Bonbon Bouye: a Culturally Acceptable Peanut Nutrition Bar Developed with Senegalese Smallholder Women Farmers





Team: Promoting Agricultural Transformation Holistically (PATH)

Postharvest Loss in Kaffrine, Senegal







40% percent of harvest lost due to inadequate storage (WFP, 2020) "25% of our cowpeas are then lost to insects" Senegalese smallholder women farmers "We lost 2kg of our cleaned peanuts from late threshing" Senegalese smallholder women farmers

Mission

Collaborate with smallholder women farmers to develop a culturally-acceptable and nutritious peanut product to reduce the loss of their cowpeas and peanuts



Bonbon Bouye





Indigenous Knowledge + Western Technology



Defining the research objective with community members



How was Bonbon Bouye Created?









Survey & focus group discussions: Diamal, Keur Serigne Djibel, Ndangane and Ngouye Siwakh

Recipe development & optimization



Final product



Process demo & discussion



Sensory test with school-age children and community

Western Technology: Recipe development



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Solving Technical Challenges - Cohesiveness



Solving Technical Challenges - Shelf life



Solving Technical Challenges - Nutrition





servings per container Serving size	(60g
Amount per serving Calories	200
% Dai	ily Value
Total Fat 8g	105
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol Omg	09
Sodium 310mg	139
Total Carbohydrate 28g	10%
Dietary Fiber 4g	149
Total Sugars 12g	
Includes 10g Added Sugars	205
Protein 5g	
Vitamin D 0mcg	05
Calcium 86mg	69
Iron 2mg	109
Potassium 294mg	69

Bouye

Nutrition Facts	
5 servings per container Serving Size	1 Bar (60g
Amount Per Serving Calories	250
	% Daily Value
Total Fat 10g	139
Saturated Fat 2g	109
Trans Fat 0g	
Polyunsaturated Fat 3g	
Monounsaturated Fat 5g	
Cholesterol Omg	09
Sodium 170mg	79
Total Carbohydrate 35g	139
Dietary Fiber 6g	20%
Total Sugars 11g	
Includes 10g Added Sugars	20%
Sugar Alcohol 0g	
Protein 6g	
Vitemin D. Omer	00
Calcium 20mg	09
Iron 1.1mg	69
Potassium 180mg	29
*The % Daily Value (DV) tells you how mu	ob a outrient in a

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Quaker Peanut Butter Baked Squares

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"Both kids and moms will like it" -Senegalese woman farmer





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Groups with the same letters are not significantly different

"not too sweet, very good" - Senegalese man farmer





Process Flow Diagram



Sanitation









peanuts, cowpea, and corn CCP 1





Milling into flour





Roasting and grinding peanuts **CCP 2**





Resting



Baking in brick oven **CCP 3**



Packaging

Food Safety - HACCP



CCP 1 📩

- Mature and undamaged seeds will be selected and dried to 7% moisture to control *A*. *flavus*
- Aflatoxin testing





CCP 2 📩

- Roast peanuts at 177°C for 20 minutes
- Sanitary post-harvest practices and seeds will be stored at 70% humidity between 25-27°C

CCP 3 📩

• Bake to 71.1° C to assure a >5D Salmonella kill



Impact: Reduce postharvest loss



Impact: Reduce postharvest loss







Women empowerment



Nutrition F	αυισ
servings per container Serving size	(133g)
Amount per serving Calories	440
% C	Daily Value*
Total Fat 19g	24%
Saturated Fat 2g	10%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 480mg	21%
Total Carbohydrate 61g	22%
Dietary Fiber 9g	32%
Total Sugars 27g	
Includes 23g Added Sugars	46%
Protein 12g	
Vitamin D 0mcg	0%
Calcium 472mg	35%
Iron 4mg	20%
0.1 1 0.50	15%

Nutrition for school-age children



Reduction of imported food products





Capital Investment Estimate: CFA 1,484,707/ \$2532.23



Solar dryer CFA 42,500 \$72



Utensils CFA 30,000 \$50.85



Roaster | Motorized mill CFA 232,207 | CFA 180,000 \$400 |\$309.38



Baking oven CFA 1,000,000 \$1,700

Economic Feasibility



80 kg of cowpea converted to Bonbon Bouye

So What's Next?







2021 Vitamin A and Zinc fortification

Improve vitamin A and Zinc content of Bonbon Bouye



2021 School feeding program Partnership with the A.K.F. Wakhinane School





"Americans come to us and do research, but they just bring our food away. We hope you can stay with us and do value-added processing here instead"

-Chief of Ngouye Siwakh



Edwin Allan Sustainable Food Systems Expertise: Product dev. & testing

Team PATH



Emily Raber Dietetics Expertise: Nutrition evaluation



Amber Clifton Dietetics Expertise: International dev., Recipe dev.



Haley Darlinton Chemical Engineering Expertise: Process optimization



Cullen Kinnare Food and Nutrition Expertise: Recipe dev.









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