

# Planning and operations of NTFP supply chains – general challenges

AFF COMMUNITY OF PRACTICE ON NON TIMBER FOREST PRODUCTS  
(NTFPS) VALUE CHAINS, 1 December 2021  
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Operations Management of the Forest Supply Chain

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## SG0222

# Operations Management of the Forest Supply Chain

[Styrning av skogliga värdekedjor](#)

Planning and management of wood- and other bio-based supply chains are key for achieving customer value, profitability and an environmental friendliness. This course focuses on how bio-based value streams are adapted to fit the business strategy, and how sourcing, production and sales are managed for sustainability and value creation. Based on operation analysis it analyses resource needs, information management and coordination between supply chain actors. The course applies, among other topics, product calculation methods, forecasting, strategic production planning and inventory management. Life cycle assessment is included as analytical tool for sustainability management. It combines theoretical lectures, guest lectures, exercises and project work. The student works with problem

**Apply here**

- Business Administration, Forest science
- 15.0 credits
- 2022-03-24 - 2022-06-05
- English

Open my Canvas room

**Course admin**  
Anders Roos

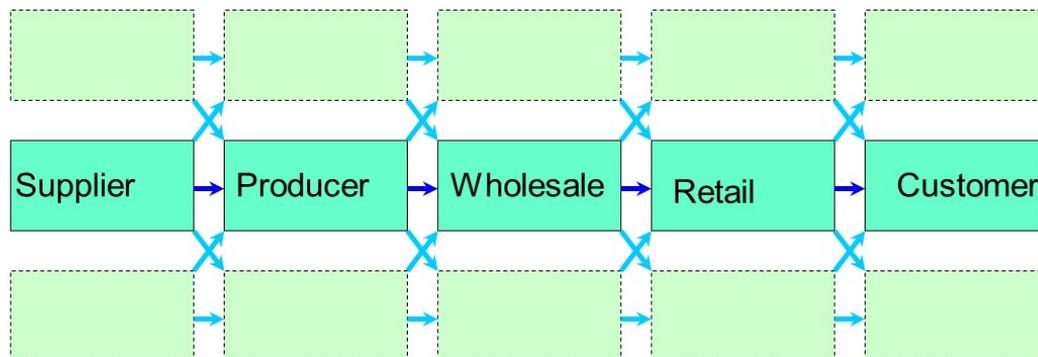
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## Content

- Supply chain management in NTFP- Basics
- Quality management
- Operations: 'running the supply chain'
- Sustainability

