Management of Agricultural Operations and Agri-Food enterprises

Third-Year Agronomy Course (Bachelor's Level)

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Chapter 05

Elaboration of the Farm Diagnostic

Introduction

The farm diagnostic is a comprehensive evaluation tool that allows a farm manager or advisor to assess the overall health of an agricultural operation. It goes beyond simple income calculation to provide a complete picture of the farm's strengths, weaknesses, and future potential.

Technical Performances	Financial Situation & Treasury	Strategy to Implement

1. Technical Performances

1.1. What is Technical Performance?

Definition

Technical performance measures how efficiently a farm uses its resources (land, labor, equipment, inputs) to produce agricultural output. It answers the question: How well is this farm producing compared to its potential?

- It reveals whether the farm's production methods are effective
- It compares actual results to regional or national benchmarks
- It identifies specific weaknesses before they become financial problems
- It provides the data needed to justify investment decisions

1.2. Key Technical Indicators (Crop Production)

Indicator	Formula	Unit	What it measures
Crop Yield	Total Production ÷ Cultivated Area	Qtl/ha or T/ha	Productivity of land
Technical Itinerary Rate	Actual practices vs. recommended practices (%)	%	Quality of production methods
Input Use Efficiency	Production ÷ Quantity of input used	kg prod./kg input	Efficiency of fertiliser/pesticide use
Cultivation Rate	Cultivated Area ÷ Total Available Land × 100	%	Utilisation of land resources
Mechanisation Level	HP available ÷ Total cultivated area	HP/ha	Power available per hectare

1.3. Key Technical Indicators (Livestock Production)

Indicator	Formula	Unit	What it measures
Milk Production per Cow	Total milk (litres) ÷ Number of dairy cows	L/cow/year	Dairy herd productivity
Calving Rate	Calves born ÷ Cows present × 100	%	Reproductive performance
Daily Weight Gain (DWG)	(Final weight − Initial weight) ÷ Days of fattening	g/day	Growth efficiency of animals
Feed Conversion Ratio (FCR)	Feed consumed (kg) ÷ Weight gained (kg)	kg feed/kg gain	Feed efficiency (lower = better)
Mortality Rate	Dead animals ÷ Total herd × 100	%	Animal health management quality

Practical Example: Ferme El-Wiam (80 ha Wheat + 30 Dairy Cows)

CROP SECTION			
Indicator	**Farm result**	**Regional average**	**Assessment**
Wheat yield	28 Qtl/ha	22 Qtl/ha	✓ Good
Cultivation rate	90%	85%	✓ Good
Fertiliser efficiency	4.2 kg grain/kg N	5.0 kg/kg	Below avg

LIVESTOCK SECTION			
Indicator	**Farm result**	**Benchmark**	**Assessment**
Milk/cow/yr	3,800 L	4,500 L	✗ Weak
Calving rate	82%	85%	Average
Mortality rate	3%	< 2%	High

Key Findings:

The crop side performs above average. However, livestock productivity is below benchmarks (low milk yield and above-average mortality suggest feed quality or health management issues that require immediate attention).

1.4. How to Read and Interpret Technical Results

Technical indicators only have meaning when compared to a reference point. There are three types of comparison:

A. Benchmark Comparison

Compare the farm's indicators against regional or national averages published by agricultural institutes (ITGC, INRAA, FAO internationally). This shows whether performance is typical, above, or below the sector.

B. Historical Comparison

Compare the current year with previous years on the same farm. This reveals trends (is the farm improving, stagnating, or declining over time?)

C. Objective Comparison

Compare actual results against the farm manager's own planned objectives. If yields were expected to be 30 Qtl/ha but only reached 22 Qtl/ha, the gap requires explanation and corrective action.

