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Using supply chain information for EMA – the case of a Vietnamese coffee exporter

Tobias Viere & Stefan Schaltegger
Centre for Sustainability Management
LEUPHANA University of Lueneburg
viere/schaltegger@uni-lueneburg.de

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UNIVERSITÄT LÜNEBURG

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Introduction – Coffee and the environment in Vietnam

- Vietnam is the second biggest coffee producer of the world after Brazil and a mass market producer of low price Robusta coffee
- The market for sustainable, organic, and fair trade coffees is still small (< 2% world market share) and mainly related to Arabica coffee
- Particular environmental concerns of coffee production in Vietnam:
  - soil erosion, loss of biodiversity, land use due to the industry's rapid growth and expansion of farm land intensive use of fertilisers, herbicides and pesticides
  - water consumption and highly polluted waste water in wet processing of Arabica coffee (very high BOD, COD, very low pH).
  - energy use and energy-efficiency, especially in coffee drying.

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The coffee exporter's EMA decision-making situation

- Medium-sized coffee export company in Ho Chi Minh City (about 100 employees)
- The company purchases green coffee beans from farmers and middlemen, refines the beans, and exports them to Europe
- The company's direct exposure to environmental concerns is low, while the supply chain's exposure is rather high
- Motivation to use EMA: To identify if and how environmental aspects are relevant for the business success:
  - internally: reduction of refining costs
  - Externally: environmental improvements within the supply chain may lead to financial benefits (lower purchasing costs, better international reputation of Vietnamese coffee)

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The coffee exporter's EMA decision-making situation

		Environmental Management Accounting (EMA)			
		Monetary EMA (MEMA)		Physical EMA (PEMA)	
		Short Term Focus	Long Term Focus	Short Term Focus	Long Term Focus
Past Oriented	Routinely generated information	e.g. environmental cost accounting 1	e.g. environmental induced capital expenditure and revenues 2	e.g. material and energy flow accounting 9	e.g. natural capital impact accounting 10
	Ad hoc information	e.g. ex post assessment of environmental costing decisions 3	e.g. environmental life cycle (and target) costing 4	e.g. ex post assessment of short term environmental impacts 11	e.g. life cycle inventories 12
Future Oriented	Routinely generated information	e.g. monetary environmental operational and capital budgeting 5	e.g. environmental long term financial planning 6	e.g. physical environmental budgeting 13	e.g. long term physical environmental planning 14
	Ad hoc information	e.g. environmental job costing, environmental pricing 7	e.g. monetary environmental investment appraisal 8	e.g. short run environmental impacts 15	e.g. life cycle analysis of specific project 16

Adapted from Burritt R.; Hahn, T. & Schaltegger, S. (2002): Towards a Comprehensive Framework for Environmental Management Accounting, Australian Accounting Review, Vol. 12, No. 2, 39-50.

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EMA application (internal focus) - physical perspective

Input		Output	
item	physical amount	item	physical amount
green beans	1000 kg	green beans grade A	430 kg
water	0.035 m3	green beans grade B	370 kg
electric energy	40 kWh	green beans grade C	60 kg
		green beans grade D	55 kg
		green beans for local market	75 kg
		dust	2 kg
		weight loss	8 kg
		waste water	0.035 m^3

- Physical inputs/outputs show very low consumption of electric energy and water per ton of green beans (the energy and water demands of coffee cultivation and processing are more than 100 times higher).
- Solid wastes account for only 1% of total output.

→ The environmental relevance of the exporter's operations is rather low

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EMA application (internal focus) - monetary perspective

- Water and electricity costs are below 1% of total costs.
- Solid waste mainly consists of the purchased valuable raw materials
- In addition, non-wanted products like green beans grade D and beans for local market are not making any profit.
- The EMA application for grade B coffee shows that its profitability per ton of final product could be increased by almost 40% if solid waste and non-wanted products are reduced to zero.
- Reduction to zero is not possible, but the potential rise in profits shows that incentives and premiums for the suppliers to deliver higher qualities of coffee should be considered.