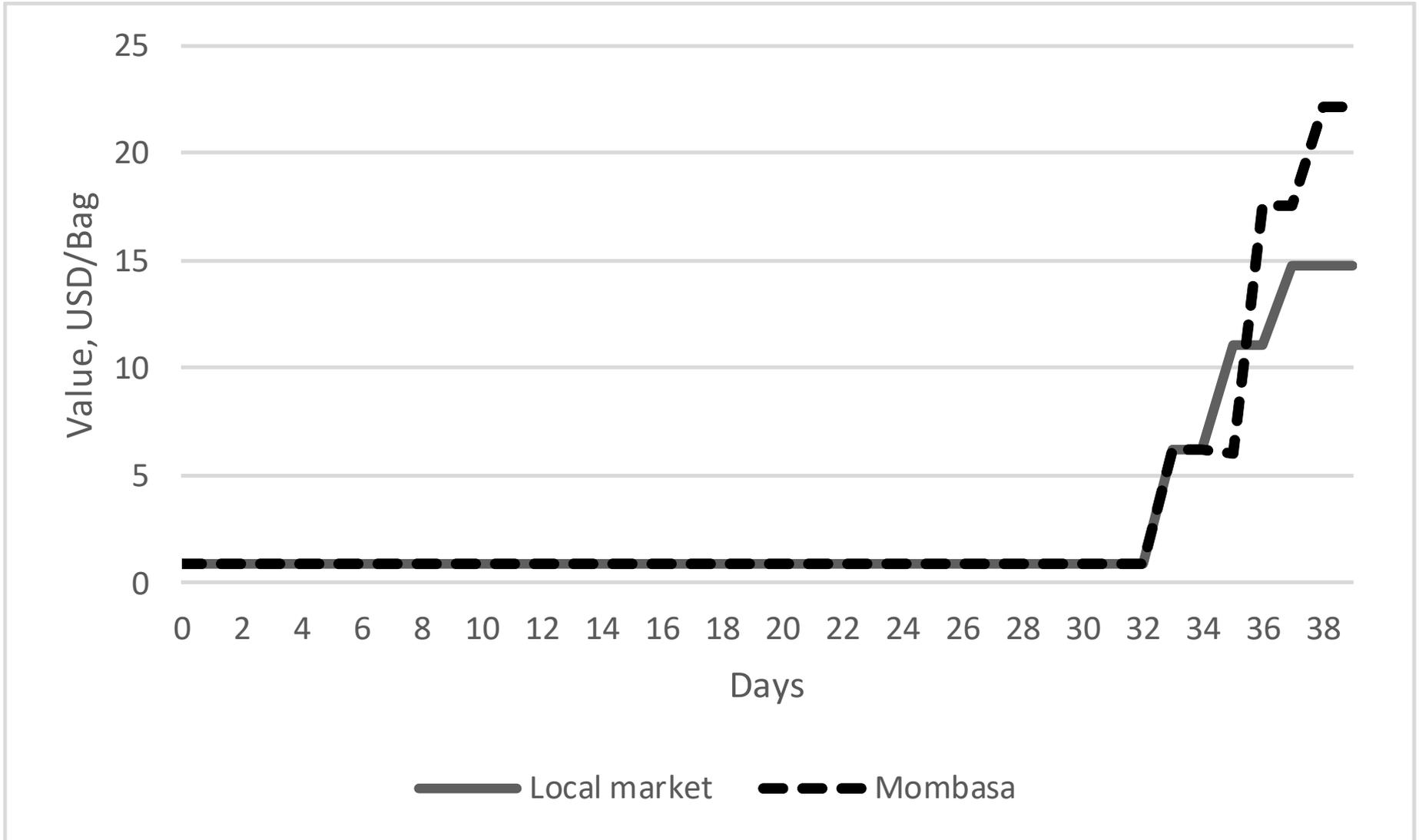
# **Supply chain management in NTFP- Basics**



