Strengthening forest value chains in a sustainable Swedish bio economy

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Six areas of R&I at Skogforsk

Forest-tree breeding for future climate and raw-material needs
Value chains and raw material use enabling the bio economy
Efficient and gentle operational systems
Silviculture for different goals

Clarify societal benefits of the forest
All possibilities in digitalisation

Value chains and raw material use enabling the bio economy

- Development and integration of forest value chains
- Enhance the full potential of forest biomass
- Describe properties, recover information
- Optimize value recovery
- Market orientation and customer order management

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Improved processes and products through digitalisation of forest value chains

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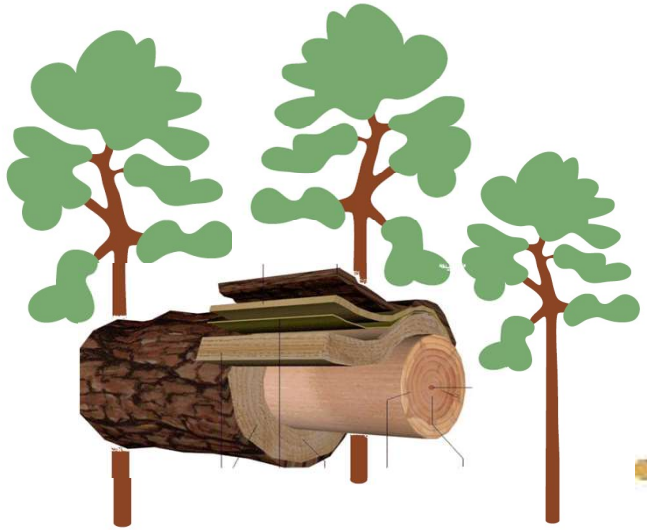

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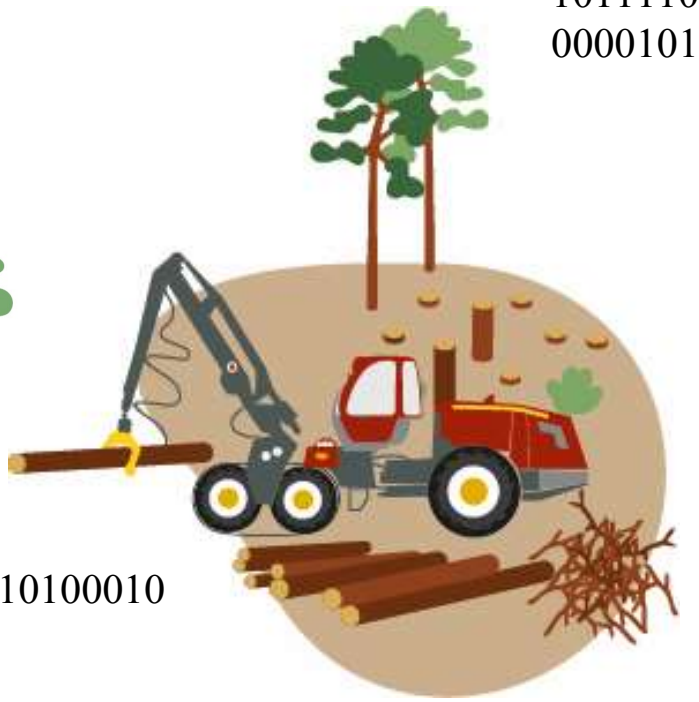

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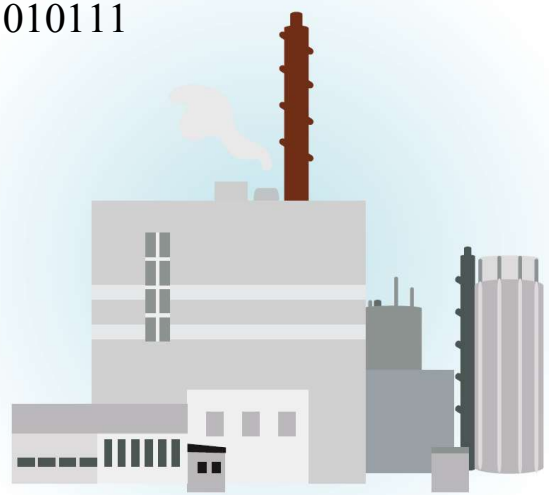


storaenso

SCA

PiiA

Process Industrial IT and Automation

Productify to communicate

effective management of forest fuel by well-specified fuel products

In March we need

1750 MWh of TRB - 8 and

1350 MWh of TRB - 13 ”

”1750 MWh TRB - 8 is OK!