→ Material-related environmental issues (waste, non-wanted products) are financially relevant. The reduction of waste and non-wanted products is likely to increase the profitability.

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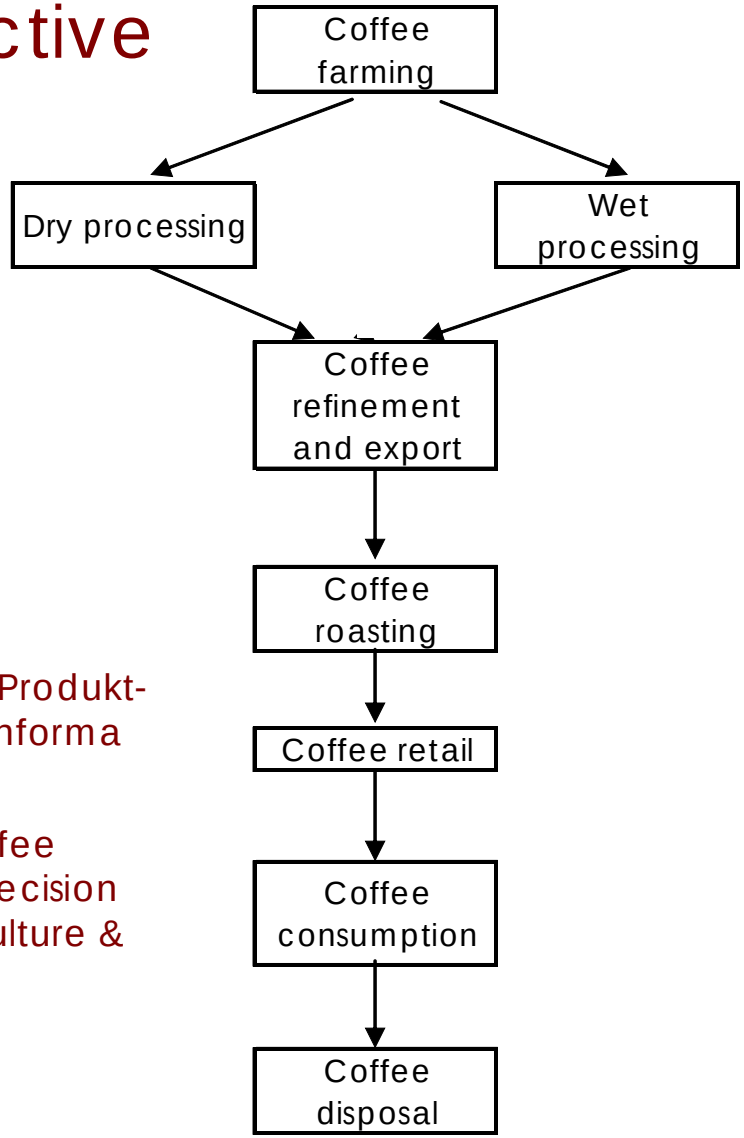
EMA application (supply chain focus) physical perspective

- Results of Life Cycle Assessments help to identify the coffee supply chain steps with the highest environmental importance
- From a decision making point of view these are starting points for environmental improvement measures



Coffee LCA sources:

Diers, A.; Langowski, H. C.; Pannkoke, K. & Hop, R. (1999): Produkt-Ökobilanz vakuumverpackter Röstkaffee, Bayreuth: Eco-Informa Press.

Salomone, R. (2003): Life cycle assessment applied to coffee production: investigating environmental impacts to aid decision making for improvements at company level, Food, Agriculture & Environment, Vol. 1(2), 295-300.

