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Swedish University of Agricultural Sciences



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University training for industrial wood supply management

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Wood supply management (1930)

The logging superintendent's duty

“to see that the log pond (mill stock) is kept full of logs in order that the mill may never have to wait”.

“a certain polite, but exceedingly intense, rivalry is maintained between him and the mill boss. They go through life in a state of armed neutrality. The mill boss only has one big ambition... that some day, something will happen to the logging department that will allow him to cut every log in the pond and have something to hold over the logging superintendent for the rest of his life”

Hosmer (1930)



Wood supply training

With time, industrial wood supply has required increasingly precise flows of an increasing number of assortments. Analysis and planning skills are now **keys to competitiveness.**

The presentation gives the status of SLUs sector-initiated training in wood supply management including:

- framework of professional tasks/learning outcomes**
- course structure with supporting exercises**
- reflections.. on further development opportunities

Building on the basic supply chain planning matrix*

Level	Wood supply	Milling
Strategic goals (3-5 years)	Development of supply structure	Development of mill capacity
Tactical coordination (monthly - yearly)	Supply volumes per supply unit	Production volumes per mill
Operational scheduling (daily - monthly)	Tracts to machine teams Roadside stocks to transporters	Orders to processing

*Carlsson & Rönnqvist (2005)



Framework of professional tasks within wood supply

Level	Task
Strategic	Analysis of trends for development of supply sources and transport infrastructure (ports, terminals, road networks) including -Desired supply structure with expected wood flows per source -Desired harvesting and transport systems (source-specific)
Tactical	Supply planning for whole organization including -Matching budgets and prognosis per supply unit -Planning of flows and stocks per supply/demand unit Wood purchase/barter Harvest and transport capacity contracting
Operational	Delivery scheduling per supply unit and function including -Harvest production planning and scheduling to match mill orders (including bucking instructions) -Transport delivery planning and scheduling to meet delivery schedules
Control and coordination of supply operations	



Corresponding learning outcomes

No.	The ability to...
LO1	Specify product- and process-specific raw material characteristics and calculate wood consumption volumes
LO2	Develop goals for wood supply structures and systems
LO3	Develop a supply plan which balances supply and demand
LO4	Evaluate and contract wood suppliers
LO5	Evaluate and contract service providers
LO6	Develop production plans for harvesting
LO7	Develop delivery plans for transport
LO8	Develop business processes and information systems to improve control and coordination of wood supply operations

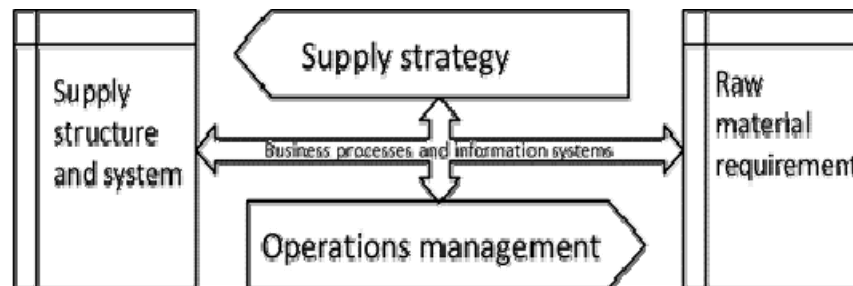
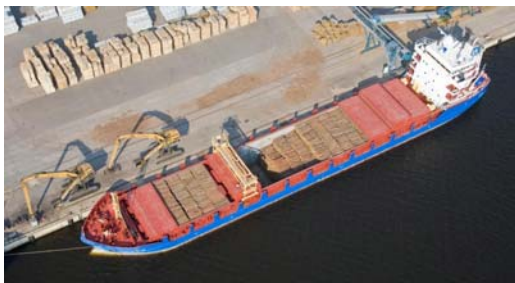
Learning outcomes can be split at different levels in order to group the tasks into course or modules of suitable size to meet program ambitions.



