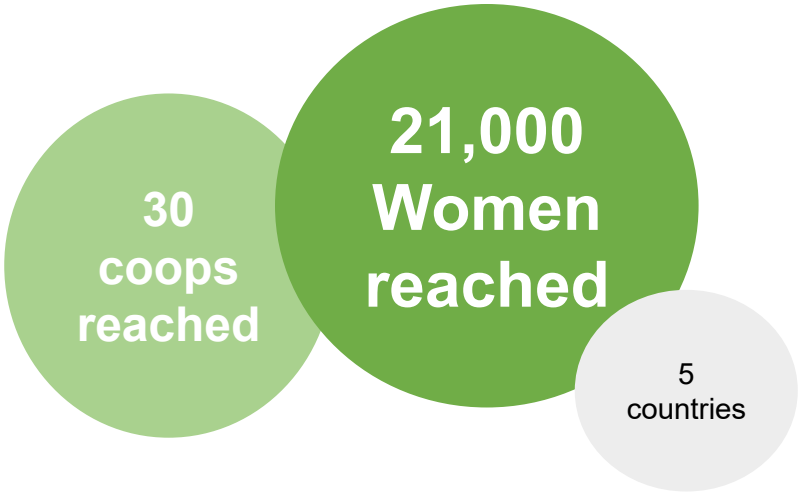
>50 new warehouses built

>40 modern kernel and shea butter processing centers

Shea Gets Greener!

Introducing Centralized post harvest for shea nuts & efficient processing equipment

Innovation: from traditional processing method at the household level to **centralized and energy efficient** processing.



- INCOME (increased quantity due to provided tricycles)
  QUALITY (improved tooling, separation of organic products)
- COST (using less firewood)
  ENVIRONMENTAL FOOTPRINT (less water, less firewood, waste recycled)

Shea Innovates

From project fulfillment to impact assessment

- 3rd party measurements of improvements and Impact
- Comparison **baseline** (before project) **vs endline** (after project intervention)
- **Social, health, economic, and environmental impacts**
- Intervention designed to be **replicated** over time: cooperative-scale follow-up

2. How to translate these actions into measurable impact – and do so over time

Under the *Shea innovates* project, Nitidæ & The SFC monitored the performances of both collectors and butter production cooperatives in terms of

Working conditions

Worker satisfaction

Perception of hardship

Exposure to smoke (particulate matter)

Work time per kg of product

Livelihoods

Income per producer

Contribution to the community development

Environment

Water consumption

Water pollution

Fuel use → CO_2 footprint

Biodiversity – forest cover

The **aim** is to establish an in-house monitoring standard, allowing to compare improvements at cooperative level, with a **quantitative** and **reproductible** approach

SHEE scoring standard

Social

Health

Economic

Environmental

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Measuring process performances – Scope of the work

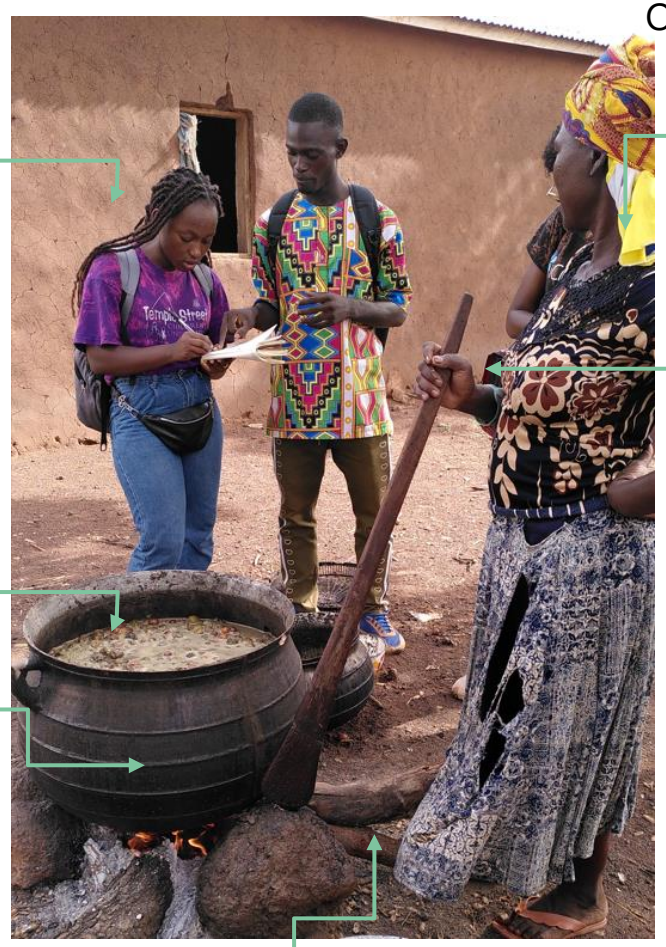
- Collectors activity: from nut collection to dry kernel
- Butter processor activity: from dry kernel to filtered butter
- Three countries: Ghana, Côte d'ivoire, Mali
- Two times for measurement, per cooperative: Baseline and Endline situation
  - In Côte d'ivoire and Mali, the baseline situation involved individual collectors and processors
  - Endline situation for collectors involved both measurements on individuals (coop members) and collective nut processing centers