2. Financial Situation & Treasury Level

2.1. Overview of the Financial Diagnostic

The financial diagnostic evaluates whether the farm is economically viable and financially stable. It uses data from the farm's balance sheet and income statement to calculate key ratios. There are four dimensions to analyse:

1	**Profitability** Is the farm generating enough income after costs?	2	**Liquidity & Treasury** Does the farm have enough cash to meet short-term obligations?
3	**Solvency** Can the farm cover all its debts if it had to stop operations?	4	**Financial Autonomy** How dependent is the farm on external borrowing?

2.2. Profitability Ratios

Ratio	Formula	Good signal	Interpretation
Profit Margin	(Net Income / Gross Revenue) × 100	> 15%	% of revenue kept as profit
Return on Investment (ROI)	(Net Income / Total Investment) × 100	> 8%	Efficiency of capital invested
Break-Even Point (BEP)	Fixed Costs / (Price/unit − Variable Cost/unit)	As low as possible	Min. production to cover all costs
Cost of Production	Total Costs / Total Production	< market price	Cost per unit of output

2.3. Working Capital, WCN and Net Cash

NWC (Net Working Capital)

NWC = Stable Resources − Fixed Assets

(Equity + Long-term Loans) − (Land + Buildings + Machinery)

NWC > 0 ✓ Safety cushion exists

NWC < 0 ✗ Financial fragility

WCN (Working Capital Need)

WCN = Operating Current Assets − Operating Current Liabilities

(Stock + Customer Receivables) − (Supplier Debts + Tax Debts)

Low WCN ✓ Cash collected quickly

High WCN ✗ More financing needed

Net Cash (NC) (Key Equation)

Net Cash = NWC − WCN

Positive NC = Farm can pay all short-term debts

NC > 0 ✓ Farm is liquid

NC < 0 ✗ Bank overdraft risk

Practical Example: Ferme El-Wiam, Balance Sheet (Year N)

ASSETS	Amount (DA)	LIABILITIES	Amount (DA)
Land + Buildings	8 500 000	Owner's Equity	6 000 000
Farm Machinery	2 000 000	Long-term Loans	3 500 000
Stock (inputs)	800 000	Supplier Debts	600 000
Customer Receivables	400 000	Tax Debts	200 000
Cash Available	100 000		
TOTAL ASSETS	11 800 000	TOTAL LIABILITIES	10 300 000

Calculations:

NWC = (6 000 000 + 3 500 000) − (8 500 000 + 2 000 000) = 9 500 000 − 10 500 000 = −1 000 000 DA (Negative!)
WCN = (800 000 + 400 000) − (600 000 + 200 000) = 1 200 000 − 800 000 = +400 000 DA
Net Cash = −1 000 000 − 400 000 = −1 400 000 DA ✗✗ → Farm is in financial difficulty!

2.4. Cash Flow Budget

A cash flow budget shows monthly movements of money in and out. The diagnostic reads it to detect timing problems:

Items (DA)	Jan.	Feb.	Mar.	Apr.	May	Jun.
TOTAL INFLOWS	550 000	200 000	350 000	50 000	50 000	50 000
TOTAL OUTFLOWS	255 000	695 000	435 000	265 000	255 000	245 000
MONTHLY BALANCE	+295 000	−495 000	−85 000	−215 000	−205 000	−195 000
CUMULATIVE BALANCE	+495 000	0	−85 000	−300 000	−505 000	−700 000

Diagnostic Reading:

→ **January:** Positive thanks to previous harvest income.
→ **February onwards:** Cumulative balance turns negative due to input purchases (seeds, fertilisers).
→ **June deficit: −700 000 DA.** Action needed before this period: negotiate a seasonal credit line or early subsidy payment.

2.5. Solvency and Financial Autonomy Ratios

Ratio	Formula	Good signal	Interpretation
General Solvency Ratio	Total Assets / Total Debts	> 2	Can repay all debts by selling assets
Debt Ratio	Total Debts / Total Assets × 100	< 50%	Share of assets financed by debt
Financial Autonomy Ratio	Owner's Equity / Total Assets × 100	> 40%	Independence from external financing
Debt Service Coverage	Net Income / Annual Loan Repayment	> 1.3	Ability to repay loans from income

Important: No single ratio tells the complete story. A farm diagnostic must always consider ALL ratios together to form a balanced judgment.

