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INTRODUCTION

- Undernutrition causes 45% of deaths in children under the age of five – which equates to 3.1 million deaths each year.¹
- Annually, Turkey loses over \$5.5 billion in GDP to vitamin and mineral deficiencies.²
- IRI research claims U.S. snack bar consumers desire fruits, nuts and seeds, for their nutritional benefits and quick label recognition.³

GOALS AND OBJECTIVES

- Design a student run facility dedicated to the full-scale production of the Whole 6 snack bar with:
 - Minimal processing of ingredients
 - Leadership and hands-on opportunities for students
- Design a one for one business plan where each unit sold in the U.S. will fund the donation of one bar to fight malnutrition in Turkey.

RECIPE FORMULATION

Ingredient	Functionality	Nutrition	Mass Percent
Almonds	Binding Agent	Protein, Calcium, Fat, Iron	46.90%
Apricots	Binding Agent & Sweetener	Vitamin A & C	25.80%
Oats	Substance	Iron, Protein, Fiber	17.48%
Pumpkin Seeds	Crunch	Iron, Zinc, Magnesium	7.28%
Cinnamon	Flavor	Calcium, Fiber, Blood Sugar Stabilizer	2.18%
Salt	Preservative & Flavor	Iodine, Sodium	0.36%

NUTRITION LABEL

Nutrition Facts		Amount/serving	% Daily Value*	Amount/serving	% Daily Value*
Total Fat 20g		26%	Total Carbohydrate 18g		7%
Saturated Fat 2g		10%	Dietary Fiber 6g		21%
Trans Fat 0g			Total Sugars 4g		
Cholesterol 0mg		0%	Includes 0g Added Sugars		0%
Sodium 95mg		4%	Protein 10g		20%
Vitamin D 0mcg		0%	Calcium 104mg		8%
Potassium 282mg		6%	Vitamin A		10%
Riboflavin		30%	Phosphorus		10%
Zinc		10%	Copper		45%
Iron 2.7mg		15%	Vitamin E		50%
Magnesium		20%	Manganese		45%