		Ghana	RCI	Mali
Nuts	Individual	**Caract** (50 x 10 coops) & **B&E Measurements** (30 x 2 coops)	**Caract** (134 over 5 zones) & **B&E Measurements** (30 x 3 types of heat treatment)	n/a
	Collective	**Endline measurements** in nut processing centers (3 x 2 coops)	**Endline Measurements** in nut processing centers (3 x 3 coops)	n/a
Butter	Individual	n/a	n/a*	**Caract** (x61) & **Measurements** (x30)
	Collective	**B&E Measurements** 3 x 4 coops	**B&E Measurements** 3 x 1 coop	*Endline measurements (Withdrawn)*

Number of individuals (or collective centers) monitored during the Impact assessment

Measuring process performances

For every process step, the following parameters are monitored



Operator's exposure to smoke (PM6 particles)

Work time (hh:mm:ss)

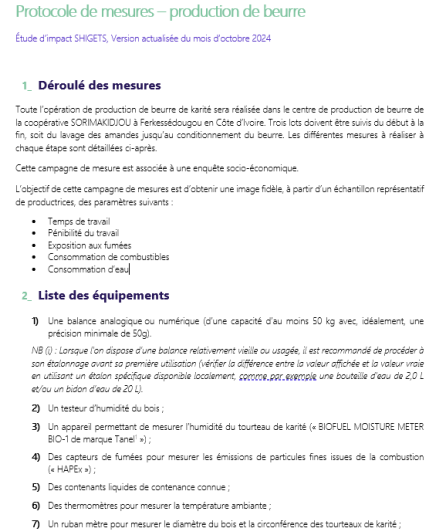
Work strain (scale 0 to 4)

Size of the batch (kg)

Water use (kg)

Fuel use (kg)
Moisture of fuel (%)

Measurement protocols produced



Protocole de mesures – production de beurre

Étude d'impact SHIGETS, Version actualisée du mois d'octobre 2024

1_ **Déroulé des mesures**

Toute l'opération de production de beurre de karité sera réalisée dans le centre de production de beurre de la coopérative SORIMAKIDJOU à Ferkessédougou en Côte d'Ivoire. Trois lots doivent être suivis du début à la fin, soit du lavage des amandes jusqu'au conditionnement du beurre. Les différentes mesures à réaliser à chaque étape sont détaillées ci-après.

Cette campagne de mesure est associée à une enquête socio-économique.

L'objectif de cette campagne de mesures est d'obtenir une image fidèle, à partir d'un échantillon représentatif de productrices, des paramètres suivants :

- Temps de travail
- Pénibilité du travail
- Exposition aux fumées
- Consommation de combustibles
- Consommation d'eau

2_ **Liste des équipements**

1) Une balance analogique ou numérique (d'une capacité d'au moins 50 kg avec, idéalement, une précision minimale de 50g).

NB (i) : Lorsque l'on dispose d'une balance relativement vieille ou usagée, il est recommandé de procéder à son étalonnage avant sa première utilisation (vérifier la différence entre la valeur affichée et la valeur vraie en utilisant un étalon spécifique disponible localement, concrète par exemple une bouteille d'eau de 2,0 L et/ou un bidon d'eau de 20 L).

2) Un testeur d'humidité du bois ;

3) Un appareil permettant de mesurer l'humidité du tourteau de karité (« BIOFUEL MOISTURE METER BIO-1 de marque Tanel" ») ;

4) Des capteurs de fumées pour mesurer les émissions de particules fines issues de la combustion (« HAPEx ») ;

5) Des contenants liquides de contenance connue ;

6) Des thermomètres pour mesurer la température ambiante ;

7) Un ruban mètre pour mesurer le diamètre du bois et la circonférence des tourteaux de karité ;

+Additional data collection through

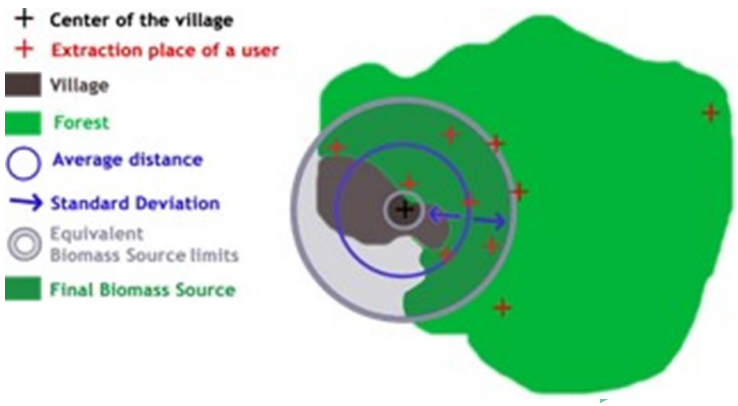
- GPS trackers for collectors
- Socio-economic survey with the operator
- Observation of the regular activities in the centers
- Note unit costs (salaries, fuel, water, power…)
- Assessment of renewability of biomass (fNRB)