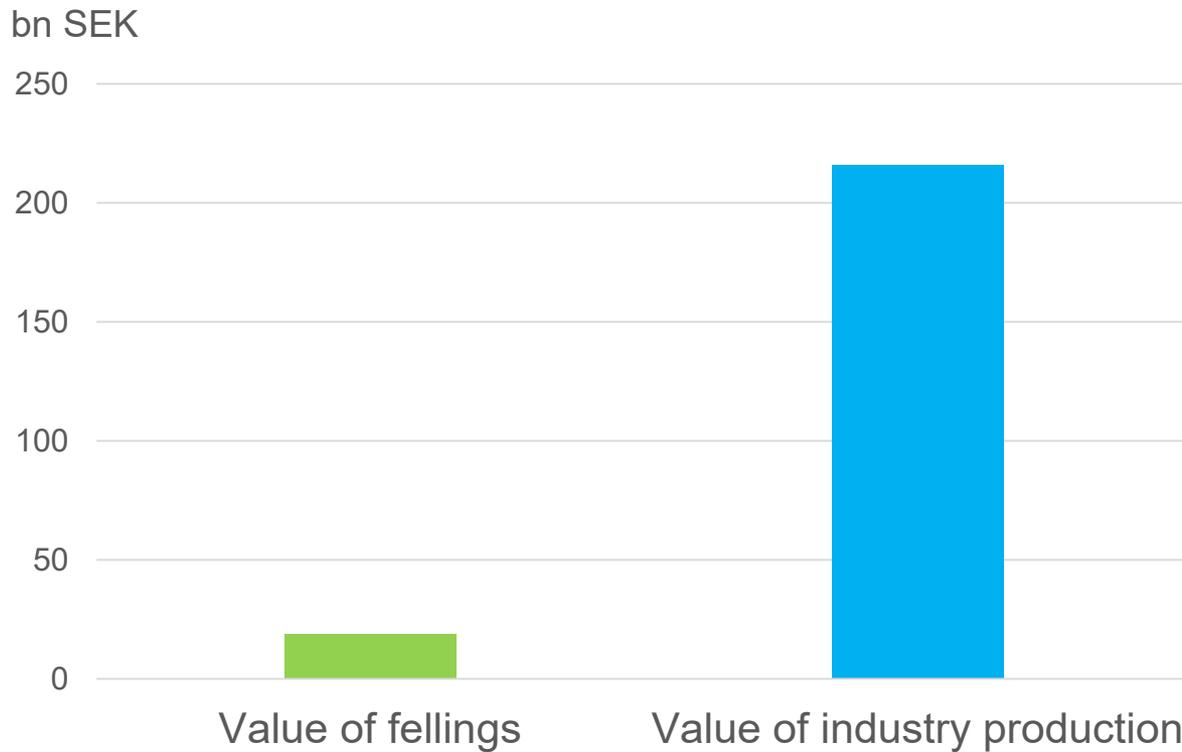
Flows	
Products	
Money	
Information	

***Supply Chain Surplus = Customer Value – Supply Chain Cost***

# Most value is created in the late parts of the value chain



# Value of fellings and forest industry production in Sweden



# How can supply chain surplus be created?

## Understand how value is created!

*“If you don't **understand the details** of your business you are going to fail.”*

Jeff Bezos

## Don't guess!

*“**Assumption** is the mother of all mistakes.”*

Eugene Lewis Fordsworthe

## Three decision phases

<b>Decision Phase</b>	<b>Time horizon</b>	<b>Examples</b>
<b>Strategy or design</b>	> 1 year	<ul style="list-style-type: none"><li>• Planting trees</li><li>• Build processing factory</li><li>• Business systems</li></ul>
<b>Planning</b>	3 months – 1 year	<ul style="list-style-type: none"><li>• Planning harvests</li><li>• Planning deliveries</li></ul>
<b>Operations</b>	Days/weeks	<ul style="list-style-type: none"><li>• Daily/weekly harvests</li><li>• Picking orders in inventory</li><li>• Transport scheduling</li></ul>

# Responsiveness versus Efficiency



## Responsive

Creative

Flexible

High price

Example: Exclusive wood carvings



## Cost efficient

'Standard' products

High quantities

Low price

Example: Charcoal

Influences how operations are organized, e.g. "push" or "pull"

# Quality management

# What is quality?

The **customer defines quality!**

- It's about: Meeting and exceeding customer expectations

*“The totality of features and characteristics of a product or service that bears on its ability to satisfy stated or implied needs”*  
**(American Society for Quality)**



# Charcoal quality – Niger

	Percent of respondents*
Quality tree species	97
Quality of the charcoal	94
Price	91
Availability	78
Packaging	67
Courtesy	66
Credibility	42
Deliver to home	23
Percent of respondents answering "4" or "5" on a five-step scale of importance	