2.6. Complete Financial Diagnostic (Ferme El-Wiam)

Category	Indicator	Value	Target	Signal
Profitability	Profit Margin	23%	> 15%	✓ Good
Profitability	ROI	18%	> 8%	✓ Good
Liquidity	Net Working Capital	−1 000 000 DA	> 0	✗ Danger
Liquidity	Net Cash	−1 400 000 DA	> 0	✗ Danger
Solvency	General Solvency Ratio	1.15	> 2	Weak
Autonomy	Financial Autonomy	51%	> 40%	✓ OK

Conclusion: The farm is profitable but faces a serious liquidity crisis. Priority action: renegotiate long-term loans to increase NWC and restore positive Net Cash.

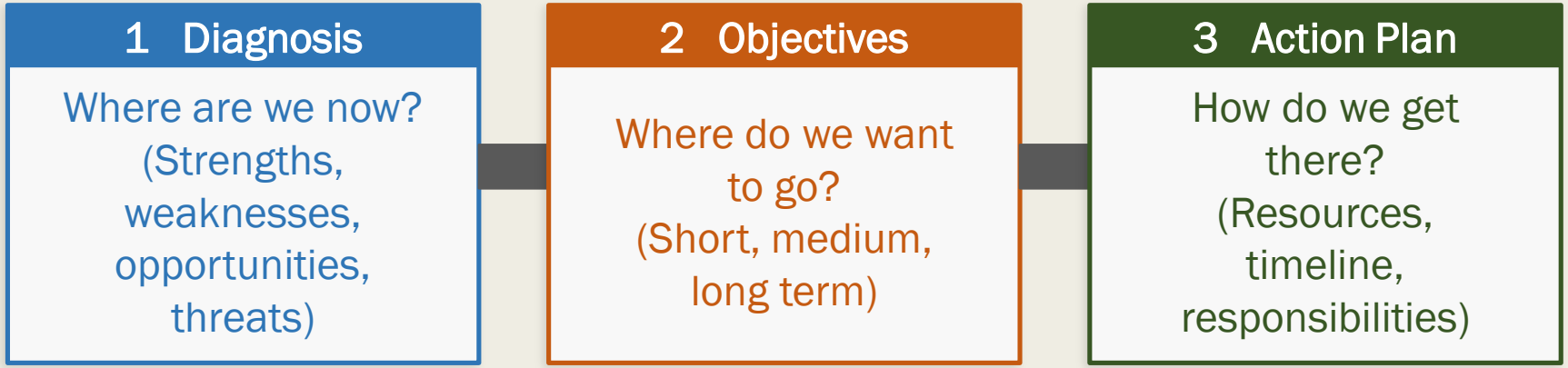
3. Strategy to Implement

3.1. What is a Farm Strategy?

Definition

A farm strategy is a structured plan of action, developed from the diagnostic results, that defines the farm's objectives and the means to achieve them over a given time horizon (1 year, 3 years, or 5 years).

A farm strategy links three elements:



3.2. The SWOT Analysis

The SWOT analysis organises all diagnostic findings into a strategic framework. It is the bridge between the diagnostic and the action plan.

S (STRENGTHS)

- Above-average wheat yield (28 Qtl/ha)
- Good mechanisation level
- Strong profitability margin (23%)
- Experienced farm manager

W (WEAKNESSES)

- Negative NWC and Net Cash
- Low milk yield per cow
- High livestock mortality rate
- Excessive fertiliser costs

O (OPPORTUNITIES)

- Government agricultural subsidies
- Growing demand for local dairy
- Irrigation infrastructure nearby
- Cooperative membership available

T (THREATS)

- Drought risk (semi-arid region)
- Price volatility for wheat
- Rising feed and input costs
- Competition from imports

3.3. Setting SMART Strategic Objectives

Objectives must be SMART: Specific, Measurable, Achievable, Realistic, Time-bound.