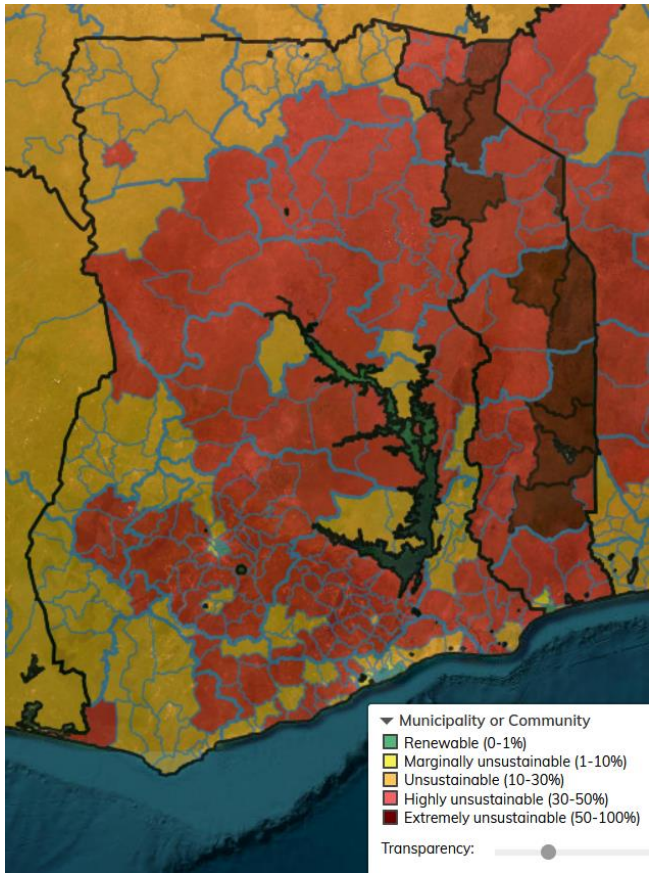
A dedicated assessment on biomass (firewood) renewability

- Assessment of renewability of biomass (fNRB)

Emissions reduction (*ER*) in year *y* (as per carbon methodologies) depends on the fNRB factor →

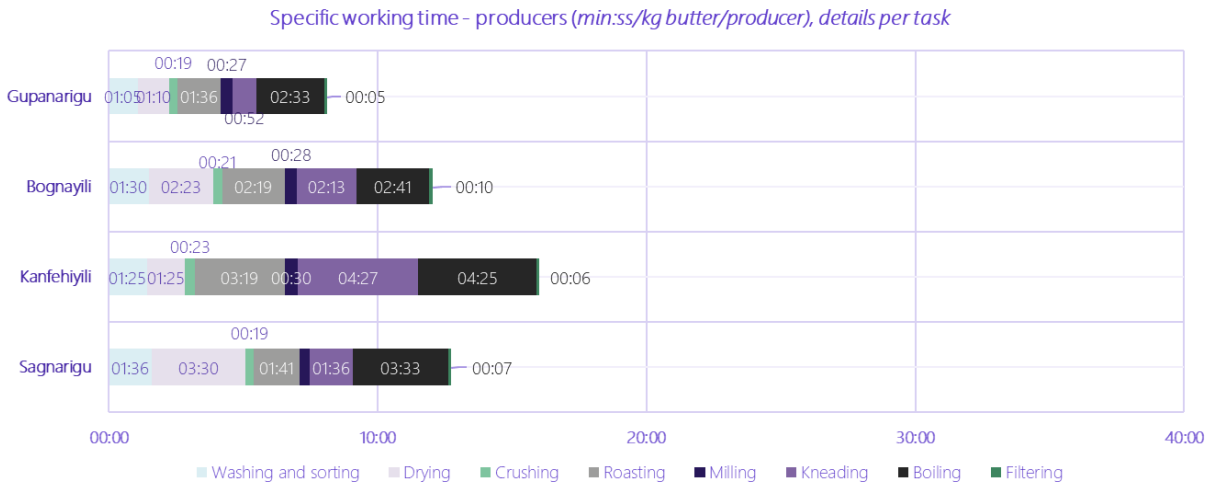
$$ER_y = \sum_{b,p} (N_{b,p,y} \times U_{p,y} \times SFS_{p,b,y} \times NCV_{b,fuel} \times f_{NRB,b,y} \times EF_{b,f,CO2} + EF_{b,f,nonCO2})) - \sum LE_{p,y}$$