# Quality is created by all involved and what they do



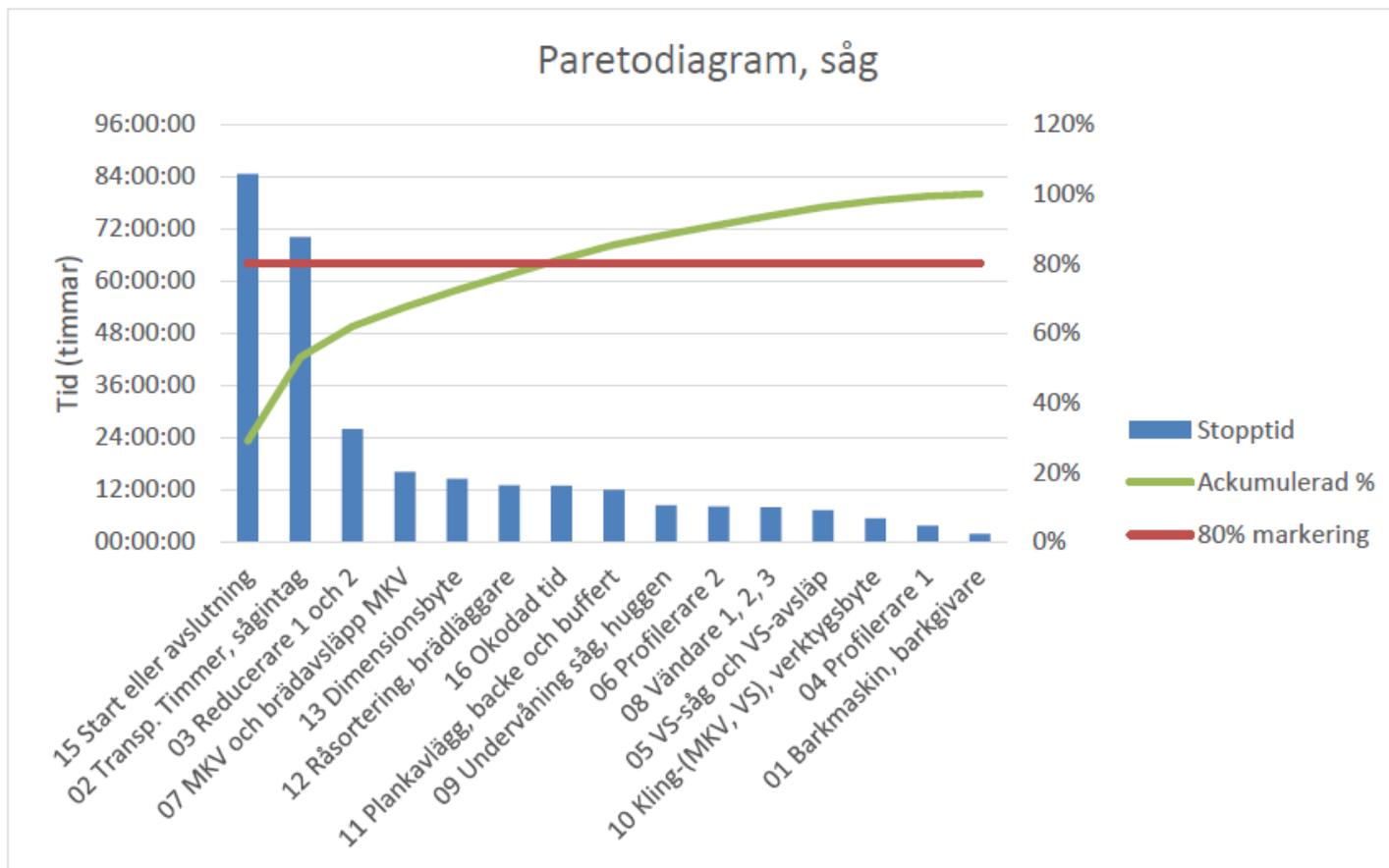
## **How is quality achieved? (some principles)**

- Strategically based (support from the top)
- Customer focus
- Scientific approach (measure)
- Teamwork
- Continual process improvement (learn and improve)
- Employee involvement and empowerment

There is a quality management toolbox

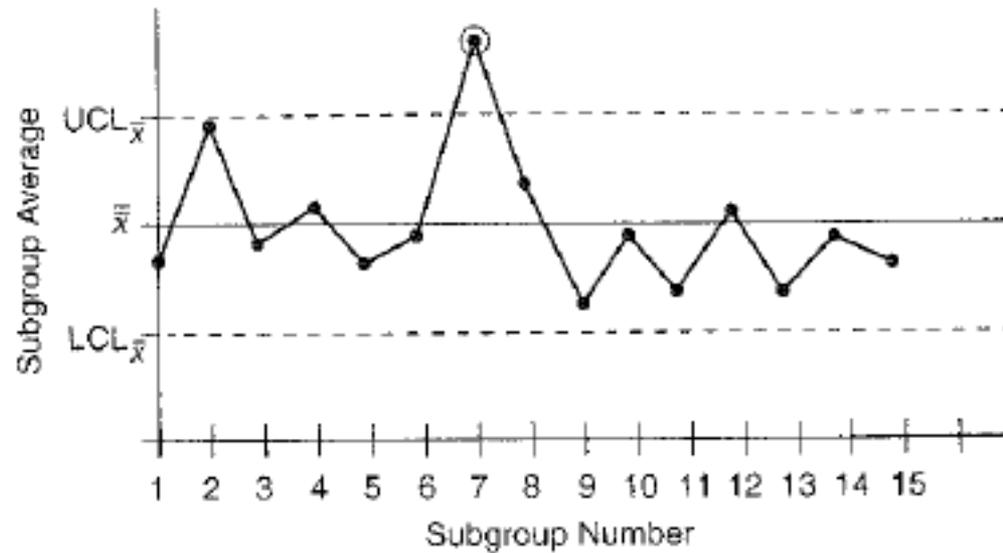


# Pareto Chart



Figur 16. Pareto-diagram som visar vilka stoppsaker som bidrar mest till den stillastående tiden för sågverket.

Kristin Olovsson 2020: Lead times in the sawmill industry - an analysis of flows and processes



**FIGURE 8** Chart for an Unstable Process

Unstable process. "subgroup 7" is outside limits. Unlikely this is because of "natural" variation. Untrained operator? Some other event? Remove "7" and re-calculate!