1 servings per container
Serving size 1 bar (68g)
Calories per serving **280**

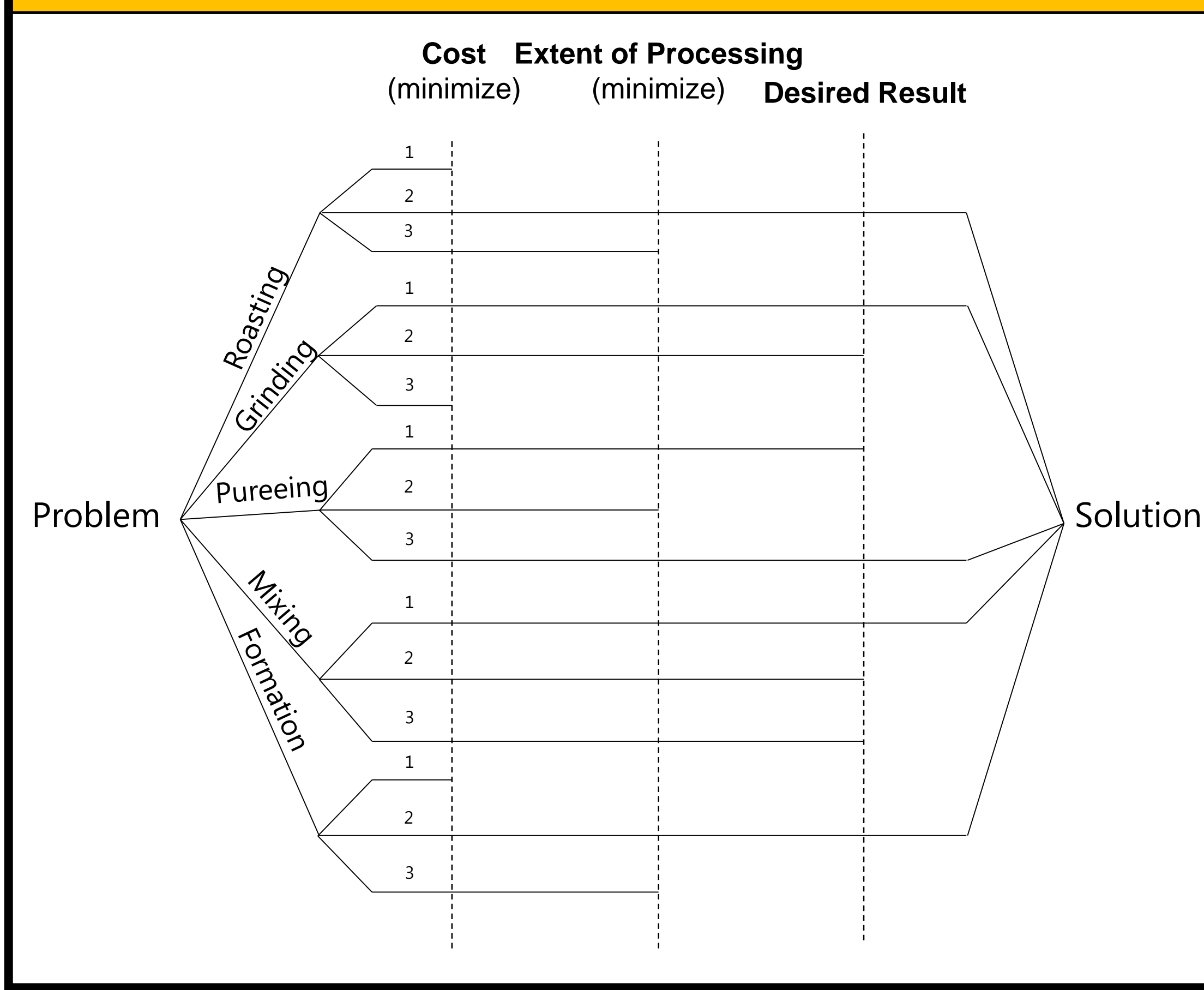
GLOBAL AND SOCIETAL IMPACTS

- Combat malnutrition and vitamin deficiencies.
- Engage both the U.S. and local Turkish community.

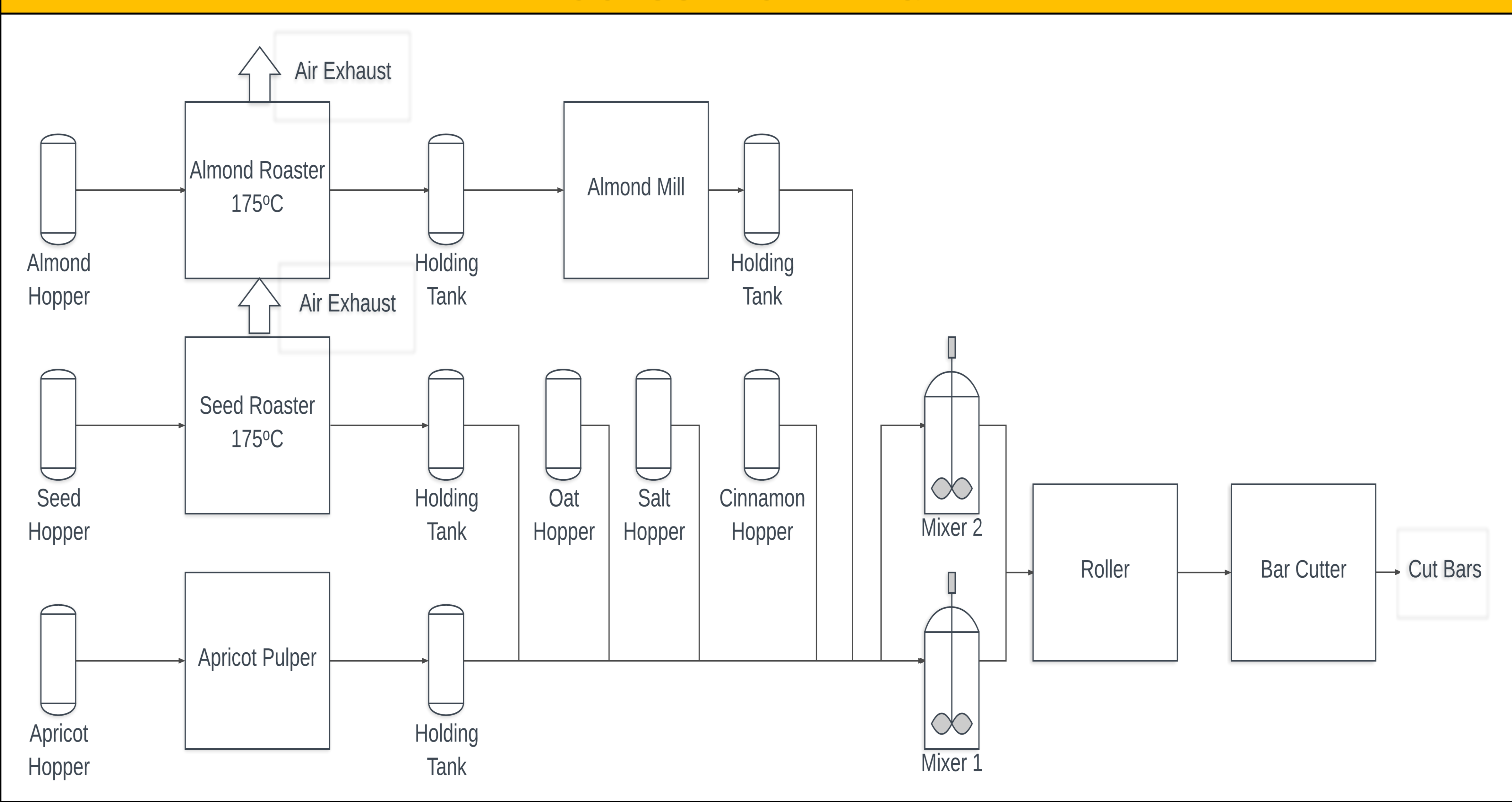
MARKETING

- In 2016, U.S. retail sales for snack bars were \$3.25 billion.
- Ethical products are an emerging trend for millennial consumers.⁴
- Our market share is 2% of national bar market, a sales base the size of Indiana.⁵

PROCESS ALTERNATIVES



PROCESS FLOW DIAGRAM

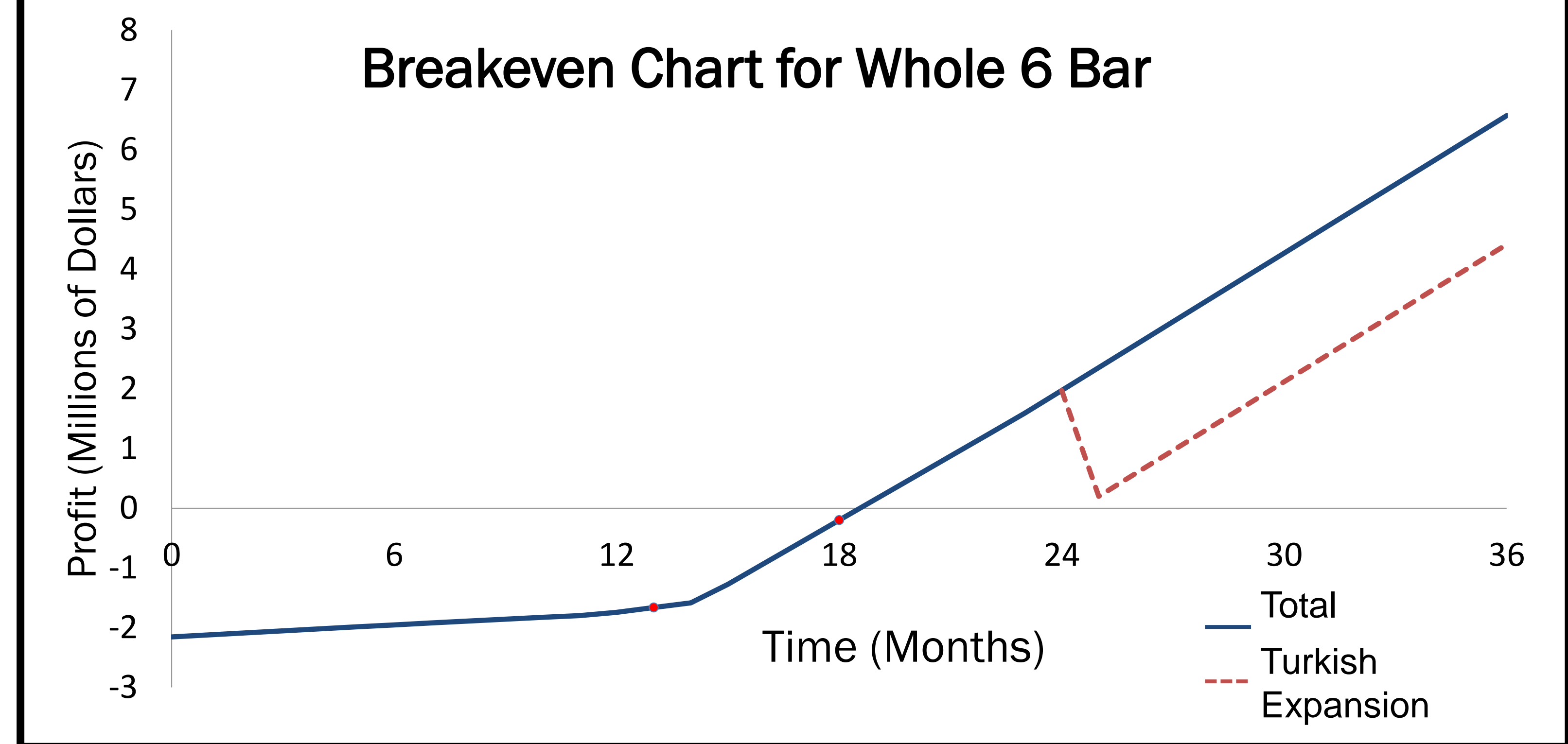


COST-OPTIMIZED ECONOMICS

Equipment	Size	Units	Total Cost
Mixers (2)	0.4	m ³	\$77,940
Roasters (2)	60	m ²	\$128,000
Roller & Cutter	30	m	\$100,000
Pulper	5	m ³	\$8,000
Grinder	0.3	m ³	\$100,060
Total			\$414,000

Ingredient	Monthly Mass (kg)	Monthly Cost
Oats	25,575	\$22,000
Almonds	68,575	\$480,000
Pumpkin Seeds	10,650	\$7,000
Apricots	37,700	\$250,000
Cinnamon	3,175	\$38,500
Salt	525	\$375
Total	146,200	\$797,875

Bar size (g/bar)	Production Rate (bars/month)	Bar Price	Monthly Income
68.0	2,150,000	\$1.50	\$3,225,000



PRODUCTION SCHEDULING

Ingredient	Process	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.25	4.5	4.75	5	5.25	5.5	5.75	6	6.25	6.5	6.75	7	7.25	7.5	7.75	8		
Almonds	Roasting																																		
	Grinding																																		
Pumpkin Seeds	Roasting																																		
	Pureeing																																		
Apricot	Mixer 1																																		
	Mixer 2																																		
Roller/Cutter																																			

FUTURE WORK

- Invest future profits into building a facility in Turkey to utilize local ingredients.
- Partnership with charities for product distribution.
- Develop new snack bars to mirror diets in other malnourished countries.

References:

1 "Malnutrition." *Global Alliance for Improved Nutrition*, 2016. Web. 25 Mar. 2017. <http://www.gainhealth.org/about/malnutrition>.
 2 Mannar, Venkatesh. "Vitamin & Mineral Deficiency." *A Global Progress Report*. UNICEF, 2 Jan. 2016. Web. 5 Apr. 2017. <https://www.unicef.org/media/files/vmd.pdf>.
 3 Kvidahl, Melissa. "Snack bars cater to today's diverse consumer demands." *Snack and Bakery RSS*, 31 Mar. 2016. Web. 7 Apr. 2017. <http://www.snackandbakery.com/articles>.
 4 Argenti, Paul A. "Corporate Ethics In The Era Of Millennials." *NPR*, 24 Aug. 2016. Web. 8 Apr. 2017. <http://www.npr.org/sections/13.7/2016/08/24/490811156>.
 5 "Population estimates." *United States QuickFacts from the US Census Bureau*, 1 July 2016. Web. 5 Apr. 2017. <https://www.census.gov/quickfacts/table/>

Acknowledgements:

Special thank you to Dr. Okos for his support, instruction, and life advice!