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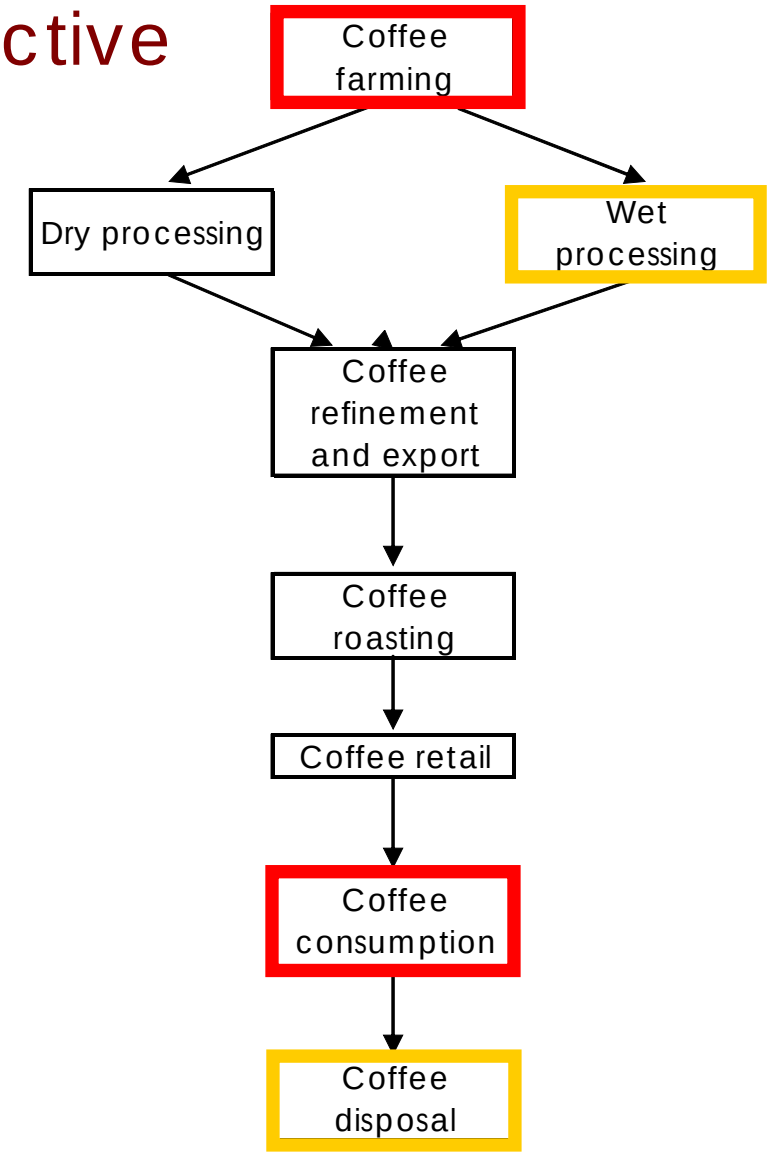
EMA application (supply chain focus) physical perspective

- Coffee farming and coffee consumption show the highest environmental importance
- Wet processing and coffee disposal are further important steps (wet processing not relevant for Robusta coffee)
- The environmental impact of all other steps including transportation is not significant



