

School Feeding with Soya Foods

“Quality Food for Quality Education”

Business Plan

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I. INTRODUCTION

Feeding children has become a major challenge to good and quality education in boarding schools in Uganda. Two key problems are met: high costs and poor quality of foods on the market.

In boarding schools, food constitutes the biggest expenditure and reduces budget of other important items needed to ensure high quality education such as good salaries for teachers, books, equipment and adequate facilities. The most worrying is the fact that food products fed to children in schools are not sufficiently nutritious to ensure a balanced diet needed for children at a critical age of growth. With their limited budgets, most schools are not able to provide regular nutritious meals with milk, eggs, fruits and vegetables that are rich in proteins and other nutrients. Consequently, most of meals served are made of maize, matoke and beans, indeed very poor in protein and vitamins.

This initiative of feeding children with soya foods aims to enable schools in improving children's nutrition by supplementing school feeding with a variety of fresh micronutrient and protein-rich products made with soya products.

With the technical assistance of Africa Do Business Ltd, the schools will be enabled to process soya beans and make soya foods such as soya milk, soya meat (tofu) and soya-maize flour blends.

This approach will help to achieve the following results:

- food needs of children are met in the immediate and long term;
- health and nutrition status of children are improved;
- children's school performance is enhanced
- food costs are reduced

II. Nutrition Content & Health Benefits of Soy Foods

Locally made soya foods including soymilk, tofu (soya meats), and soya flour blends are inexpensive and an excellent source of protein and certain minerals and vitamins. The soybean is the only plant-based food that is a complete protein (certified by the World Health Organization-WHO). Soy protein has amino acid content similar to dairy milk, meat and eggs. The soya grain contains protein (38%), oil (18.5%), fibre (7%), moisture (12.5%) and other nutrients (24%).

A 200 ml serving of soymilk, with no supplements except sugar added as a sweetener, includes the following nutritional content (% means percentage of daily requirement):

Protein	7g	Omega-6	1.0g	Iron	5%
Calories	100	Omega-3	0.25g	Cholesterol	0mg
Fats	4g	Magnesium	8%	Potassium	300mg

Soy milk also contains Vitamins B1, B2, B6 and E. For 200g of tofu, the nutrient concentration is five times as high, except for calories. Consumption of soy provides the following health benefits.

Children:

- Prevention/reduction of stunting due to protein deficiency
- support of neurological development; soybeans have a high-quality essential fatty acid profile, rich in omega-3 and omega-6 fatty acids
- helps absorption of calcium to build bones
- strengthening of immune system

In 2000, the US Department of Agriculture issued a ruling that soy protein can provide 100% of protein required in school lunch programs, replacing animal protein

General Health:

- healthy, vegetarian source of complete protein with no cholesterol or lactose
- cancer prevention: soy isoflavones in soybeans reduce cancer risks
- osteoporosis: soy isoflavones reduce bone deterioration
- soy products have low levels of saturated fat and help lower blood cholesterol, this helps prevent clogging of arteries (arteriosclerosis)
- lactose intolerance: soy milk is digestible as it has no lactose

The US Food and Drug Administration states that “25 g of soy protein a day, as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease”

The soya foods

Soy milk: is made by soaking soybeans, grinding them with water. The fluid which results after straining is called soy milk. Plain soy milk is very nutritive: it's an excellent source of high quality proteins, isoflavones and B-vitamins. Soy milk is free of the milk sugar (lactose) and is a good choice for people who are lactose intolerant. Also, soy milk is a good alternative for those who are allergic to cow's milk.

Tofu (Soya Tofu): is a white protein curd precipitated from soya milk with salt or acid. Tofu is coagulated soya drink. Tofu is rich in Nutrients - Tofu is rich in both high quality protein and B-vitamins. Tofu is, therefore, an excellent substitute for meat in many vegetarian recipes.

The production of soya milk and tofu can be made by using simple and manual kitchen equipment. But for larger quantities, soya milk maker machinery is required.

III. Soya Foods requirements and Cost Benefit Analysis

The introduction of soya foods will allow reducing less nutritious food products (ex. Maize-posho matoke and beans), providing alternatives to costly food products (ex. cow milk and meat) and at the same time by improving the diet in schools.

In a school of 500 students, the feeding budget can be reduced by 25% with the introduction of soya food products (soya milk, Tofu and soya flour blends).