Master's level training

Packaged in one year with **4 core courses** (45 ECTS credits, 1200 hrs) and 2 electives (15 ECTS credits, 400 hrs)

	Core course	LO	hrs
1	Product/processing/raw material requirements	1	200
2	Supply strategy	2-4	400
3	Supply operations management	5-7	400
4	Business processes and information systems	8	200





Alternative configurations

3 courses

(37,5 ECTS credits, 1000 hrs*)

	Core course	LO	hrs
1	Product/processing/raw material requirements	1	200
2	Supply strategy	2-4	400
3	Supply operations management w/business processes	5-7	400

1 course

(10 ECTS credits, 270 hrs*)

	Module	LO	hrs
2.1	Infrastructure	X	60
2.2	Supply Strategy	2,3	40
3.1	Production planning	5,6	20
3.2	Transport planning	5,7	120
3.3	Coordination and control	8	30

* Both configurations assume introductory course at bachelors level



Training approach



Case-based exercises are the “backbone” of training

Students’ present plans/solutions for sector representatives. (demanding, but more realistic with better feed-back).

“**What if**” **scenarios** and contingency planning to develop student ability to adapt and improve.



Multiple exercises per LO gives understanding of both context and task

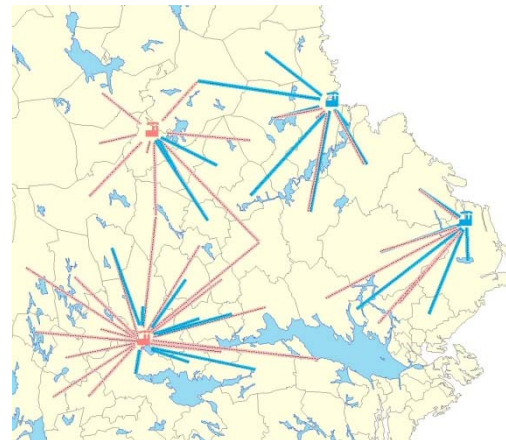
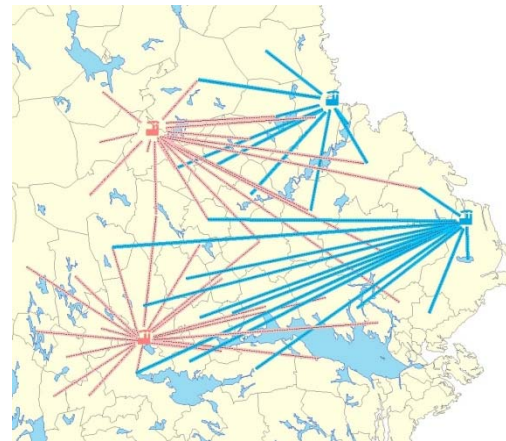
Learning outcome (LO)	Exercise (EX)
LO5. Evaluate and contract service providers	EX5.1 Given an understanding of service pricing and contracting forms for harvesting and hauling <ul style="list-style-type: none">- use key financial indicators to evaluate financial status of service providers- calculate payment rates for service providers
	EX5.2 Given an understanding of rail and ship transport practices <ul style="list-style-type: none">- specify capacity requirements and delivery schedules- calculate pricing for a transport system solution
LO6. Develop harvesting production plans to match mill orders	EX6.1 Given an understanding of harvesting team productivity and seasonal considerations for a typical supply unit <ul style="list-style-type: none">- allocate individual tracts to specific harvesting teams in order to fulfil goals for monthly mill orders and machine capacity utilization- calculate wood sales incomes, operating costs and net income
LO7. Develop truck transport plans to match delivery schedules	Given an understanding of transport capacity and transport management <ul style="list-style-type: none">EX7.1 Periodically re-balance wood flows between current landings and mills to minimize transport costsEX7.2 Break down monthly volumes to weekly quotas and allocate these to haulersEX7.3 Route individual trucks to fulfil weekly quotas and maintain high capacity utilization