But we have only 900 MWh of TRB - 13.

Can we deliver 450 MWh of TRB - 11

instead ? ”

Fuel product	Moist (M %)	Ash (A %)	Main fract. (P)	Fine fract. (F)	Orgin	
					1	2
TRB-8	M45+	A1.0	P45	F15	Woody biomass	Stem wood
TRB-11	M45	A3.0	P45	F15	Woody biomass	Logging residues
TRB-13	M45+	A3.0	P45	F15	Woody biomass	Logging residues

Product specifications

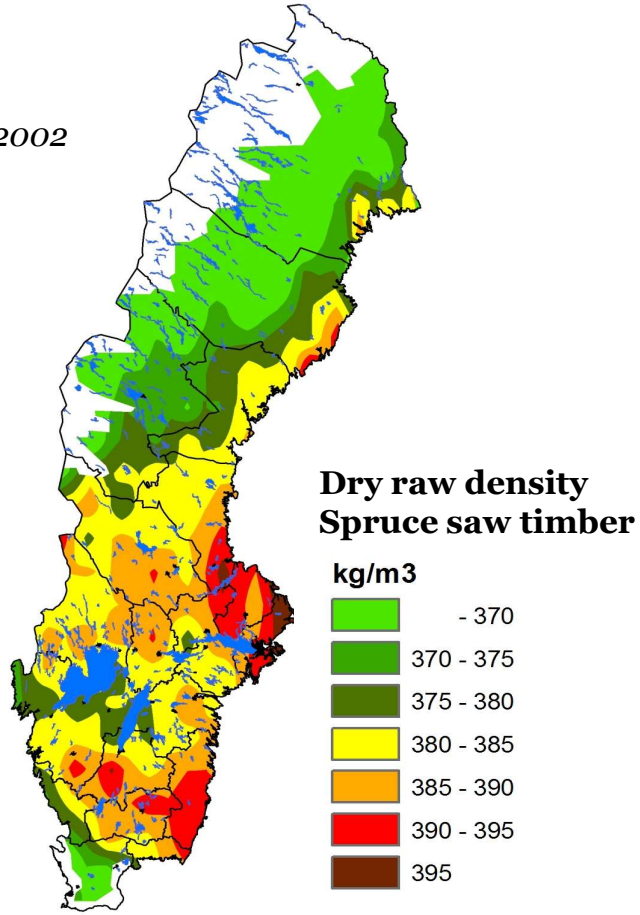
Followed in the production chain…

Feedback & control of prognosis & delivery

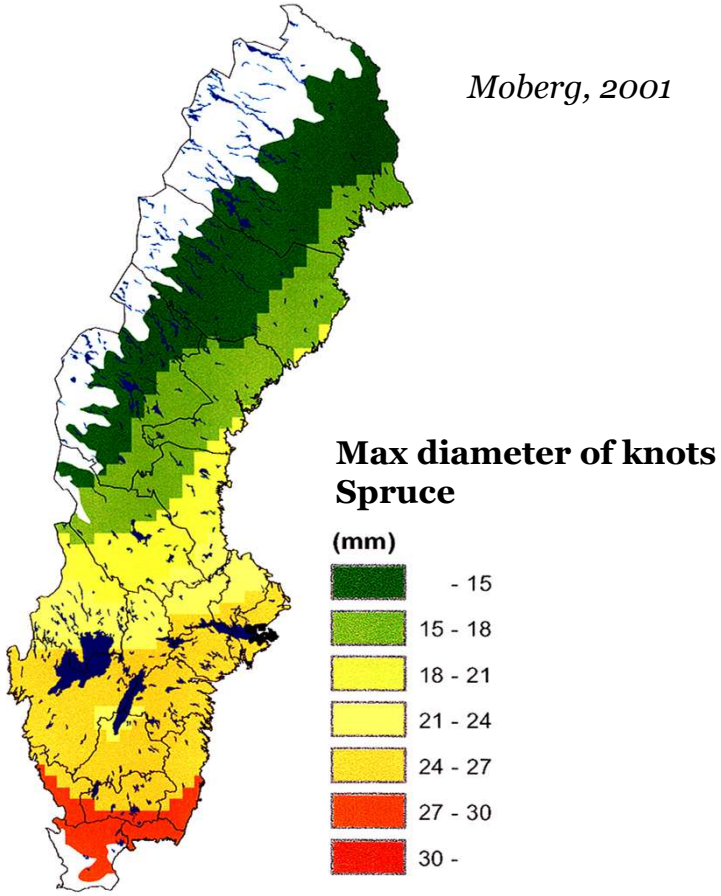
… with measurement data, experience and prognosis

Wood properties can be modelled

Moberg, 2004
Wilhelmsson et al, 2002



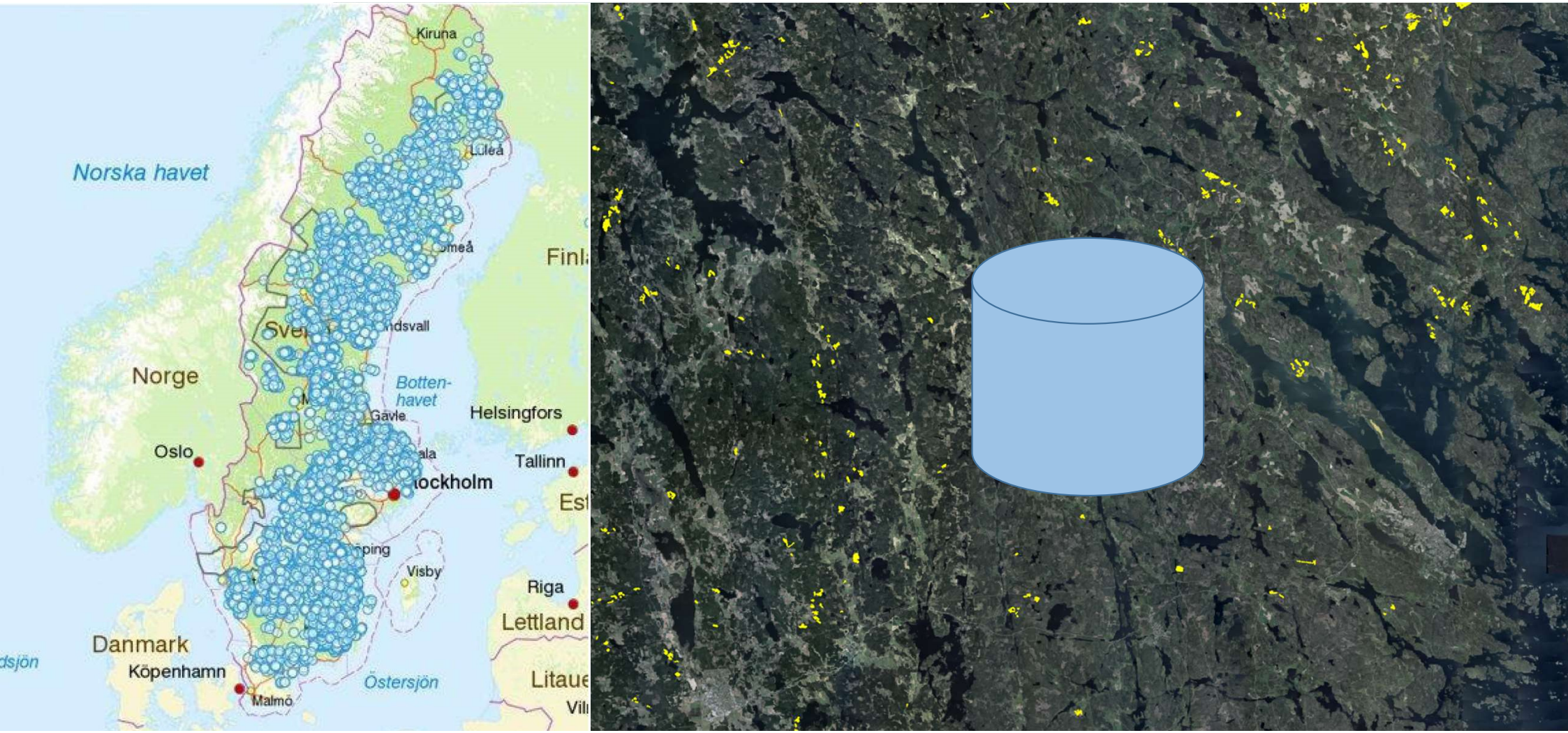
Moberg, 2001



StanForD 2010

- Global de-facto standard for communication with forest machines
- Detailed information on every log produced – big data!
- Harvester data + information from forest inventories are input data to calculation of wood properties in large scale

Harvester data is a key to large-scale use



Pre-study indicate strong potential!

- 60 harvesting sites – calculation of wood properties
- Properties – harvester data – X-ray
- Timber
  - 226.270 pine sawlogs
- Pulpwood
  - 297.271 pine pulplogs
    287.600 spruce pulplogs

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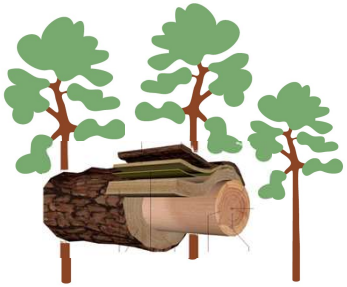
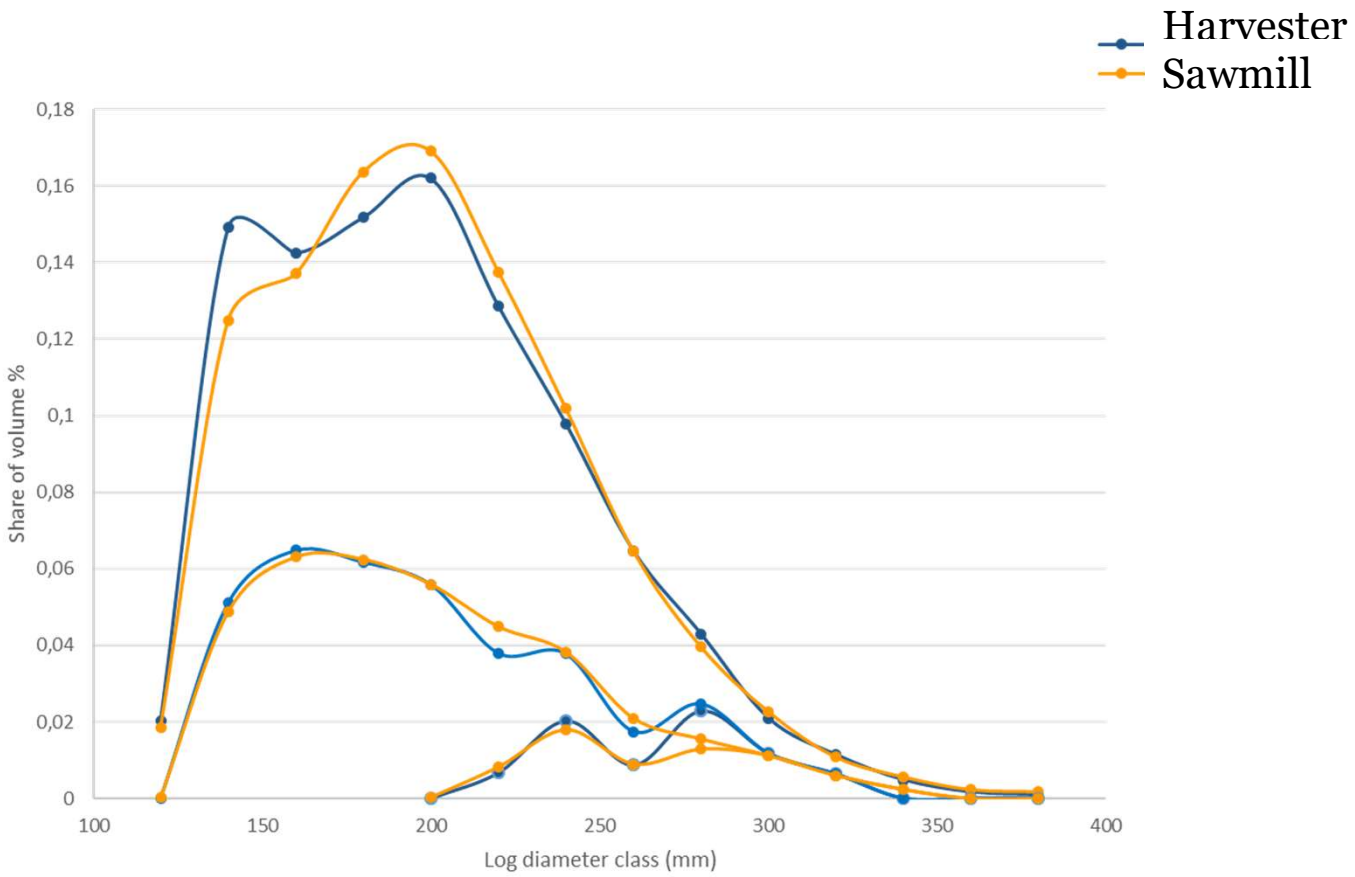
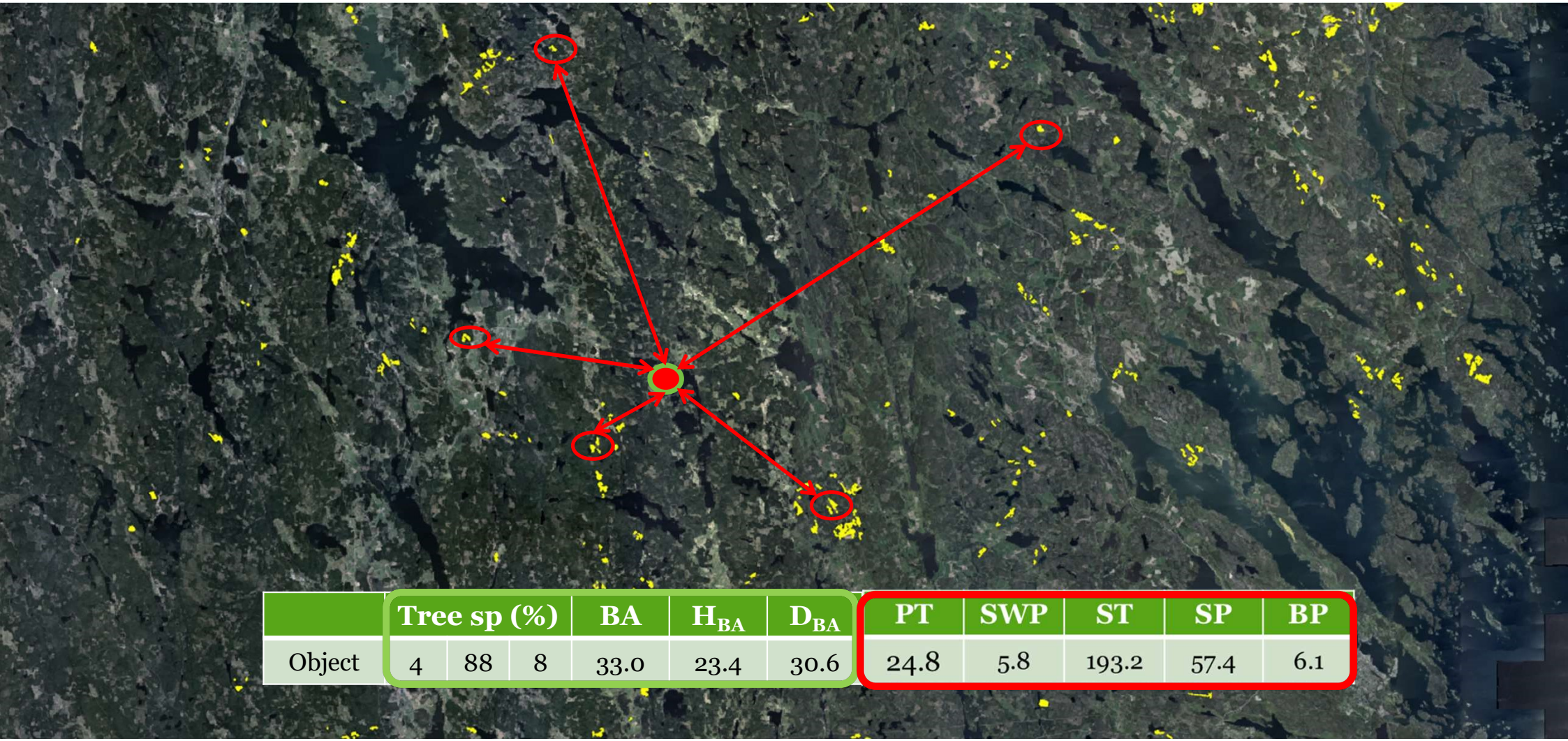


Calculated wood properties vs X-ray



Yield forecasts – imputation method (*k*MSN)



	Tree sp (%)			BA	H_{BA}	D_{BA}	PT	SWP	ST	SP	BP
Object	4	88	8	33.0	23.4	30.6	24.8	5.8	193.2	57.4	6.1

Conclusion

- