

Sequence 2 : The farm model

Unit 2 : Multi-annual decisions in an annual model

Lesson 17 : Cash-flow

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ModelEco

Cash-flow needs and sources

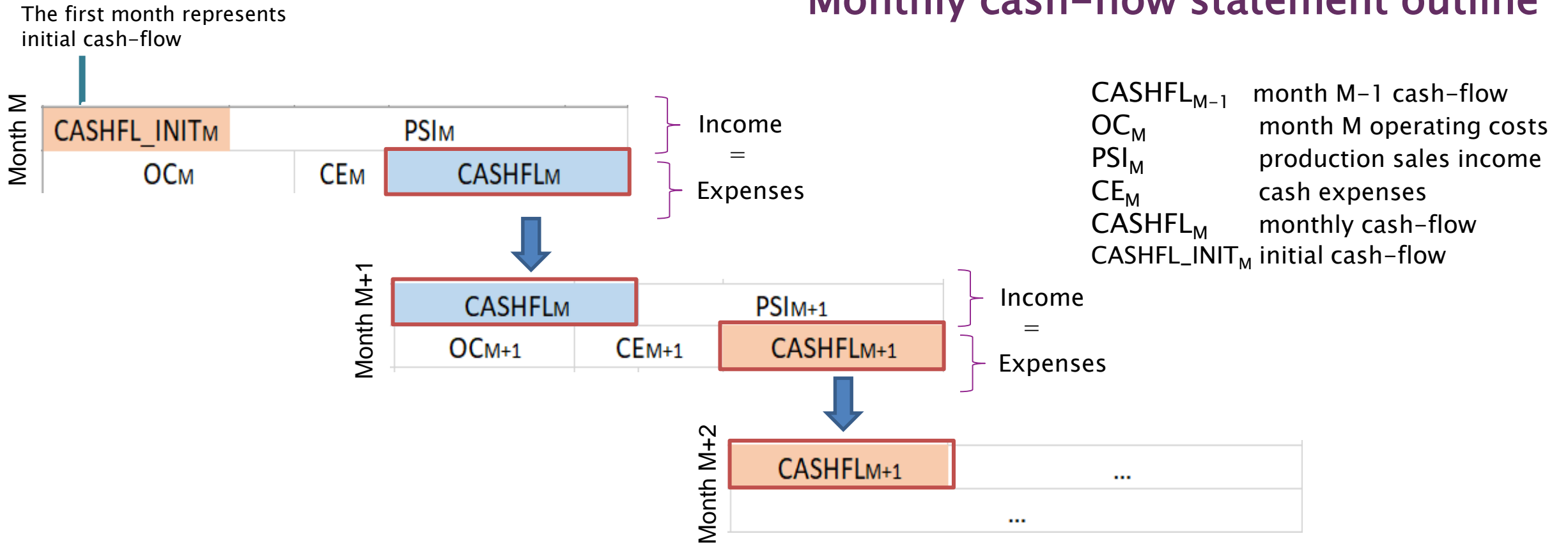
Year-round expenses

⇒ Limits to intensification

⇒ Impacts the choice of production

	Expenses	Income
For each period	<ul style="list-style-type: none"> - Purchase of production factors - Household consumption - Farm fixed costs 	<ul style="list-style-type: none"> - Crop and production sales - Household external incomes

Monthly cash-flow statement outline



Constraints : $CASHFL_{M-1} + P_{S}I_{M} = O_{C}_{M} + CASHFL_{M} + C_{E}_{M}$

In GAMS CASH_{M-1} is written : cash (M-1)

Loan opportunity

Constraints :

$$\text{INCOME} = \text{EXPENSES}$$

$$\text{CASH}_{M-1} + \text{REC}_M = \text{CO}_M + \text{CASH}_M + \text{DM}_M$$

$$\text{CASH}_{M-1} + \text{REC}_M + \text{EMPT}_M = \text{CO}_M + \text{CASH}_M + \text{DM}_M + t_x * \text{EMPT}_M + \text{EMPT}_{M-1}$$

- Cash can be invested in the short-term
- Possibility of an initial cash flow
- Do not forget to introduce the cost of the loan and the income from possible investments in the objective function

Data for the example

- ▶ UAA : 100 ha
- ▶ Fixed costs (paid monthly) : 30500€/year
- ▶ Household withdrawal : 2000€
- ▶ Initial cash-flow : 30500€
- ▶ Possible crops : wheat, sugar beet, barley
- ▶ Costs :

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Complete the model

Monthly costs per crop (€)												
Month	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Wheat	0	10	130	90	10	10	0	210	0	110	0	0
Sugar beet	0	0	10	330	30	10	10	0	110	370	10	15
Barley	0	10	130	90	10	10	0	200	0	110	0	0

- ▶ Selling price (and month) : wheat 17€/q (M9), barley 14€/q (M9) and sugar beet 38€/t (M12)
- ▶ Yields : wheat 70q/ha, barley 72€/q and sugar beet 50t/ha
- ▶ Annual loan interest rate : 11%