# Beware of measurement excess...



- However.....
- "Measurement" also takes time and resources....

**Operations: 'running the supply chain'**

# Planning the production

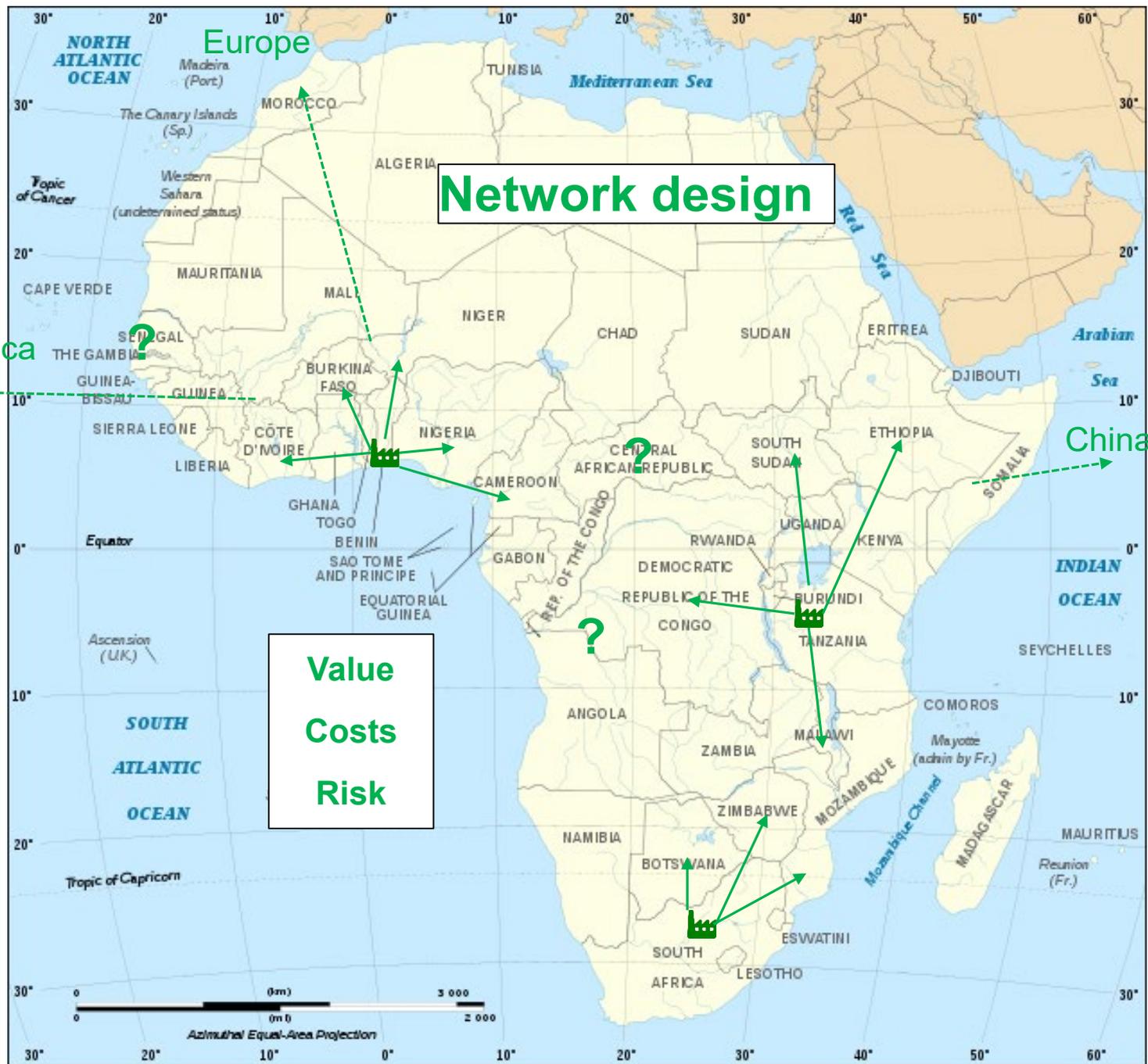
- Forecasts
- Production scheduling
- Material Resource Planning:  
raw materials, component,  
subassemblies, finished  
products