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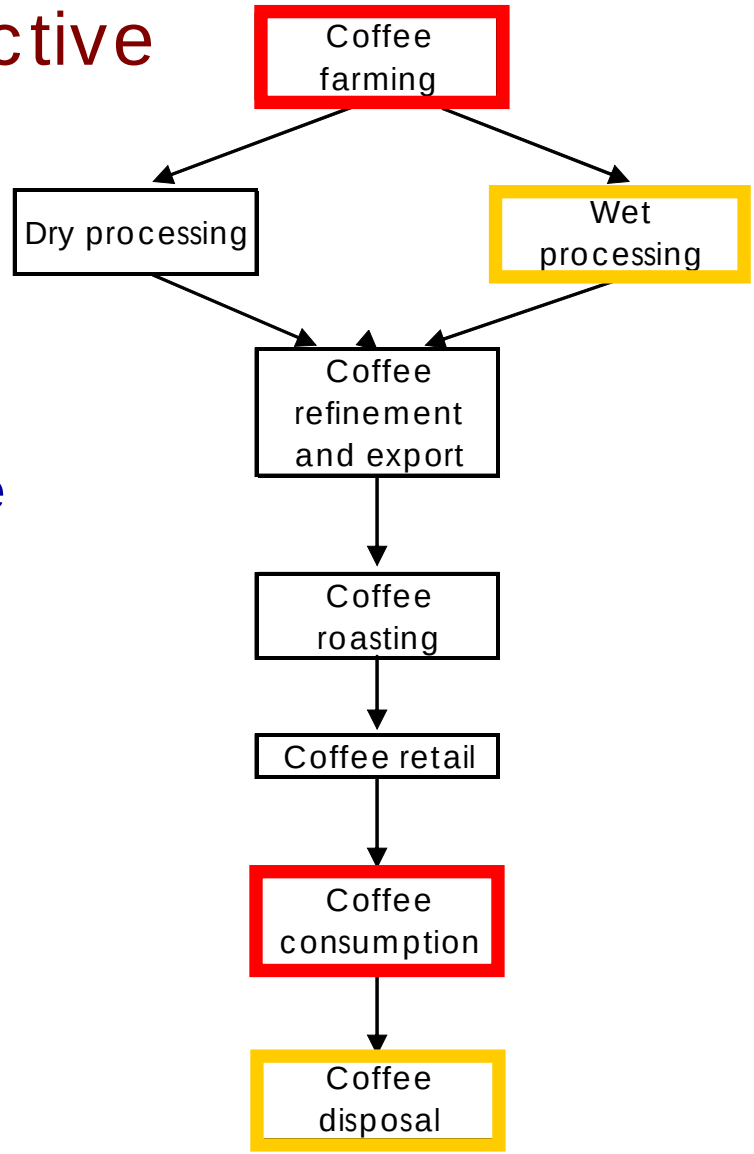
EMA application (supply chain focus) physical perspective

Examples of measures to reduce environmental impacts:

- **Coffee cultivation:** avoidance or reduction of fertilizer use
- **Wet processing:** proper waster water treatment and more efficient water use
- **Consumption:** Increased energy efficiency, e.g. substituting electric coffee machines with plunger pots, avoidance of pouring one cup of coffee per can on average, using thermos bottles instead of leaving coffee on the hot plate.
- **Disposal:** Ensuring proper composting



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EMA application (supply chain focus) monetary perspective

Supply chain costing can be used to analyse the financial relevance of the environmental issues in various supply chain steps, for example, it is estimated that Vietnamese farmers overdose fertilisers by almost 100%:

→ Proper use of fertilisers reduce fertiliser costs by 50% and total production costs of the farmer by almost 20%.

→ Better use of fertilisers is relevant for the whole supply chain (higher profits for farmers and/or lower purchasing costs for following steps)

References for supply chain costing:

Cullen, J.; Berry, A.J.; Seal, W.; Dunlop, A., Ahmed, M. & Marson, J. (1999): Interfirm Supply Chains – the contribution of management accounting, Management Accounting, June 1999, 30-32.

LaLonde, B.J. & Pohlen, T.L. (1996): Issues in Supply Chain Costing, The International Journal of Logistics Management, Vol. 7, No. 1, 1-12.

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EMA application (supply chain focus) monetary perspective

- To realise eco-efficiency improvements of the supply chain, the exporter could for example initiate **trainings** to teach farmers on the efficient use of fertilisers.
- **But who guarantees that the exporter and not competitors benefit from the savings?** → Typical question for environmental supply chain management.
- One option to overcome this problem is to co-operate with competitors and coffee associations to **jointly** set up trainings which benefit the whole Vietnamese coffee industry.

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Conclusions

- The case study reveals that a proper consideration of physical and monetary supply chain information supports corporate decision making and eco-efficiency measures.
- LCA information support the **identification of environmental "hot-spots" within the supply chain.** Ideally, this information is complemented by real data of the specific case to avoid misjudgements.
- **The integration of this information into supply chain costing** increases the decision making relevance for companies within the chain.
- Establishing ethical **standards** (fair trade, organic, shade grown, sustainable coffees) is one way to increase the sustainability of coffee production. **Eco-efficiency improvements at both ends** of the supply chain, namely cultivation and consumption or making of coffee, is another valuable approach.

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Thank you!

Tobias Viere & Stefan Schaltegger
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