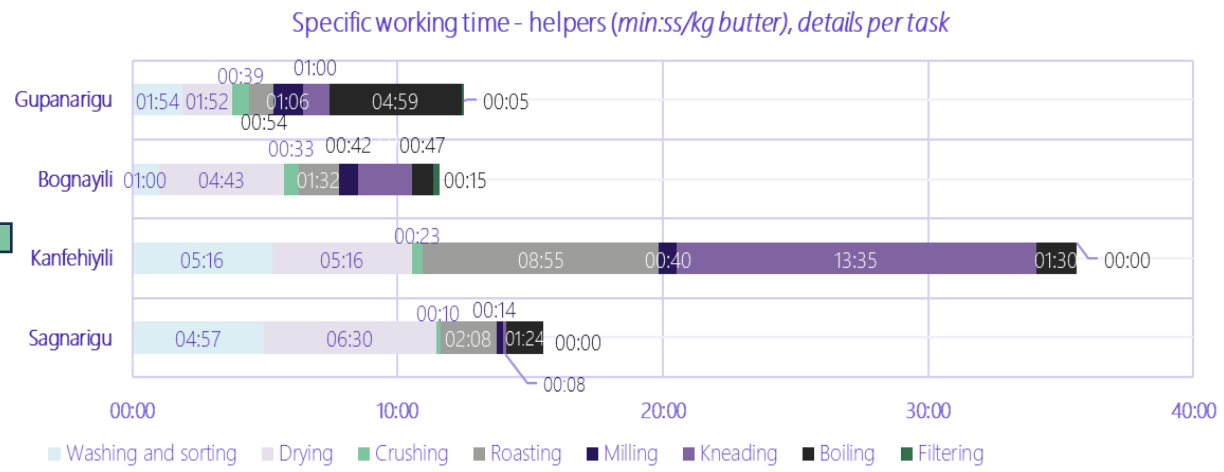


District	fNRB
Sagnarigu (Ghana)	**46%**
Bole (Ghana)	**37%**
Tamale municipal (Ghana)	**51%**
Kita (Mali)	**30%**
Tafiré and Niédiékaha	**20%** (*50% following own methodology)

3. Results (1): working time

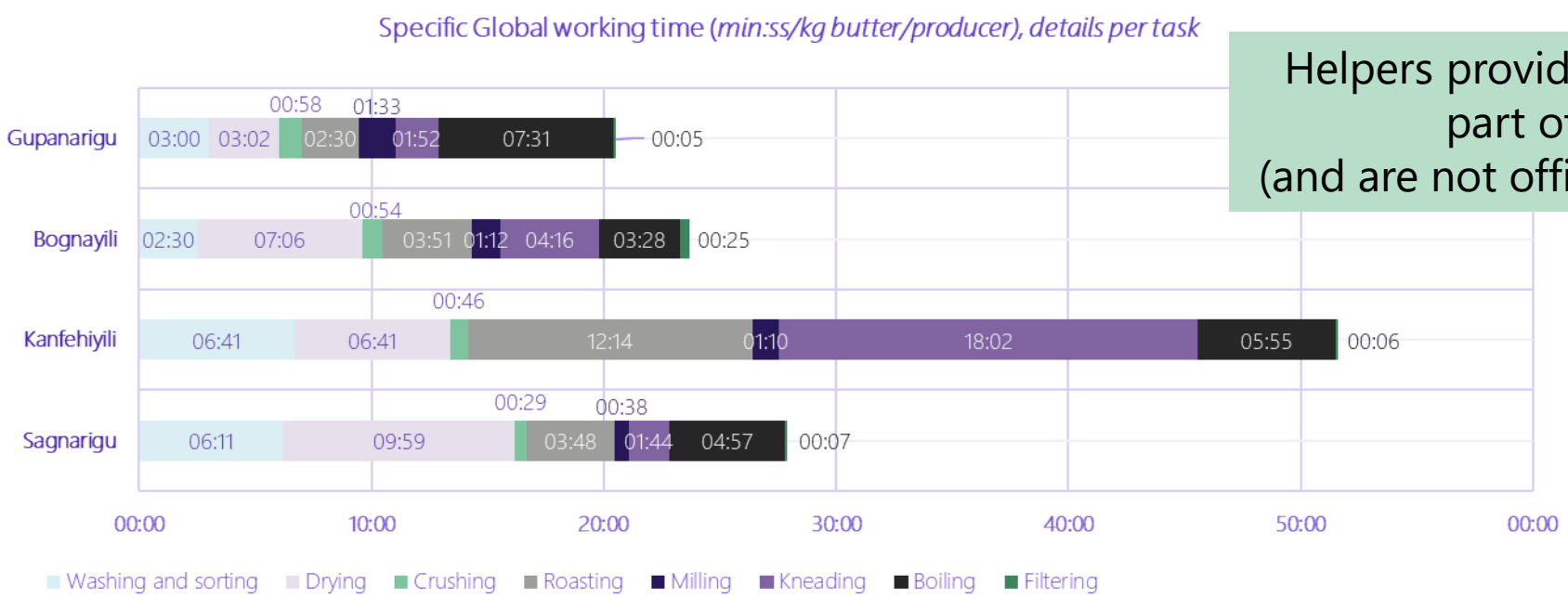


Working time of per butter producer



Working time of helpers, per butter producer

Helpers provide a non negligible part of the work
(and are not officially remunerated)