Soya foods needs for 500 students for trimester are calculated are as follows:

Soya Food Product	Daily intake by a student	Weekly intake by a student	Number of days or weeks	Quantity for 500 day in trimester	Quantity of soya grains needs
Soya Milk	200ml		80 days	8,000 Litres	1,143 kg
Tofu		500 gr	12 weeks	3,000 Kg	1,000 kg
Soya Maize Blend (CSB) - poridge	100 gr of soya & 200 gr of maize		80 day	4,000 Kg (soya) 8,000 Kg (maize)	4,000 Kg 8,000 kg

- One kilo of soya bean grains gives 7 liters of soya milk
- One kilo of soya bean grains gives 3 kg of tofu (soya meat)
- 1/3 of soya and 2/3 of maize to make a soya maize blend known as CSB

Cost of raw materials

Food Product	Quantity in kg	Unit cost in UGX	Total Cost in UGX
Soya bean grains	6,200	2,000	12, 400,000
Maize flour	8,000	1,300	10, 400,000
			22, 800,000

Production cost for a trimester

Raw materials:	22,800,000
Additional ingredients (sugar, flavors):	2,000,000
Production cost:	5,000,000
Total Cost:	29,800,000

Cost per child per day: 662 UGX

Case Study of a Primary Boarding School with 120 children in Kampala

Since February, Namungoona Primary School, located in Lubaga Division, Lubiya Parish has started feeding 120 children with soya milk with the assistance of Africa Do Business Ltd. After three months the impact is tremendous. Children are healthier and follow better in class and the food costs are increased very slightly. By introducing soya milk black tea has been dropped and quantities of the maize/posho has been reduced as calculated below.

Number of children fed= 120
Current cost of food per week

Products	Quantity in kg	Unit Cost in UGX	Total
Maize flour posho(Lunch +Supper)	7x60=420	1300	546,000
Maize flour –porridge – 10h Break	7x12=84	1300	109,200
Rice (Friday)	50	2900	145,000
Beans	7X32=224	1600	358,400
Meat (Sunday)	16	7500	120,000
Groundnuts (Sunday)	4	4500	18,000
Matooke			50,000
Cabbages/Tomatoes			80,000
Sugar	7X6=42	2800	117,600
Total			1,544,200

Cost including soya milk in breakfast

Each morning each child will drink a cup of 330ml of soya milk.
Cost of soya milk = 600 UGX for one litre
Quantity of soya milk for 120 children = $120 \times 1/3 \text{lr} = 40 \text{lr}$
Total daily cost= $600 \times 40 = 24,000 \text{UGX}$

Soya milk weekly cost= $7 \times 24,000 = 168,000 \text{UGX}$

The introduction of milk will reduce the following items in specified quantities:

100% of black tea= 5,000
30% of sugar= $117,600 \times 30/100 = 35,280$
20% of beans= $358,400 \times 20/100 = 71,680$
10% of porridge= $109,200 \times 10/100 = 10,920$

Total cost reduction = 122,880

The introduction of soya milk will increase the food cost by only = **45,120 UGX** (only by 3%)

While the increase in food cost is minimal, the improvement in diet is tremendous. Later with the introduction of tofu (soya meat) with the reduction of meat; and with the introduction of maize and soya blend the reduction in food cost would reach 25%

Micro Scale of Soya Milk Production with Electric Blender

A. Cost of Soya Milk Production (40 litres per day) all items covered by producer

	Quantity	Unit	Total
Investment			
Commercial Blender	1	500,000	500,000
Cooking pots	2	30,000	60,000
Other			40,000
Sub Total			600,000
Daily costs			
Daily depreciation			2,000
Soya bean	5 kg	2,000	10,000
Flavour	100 gr		3,000
Charcoal			6,000
Other (transport, etc)			3,000
Sub Total			24,000

Input cost per kilo= $24,000/40=$ 600 UGX

Production costs per kilo= 200 UGX

Selling Price= 800 UGX

B. Cost of Soya Milk Production (40 litres per day) with cooking facilities provided

	Quantity	Unit	Total
Investment			
Commercial Blender	1	500,000	500,000
Sub Total			500,000
Daily costs			
Daily depreciation			2,000
Soya bean	5 kg	2,000	10,000
Flavour	100 gr		2,000
Other (transport, etc)			2,000
Sub Total			16,000

Input cost per liter= $16,000/40=$ 400 UGX

Production cost per liter= 200 UGX

Selling Price= 600 UGX