Horizon	Objective	Target indicator	Source (SWOT)
Short-term (Year 1)	Restore positive Net Cash through long-term loan renegotiation	NC > 0 DA	Weakness → Action
Short-term (Year 1)	Improve livestock diet and veterinary protocols to reduce mortality	Mortality < 2%	Weakness → Action
Medium-term (Years 2-3)	Increase milk production per cow through improved genetics	> 4 500 L/cow	Weakness + Opportunity
Medium-term (Years 2-3)	Install drip irrigation to increase wheat yield and reduce water costs	> 32 Qtl/ha	Strength + Opportunity
Long-term (Years 4-5)	Develop on-farm cheese processing unit to increase added value	Revenue +30%	Opportunity leveraged

3.4. Building the Farm Action Plan

An action plan translates each strategic objective into concrete steps, with assigned resources, timelines, and measurable outcomes.

Action	Objective addressed	Resources needed	Timeline	Expected result
Negotiate loan restructuring with bank	Restore positive NWC	Financial advisor, bank meeting	Month 1-3	NWC > 0 DA
Hire livestock veterinary consultant	Reduce mortality rate	Contract vet, health protocol	Month 1-6	Mortality < 2%
Purchase 5 higher-yield dairy cows	Increase milk output/cow	Bank loan + subsidy	Year 2	> 4 500 L/cow/yr
Install drip irrigation on 40 ha	Raise wheat yield, cut water costs	Equipment loan + grant	Year 2-3	Yield > 32 Qtl/ha
Set up artisan cheese unit	Add dairy value, grow revenue	Cooperative + investment loan	Year 4-5	Revenue +30%

3.5. Strategies to Improve Cash Flow & Financial Position

A) Improve Inflows (Revenue Side)

- Negotiate shorter payment terms with buyers (cooperatives, processing companies)
- Set up direct sales channels (farmers markets, local delivery) for immediate payment
- Diversify crops or livestock to spread income across more months of the year
- Submit VAT refund claims promptly to speed up government reimbursements

B) Control Outflows (Expenditure Side)

- Negotiate longer payment terms with input suppliers (pay in 60 days instead of 30)
- Lease equipment instead of buying outright to reduce upfront capital requirements
- Join a purchasing cooperative to buy inputs at lower prices through group purchasing
- Delay non-urgent investments to months when the cumulative cash balance is higher

3.6. Integrating Risk Management into the Farm Strategy

Every farm strategy must anticipate risks that could prevent objectives from being achieved. The four main risk categories in Algerian agriculture are:

Production Risk

Drought, floods, frost, pests, disease outbreaks affecting yields

Mitigation: Crop insurance, irrigation, diversification, resistant varieties

Market Risk

Price volatility for wheat, milk, livestock (hard to predict)

Mitigation: Contract farming, cooperatives, forward sales agreements

Financial Risk

Interest rate changes, credit refusal, cash shortages

Mitigation: Maintain NWC > 0, diversify funding sources, build reserves

Human Risk

Labour unavailability, lack of skilled workers at critical times

Mitigation: Training, seasonal labour contracts, mechanisation of key tasks

3.7. Monitoring and Evaluating the Strategy

A strategy without monitoring is just a wish list. The farm manager must regularly check whether actions are achieving their objectives and adjust the plan if needed.