Global working time: time of producer + helpers

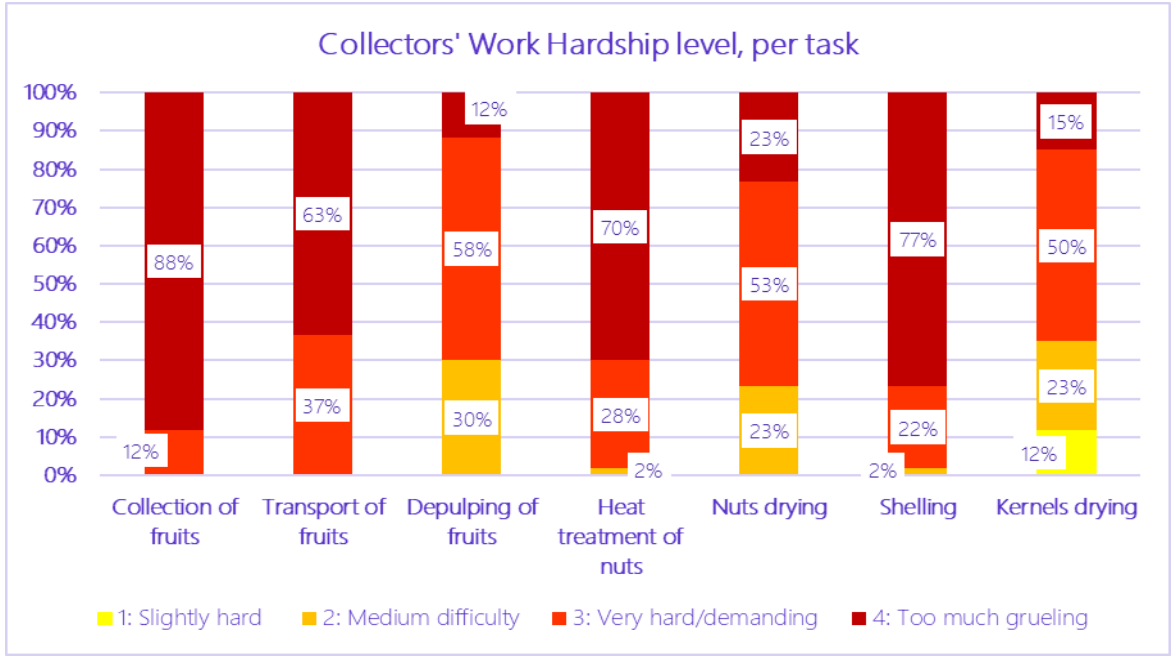
3. Results (2): work hardship

Hardship assessed both through **collector/producer's witness** (example below)

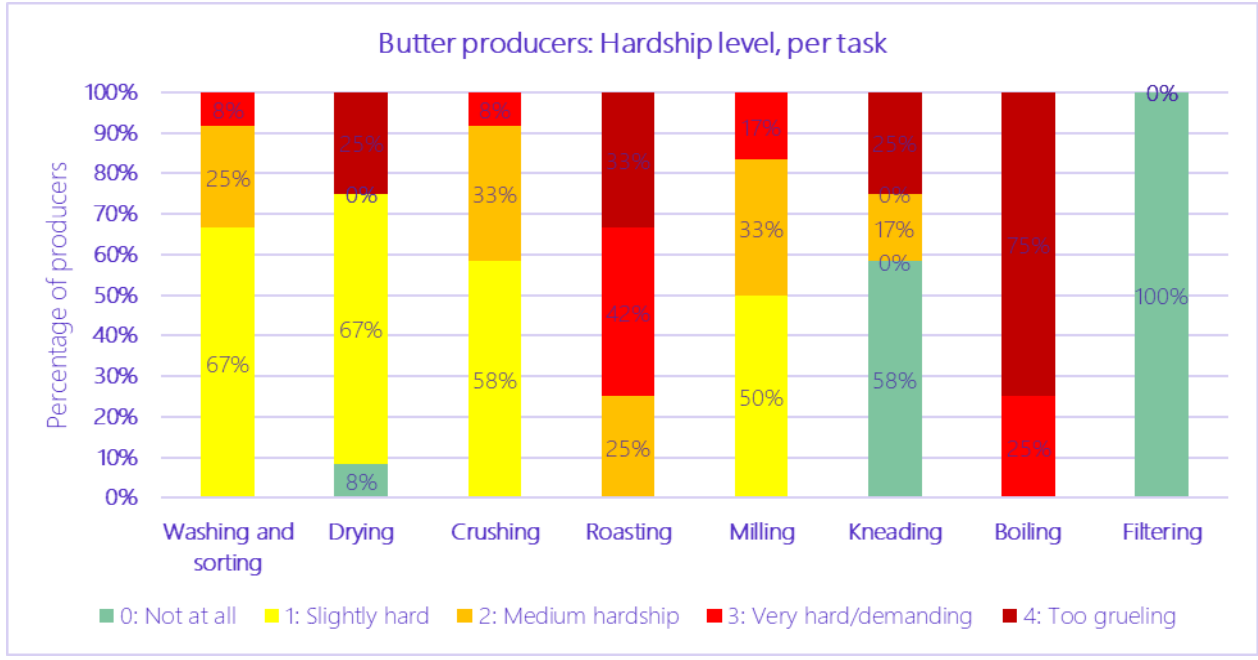
Name of Centre	Level of labour intensity - Washing	Justification	Level of labour stress - Drying	Justification	Level of labour stress - Crushing	Justification
Sagnarigu	2	Tiredness	1	NA	1	Noise
Sagnarigu	3	Time consuming	1	Sun	2	NA
Sagnarigu	1	Tiredness	0	NA	2	Heat
Kanfehiyili	1	Waist pain	1	Heat	1	Noise
Kanfehiyili	1	xposition to sunlig	1	Heat	1	Noise
Kanfehiyili	1	Tiredness	1	Waist pain	1	Noise

and **the judgment of a trained enumerator** (below)