*Know what you can promise  
And keep your promises*

Time, risks

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Network design

Value  
Costs  
Risk

America

China

# Plant Location Model

$n$  = number of potential plant locations/capacity

$m$  = number of markets or demand points

$D_j$  = annual demand from market  $j$

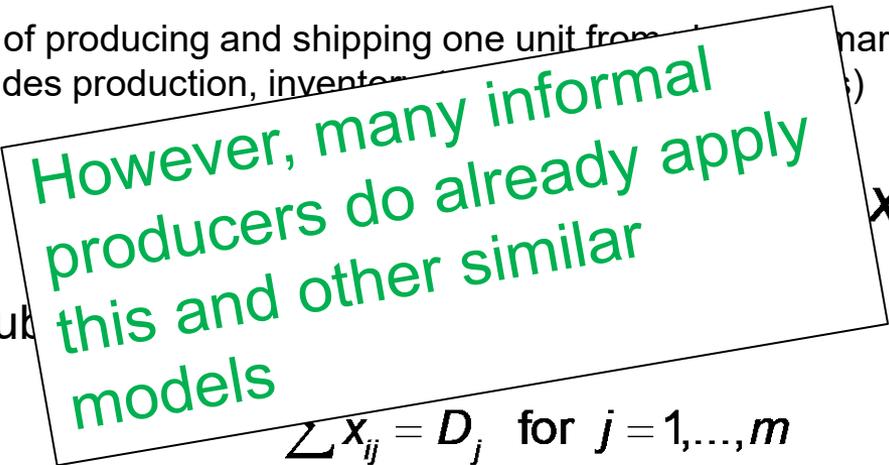
$K_i$  = potential capacity of plant  $i$

$f_i$  = annualized fixed cost of keeping plant  $i$  open

$c_{ij}$  = cost of producing and shipping one unit from plant  $i$  to market  $j$  (cost includes production, inventory, and shipping)

$y_i$  = 1 if plant  $i$  is open, 0 otherwise

$x_{ij}$  = quantity shipped from plant  $i$  to market  $j$

sub  


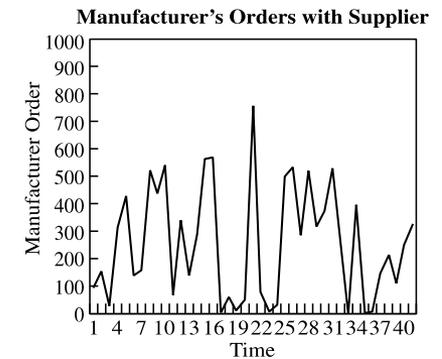
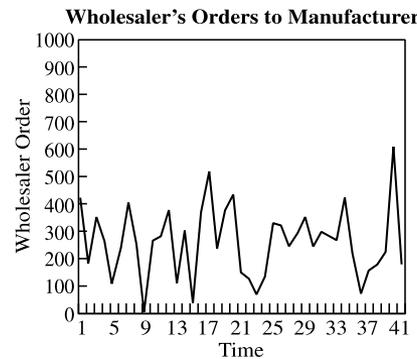
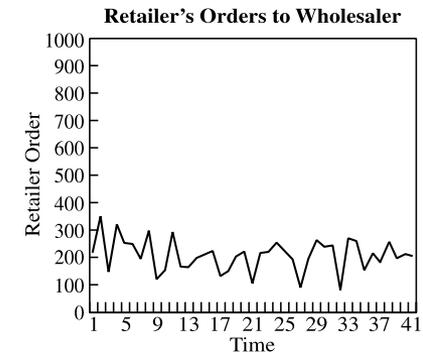
$$\sum_{i=1}^n x_{ij} = D_j \quad \text{for } j = 1, \dots, m$$

$$\sum_{j=1}^m x_{ij} \leq K_i y_i \quad \text{for } i = 1, \dots, n$$

$$y_i \in \{0, 1\} \quad \text{for } i = 1, \dots, n, x_{ij} \geq 0$$

# Bullwhip Effect

- Fluctuations in orders increase as they move up the supply chain from retailers to wholesalers to manufacturers to suppliers → **This increase costs**
- Reason: information filters, large batches, complexity



