OUR DIET PROBLEM

PROBLEM STATEMENT AND DATA

Let's assume that I am a moderately active person and weigh around 120 pounds.

Daily Requirements

- Total Calorie Intake = 2,000
- Total Carbohydrates = 271 grams
- Total Protein = 91 grams
- Total Fat = 65 grams

Half of my daily requirements from dinner

- Total Calorie Intake = 1,000
- Total Carbohydrates = 135.5 grams
- Total Protein = 45.5 grams
- Total Fat = 32.5 grams

Calorie Intake from one serving of Green beans

- 12 grams of Carbohydrates
- 3 grams of Protein
- 9 grams of Fat
- Cost = $2.0

Calorie Intake from one serving of Kisir

- 33 grams of Carbohydrates
- 6 grams of Protein
- 1 gram of Fat
- Cost = $1.5

OPTION 1 – EATING 33 SERVINGS OF GREEN BEANS

	Carbs	Protein	Fat	Calories	Cost / serving		Decision variables
Green beans	12	3	9	171	$2.0		16.0
Kisir	33	6	1	150	$1.50		0
Daily intake	192	48	144	2,736			
	=	=	=	=			
Daily requirement	135.5	45.5	32.5	1,000		Total cost	**$32.0**

OPTION 2 – EATING 16 SERVINGS OF KISIR

	Carbs	Protein	Fat	Calories	Cost / serving		Decision variables
Green beans	12	3	9	171	$2.0		0
Kisir	33	6	1	150	$1.50		33.0
Daily intake	1,089	198	33	4,950			
	=	=	=	=			
Daily requirement	135.5	45.5	32.5	1,000		Total cost	**$49.5**

MATHEMATICAL FORMULATION

Let's denote

x_1 = Green beans

x_2 = Kisir

z = Cost

Minimize $z = \$2.0\ x_1 + \$1.5\ x_2$

$12\ x_1 + 33\ x_2 \geq 135.5$	(Carbohydrates)
$3\ x_1 + 6\ x_2 \geq 45.5$	(Protein)
$9\ x_1 + x_2 \geq 32.5$	(Fat)
$171\ x_1 + 150\ x_2 \geq 1{,}000$	(Calories)
$x_1 \geq 0$	(Green beans)
$x_2 \geq 0$	(Kisir)