Lot	Evaluation de la pénibilité du travail	Justification (exposition aux fumées et effort physique)	Justification2 (Température dans le lieu dédié à la cuisson jour1(°C))
1	1: Un peu pénible;	Exposition aux fumées	46,2
2	1: Un peu pénible;	Exposition aux fumées et à une forte chaleur	45,7
3	2: Moyennement penible	Exposition aux fumées et à une forte chaleur	46,1

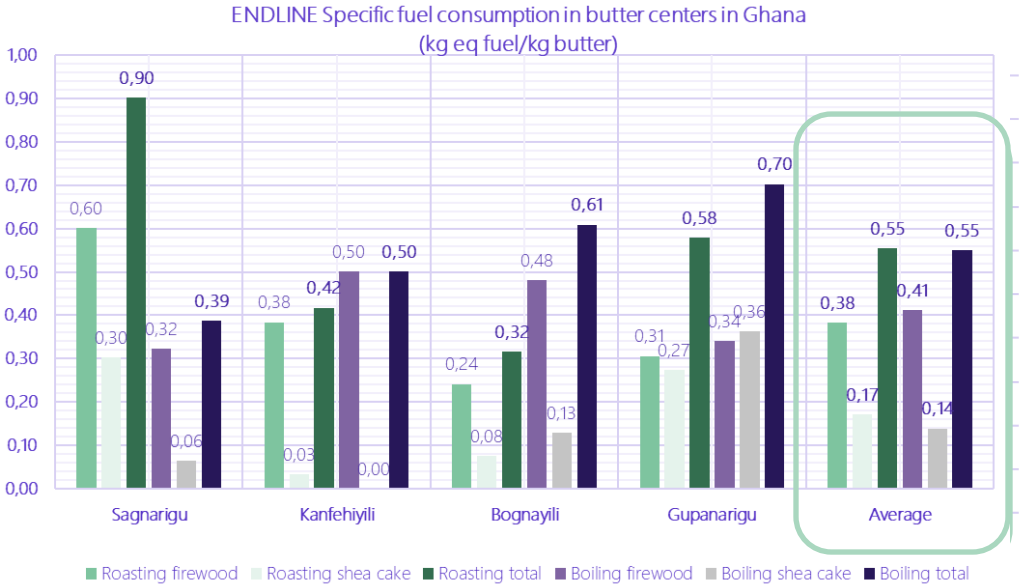


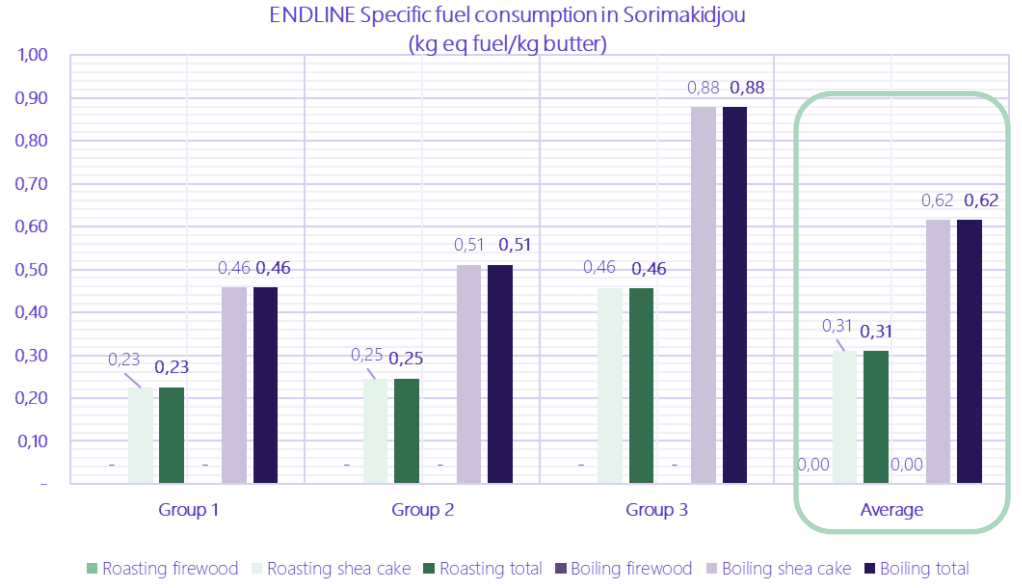
Hardship perception by collectors, Ghana (2024)



Hardship perception by butter producers, Ghana (2024)

3. **Results** (3): fuel use





Fuel use (firewood, shea cake) in Roasting (green) and Butter boiling (purple)

Butter processing in Côte d'ivoire: Collective processing (groups of 12 female operators): Three groups recorded

Impact of the SGG project = Baseline vs endline:

- Through introduction of shea cake compacting equipment: firewood no longer used for fuel – reduction of firewood 100%
- Introduction of improved roaster: average total fuel use -32%
- Introduction of improved cookstove: average total fuel use -10%
- Total fuel use (firewood + cake) 0.93 kg/kg butter → -20%
- Compared with Ghana cooperatives (total fuel use 1.10 kg/kg butter) this is -15%

➢ Large variability amongst groups → recommended to take more samples

Calculating impact on a yearly basis

- For 20 tons butter produced, 16.4 tons firewood were avoided
- GHG impact: 17.5 tons CO2eq avoided

A dashboard to monitor everything

Butter production BASELINE VS ENDLINE	Ghana (SFC Centers) BASELINE (2021-2022)					Ghana (SFC Centers) ENDLINE (2023-2024)				
	Sagnarigu	Kanfehiyili	Bognayili	Gupanarigu 2	Average	Sagnarigu	Kanfehiyili	Bognayili	Gupanarigu 2	Average
Yearly volumes per cooperative (t butter/year)	Yearly volumes per cooperative (t butter/year)					Yearly volumes per cooperative (t butter/year)				
Organic butter sales (ton)	16,5	22,0	13,5	13,0	16,3	16,5	22,0	13,5	13,0	16,3
Number of members	58	104	105	96	91	58	104	105	96	91
Batch size and yield	Batch size and yield					Batch size and yield				
Dry kernel mass used (kg)	116,6	159,5	105,2	113,7	123,8	244,5	239,7	252,0	234,8	242,7
Shea butter mass obtained (kg)	40,0	60,0	38,7	42,3	45,3	75,7	83,7	93,4	87,6	85,1
Butter production yield (%)	34%	38%	37%	37%	37%	31%	35%	37%	37%	35%
Global Working time per batch (h/batch) - all female operators	Global Working time per batch (h/batch) - all female operators					Global Working time per batch (h/batch) - all female operators				
Total time per batch (h/batch of butter)	9,34	13,95	11,83	10,83	11,49	14,64	53,19	21,25	21,04	27,53
Specific working time (mm:ss/kg butter) - producer	Working time (mm:ss/kg butter produced) - butter producer					Specific working time (mm:ss/kg butter) - producer				
Washing + sorting (hh:mm:ss)	NA	NA	NA	NA	NA	0:01:36	0:01:25	0:01:30	0:01:05	0:01:24
Drying (hh:mm:ss)	NA	NA	NA	NA	NA	0:03:30	0:01:25	0:02:23	0:01:10	NA
Crushing (hh:mm:ss)	00:00:15	00:00:17	00:00:08	00:00:24	00:00:16	0:00:19	0:00:23	0:00:21	0:00:19	0:00:20
Roasting / Steaming (h)	00:05:25	00:03:02	00:05:42	00:04:10	00:04:35	0:01:41	0:03:19	0:02:19	0:01:36	0:02:14
Milling (h)	00:00:21	00:00:38	00:00:55	00:01:11	00:00:46	0:00:24	0:00:30	0:00:28	0:00:27	0:00:27
Kneading / Pressing (h)	00:02:24	00:04:27	00:05:09	00:02:53	00:03:43	0:01:36	0:04:27	0:02:13	0:00:52	0:02:17
Boiling (hh:mm:ss)	00:05:36	00:05:33	00:06:26	00:06:44	00:06:05	0:03:33	0:04:25	0:02:41	0:02:33	0:03:18
Filtering (hh:mm:ss)	NA	NA	NA	NA	NA	0:00:07	0:00:06	0:00:10	0:00:05	0:00:07
Total specific time - producer (hh:mm:ss/kg butter)	00:14:01	00:13:57	00:18:20	00:15:22	00:15:25	0:12:45	0:16:01	0:12:04	0:08:07	0:12:14
Variation of Total specific time - producer	00:01:16 decrease	00:02:04 increase	00:06:16 decrease	00:07:15 increase	00:03:11 decrease					

Now that we have all these data, we can use some to calculate the SHEE score!

4. SHEE: Social indicators

Impact category	Criteria	Mid-point indicators	Score range		Max score
Social	**Quality of social relations within coop members**	Applying FFL questions SOC-12, SOC 13, SOC-14 and SOC-15 to the coop boundaries	Each question SOC-12, SOC-13, SOC-14, SOC-15 gets a score of 0 to 1	0 - 0.5 - 1	4
	Women satisfaction with their work	Consensual rating of the coop members' satisfaction (profit vs effort)	Very good	6	6
			Good	4	
			Fair	2	
			Mediocre/bad	0	
			TOTAL SOC		**10**

- Indicators aligned with requirements of FFL certification, or inspired from queries of buyers
- The weight allocated to each criteria is purely subjective: weighing can be changed over time

4. sHEE: Health indicators

Impact category	Criteria	Mid-point indicators	Score range		Max score
Health	Work arduousness	%product processed through appropriate equipment - *Roasting step*	% butter from kernels roasted in manual roasters (3-stone fire)	0	3
			% butter from kernels roasted in Burkina roaster model	0,8	
			% butter from kernels roasted in BDL roaster model	1	
		Degree of use of appropriate equipment - *Kneading step*	% butter extracted through only manual kneading	0	4
			% butter extracted through manual press	0,6	
			% butter extracted through mechanical kneading followed by manual kneading	0,8	
			% butter extracted only through mechanical kneading, or mechanical press (expeller)	1	
		Degree of use of appropriate equipment - *Boiling step*	% butter boiled on open fire (3-stone)	0	3
			% butter boiled in simple improved cookstove	0,5	
			% butter boiled in improved cookstove with chimney	1	
	Level of exposure to smoke	- Average PM measured during nut cooking x - Exposure time per kg of dry butters	IF less than 20	1	0
			IF between 20 and 50	0,5	
			IF more than 50	0	
			TOTAL HEALTH		**10**