Recommended monitoring frequency:

Indicator type	Frequency	Who checks
Cash balance / treasury	Monthly	Farm manager
Technical indicators (yield, milk, FCR)	Each production cycle	Farm manager + technician
Financial ratios (NWC, solvency)	Annually	Accountant + manager

Practice Exercise

Ferme Benali operates 60 ha of market gardening and 20 dairy cows. You are given the following data:

Technical data: Vegetable yield: 180 Qtl/ha (regional avg: 200 Qtl/ha) | Milk/cow: 4,200 L (benchmark: 4,500 L) | Mortality: 1.5%
Financial data: Owner's equity: 5,500,000 DA | Long-term loan: 3,000,000 DA | Land+Buildings: 7,200,000 DA | Machinery: 1,800,000 DA
Current assets: Stock 600,000 DA | Receivables 350,000 DA | Cash 80,000 DA
Current liabilities: Supplier debts 450,000 DA | Tax debts 150,000 DA

Questions:

1. Compare each technical indicator to the benchmark. Is the farm above or below average?
2. Calculate NWC, WCN, and Net Cash. Comment on the financial situation.
3. Conduct a simplified SWOT analysis based on the data provided.

1) Comparing Technical Indicators to the Benchmark

Indicator	Ferme Benali	Regional Average	Gap	Assessment
Vegetable yield	180 Qtl/ha	200 Qtl/ha	−20 Qtl/ha	❌ Below average
Milk per cow	4,200 L/cow	4,500 L/cow	−300 L/cow	❌ Below average
Livestock mortality	1.5%	—	—	✅ Acceptable (< 2%)

Conclusion: Ferme Benali is underperforming on both production indicators. It is not yet reaching its full potential in either vegetable growing or dairy production. The only positive technical result is the mortality rate, which stays below the 2% threshold.

2) Calculating NWC, WCN, and Net Cash

Key Formulas:

- **NWC (Net Working Capital)** = Current Assets − Current Liabilities
- **WCN (Working Capital Need)** = Stock + Receivables − Supplier Debts
- **Net Cash** = NWC − WCN

Net Working Capital (NWC)

Current Assets = Stock + Receivables + Cash = 600,000 + 350,000 + 80,000 = 1,030,000 DA

Current Liabilities = Supplier debts + Tax debts = 450,000 + 150,000 = 600,000 DA

NWC = 1,030,000 − 600,000 = +430,000 DA

NWC = +430,000 DA ⟶ Positive. The farm owns more short-term assets than it owes in short-term debts. This is a good sign.

Working Capital Need (WCN)

WCN = Stock + Receivables − Supplier Debts = 600,000 + 350,000 − 450,000 = +500,000 DA

WCN = +500,000 DA. The farm needs 500,000 DA of cash just to keep its daily operations running (buying inputs before receiving payment from sales).

Net Cash

Net Cash = NWC − WCN = 430,000 − 500,000 = −70,000 DA

Net Cash = −70,000 DA ⟶ Negative. This is the farm's main financial problem.

Financial comment:

•Farm has positive NWC, so it can pay its liabilities.

•Net Cash is slightly negative, meaning liquidity is tight. The farm may need extra cash in short term.

3) Simplified SWOT Analysis

Strengths

•Large farm area: 60 ha of market gardening

•Existing dairy herd: 20 cows already in production

•Acceptable mortality rate: 1.5% (below the 2% threshold)

•Strong owner's equity: 5,500,000 DA

•Significant fixed assets: land + buildings valued at 7,200,000 DA

Weaknesses

•Vegetable yield below regional average: 180 vs 200 Qtl/ha

•Low milk output per cow: 4,200 vs 4,500 L benchmark

•Negative net cash: −70,000 DA (daily liquidity problem)

•Heavy long-term debt: 3,000,000 DA still outstanding

Opportunities

- Genetic improvement potential to reach the 4,500 L/cow benchmark
- Room to close the 20 Qtl/ha yield gap through better practices
- Possibility to add value by processing milk into cheese on-farm
- Potential access to agricultural subsidies or soft loans

Threats

- Competition from more productive farms in the region
- Drought risk affecting vegetable yields
- Rising input prices (fertilisers, animal feed)
- Existing tax debt may worsen if cash flow is not improved

End of Chapter 05