# Inventory management

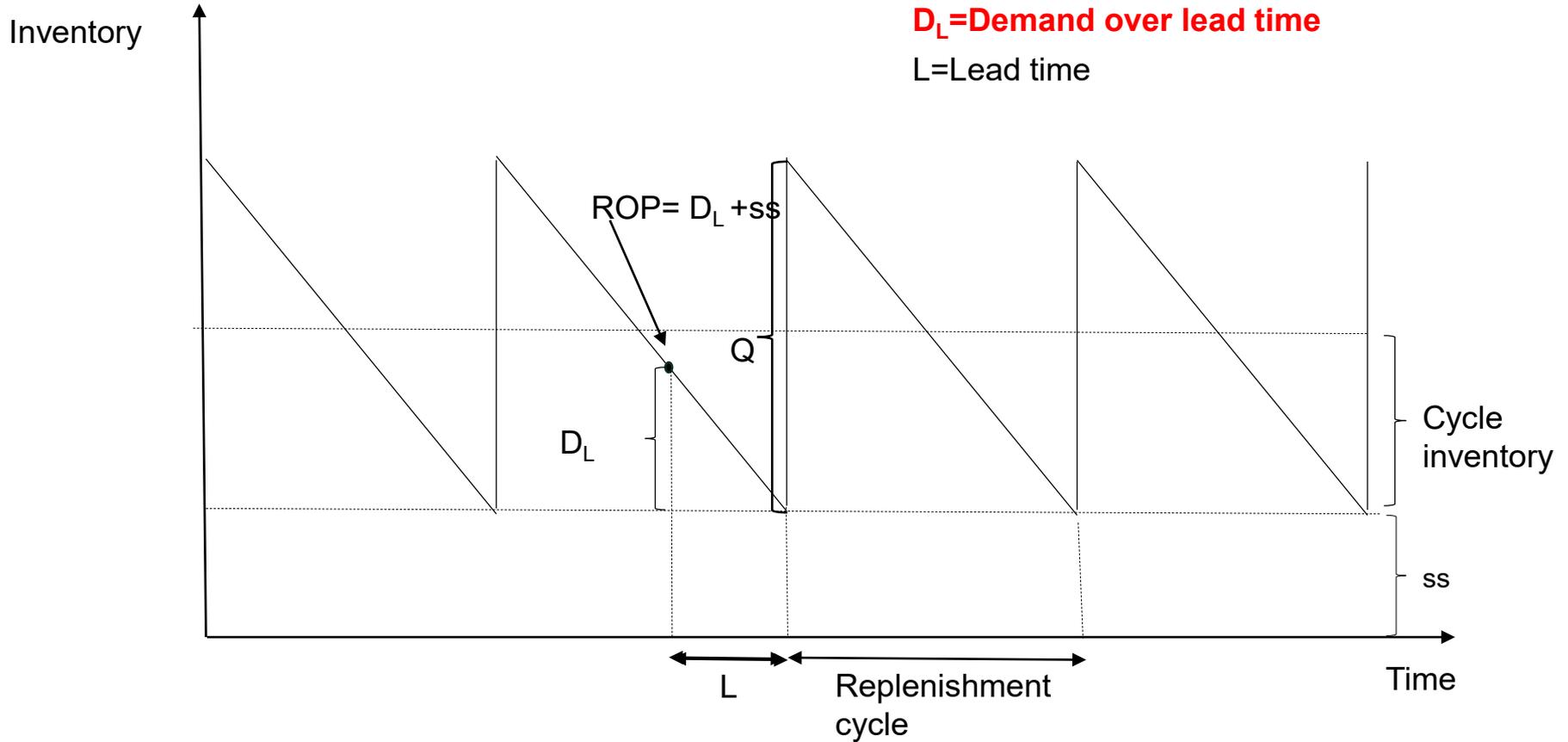
ROP=Reorder point

ss = Safety Inventory

Q=Order quantity

**$D_L$ =Demand over lead time**

L=Lead time



**Key aspects: Inventory costs – Availability (Fill rate) – Uncertainty**

# Sustainability

# Sustainable Business Model and NTFPs

## Business model canvas

**Value proposition:** (products and services, customer segments and relationships)

**Value creation and delivery** (key activities, partnerships, resources, and channels)

**Economic value capture** (cost structure and revenue streams)

Impacts  
of charcoal  
production on  
sustainability



**Feedback**  
of SDG status  
on charcoal  
business



## SDG status



# Where are the people in all this?

## Supply chain management is about people



## Conclusions

1. Most value is created in the value chain
2. Regulate wisely: Define responsibilities, rights
3. Join local knowledge with expertise for improvement





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