E.g. kernels roasted in
- 10% manual roasters
- 80% Burkina roasters
- 10% BDL roasters

→ 10%x0 + 80%x0,8 + 10%x1 = 0.74 (out of 1)

→ **Weighted score 0.74x3 = 2.22**

- **Work arduousness** NOT measured through testimonies, but through observation of use of best-practice techniques/technologies
- Scoring scales have been discussed internally with SFC team
- Due to technical issues with **smoke probes**, data collection was not exhaustive enough to build a scoring framework

4. SHEE: Economic indicators

Impact category	Criteria	Mid-point indicators	Score range		Max score
Economic	**Revenue generated for women**	- Global sales from cooperative (certified & conventional butter) - Composition of butter prices: identify the price component for remunerating producers' handwork - Number of coop members selling product to SFC	< minimum legal wage 1.5 months	0	5
			between Minimum legal wage and Living wage (1.5 months)	0,3	
			> living wage 1.5 months	1	
	Active worktime (processing time)	- Total specific global worktime per kg of butter Read Column T for comments on methodology	IF >00:24:00 per kg butter	0	5
			IF between 00:20:00 and 00:24:00	0,5	
			IF <00:20:00	1	
			TOTAL ECONOMIC		**10**

- **Revenue** score is considered for one (main, avg) female producer: needs a measure of time of work + monitor the qtity butter produced in the season.
- Butter production **not a full-time job** for the majority: yearly production compared to 1.5 times the monthly **legal & living wages**

4. SHEE: Environmental indicators

Impact category	Criteria	Mid-point indicators	Score range		Max score
Environment	**Carbon footprint (through firewood consumption)**	- kg firewood (dry weight eq) / kg butter	IF higher than 0.75 kg firewood/kg butter	0	4
			IF between 0.65 and 0.75 kg firewood/kg butter	0,4	
			IF less than 0.65 kg firewood/kg butter	1	
		- kg firewood (dry weight eq) / kg butter - fNRB per district *(see Sheet Data)*	Decreasing score for emissions 0 to 0.75 kgCO2eq/kg butter	any	2
	Impacts on water resource	Liters of water/kg butter	%butter with water consumption >8,5 Liters/kg butter	0	1
			%butter with water consumption between 4 and 8,5 Liters/kg butter	0,5	
			%butter with water consumption <4 Liters/kg butter	1	
		Turbidity through Secchi disk Read Column T for comments on methodology	IF <2cm	0	1
			IF between 2 and 5cm	0,5	
			IF >4 cm	1	
	Green elements in cooperatives' facilities	- Tree occurrence - Live fence (hedge) - Small plants and bushes - Gardening elements	Existance of at least one of the listed mid-point elements (column D) adds 0,25 to the measured value (column O)	0 - 1	2
			TOTAL ENV		**10**

- **Firewood use** is proportional to **Carbon footprint** BUT proportion is different in every district (=different "non renewability of biomass, fNRB")
- **Quality of wastewater** could be measured with a simple and repeatable technique; methodology and thresholds still to be set
- **Biodiversity** proved difficult to evaluate (tried with a proxy "tree cover in collection areas", methodology to be developed further). Instead, introduced a category **"Green elements in the facilities"**

The SHEE standard

Measuring

Compiling

Reporting

Sharing impact

SHEE impact indicators
Social
Health
Environmental
Economic

- With cooperatives (continuous improvement)
- With buyers (compliance, EU-CSRD, monetizing impact)
- With final consumers (inputs to the emerging eco-labels)

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5. Feedback after the 1st run of the scoring system

Strengths

- Includes both producer/collector & helpers' work separately
- Precise assessment of GHG emissions thanks to the biomass renewability factor
- Subjective indicators (e.g. perception of work hardship) leveraged with field observations for a standardized score
- Most indicators can be drawn from the cooperatives' annual report OR on-field measurements with basic tools
- Measurement protocols repeatable → results could be compared among coops, even in different countries
- Indicators inform other monitoring needs (e.g FFL reports)
- Synthetic score, similar to others in the market (e.g. Chocolate scorecard)
- Flexible methodology, can be adapted over time (e.g. give a different overall weight to some Impact categories?)

Downfalls

- Some indicators could not be compared from endline vs baseline due to evolving methodology – could happen again if methodology changes
- Measurement protocol for some parameters could not be calibrated (need of different measurement tools, need more experiences)
  - Health impacts: Exposure to smoke
  - Biodiversity: Tree cover in nut collection sites
  - Waste water quality after kneading
- Some indicators require specific tools, high-end equipment: failures and not enough time to calibrate methodology
- Measurements could not be finished in Mali

Thank you

https://www.savannahfruits.com/

https://www.nitidae.org/

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