Exercises from partner research organizations

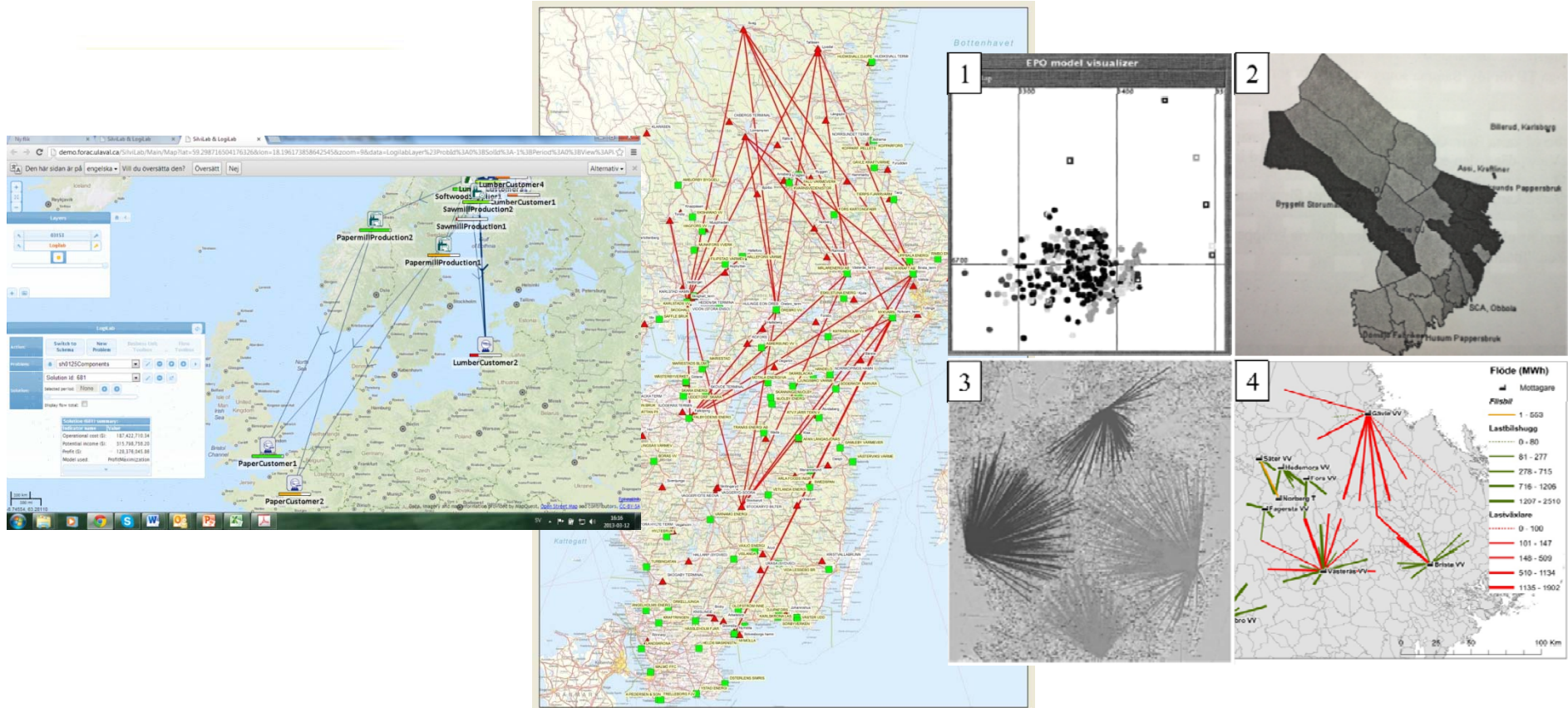
MoRe Research

Wood trade negotiation





Flow planning in different software





SC coordination training in a virtual environment



Informations
Team: Patate
Week: 1 of 10

Costs
Inventory cost: 0\$
Back order cost: 0\$
Total cost: 0\$
Average cost: 0\$

Customer order
4
Satisfaction: 100%

Inventory and back orders: 12

Forest operations
0
Submit

Supply plan					
1	8	11	21	31	41
2	8	12	22	32	42
3	8	13	23	33	43
4	8	14	24	34	44
5	8	15	25	35	45
6	8	16	26	36	46
7	8	17	27	37	47
8	8	18	28	38	48
9	8	19	29	39	49
10	8	20	30	40	50

Maximum harvesting: 300
Cumulative harvesting: 0

- Forest
- Paper mill
- Saw mill
- Lumber wholesaler
- Lumber retailer
- Paper wholesaler
- Paper retailer

Send



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Further development

Status

- the task-based framework facilitates a transition away from individual disciplines
- the core of master's level training in forest operations is managing supply operations.
- better anchored in the strategic and tactical planning of wood supply which frames the operational level.
- increased focus on coordination of the different stages of operations being managed.

Increased use of operations research (OR) methods

- further development requires an approach which balances training between understanding context and tasks versus learning methods for better solutions.



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