

Tutorial 02

Agricultural Production Management

Exercise: Dairy Herd Management: A dairy farm has 35 cows (average weight 580 kg). The farmer wants to optimize feeding to improve production while controlling costs.

Technical Data

- Dry Matter (DM) needs for maintenance = 2% of live weight
- DM needs for production = 0.45 kg DM per liter of milk
- Current production: 20 liters/cow/day

Proposed Rations

Ration	Ingredients	Quantity/day/cow	Cost & DM content
Current	Hay	26 kg	19 DZD/kg, 84% DM
	Concentrate	5 kg	70 DZD/kg, 89% DM
	Minerals	0.2 kg	250 DZD/kg
Improved	Hay	20 kg	19 DZD/kg, 84% DM
	Corn silage	20 kg	9 DZD/kg, 32% DM
	Concentrate	7 kg	70 DZD/kg, 89% DM
	Minerals	0.2 kg	250 DZD/kg

Economic Data

- Milk price: 56 DZD/liter
- Other fixed costs: 700 DZD/cow/day (vet, electricity, maintenance)
- Expected production with improved ration: 25 liters/cow/day

Questions

- 1) Calculate total DM needs for a 580 kg cow producing 20 L/day
- 2) Calculate total DM provided by current ration
- 3) Is the current ration nutritionally adequate? Justify
- 4) Calculate daily gross margin per cow for each ration: $\text{Margin} = \text{Milk revenue} - (\text{Feed cost} + \text{Other costs})$
- 5) Calculate total monthly gross margin for the herd (35 cows, 30 days) with each ration
- 6) Calculate monthly gain if switching from current to improved ration
- 7) Adopting the improved ration requires buying a silage machine for 1,270,000 DZD.
 - How many months to pay back this investment?
 - With 8% annual interest credit over 2 years, calculate monthly credit cost. Is the investment still profitable?
- 8) A metabolic disease (acidosis) affects 20% of the herd on improved ration: Sick cows produce 30% less milk for 2 months. Treatment cost: 8,700 DZD/sick cow + 400 DZD/cow/day extra vet costs during illness
 - Calculate revenue loss from reduced production over 2 months
 - Calculate total treatment cost
 - Despite this risk, is improved ration more profitable over the year? Calculate and compare
 - Suggest 2 concrete preventive measures to reduce acidosis risk

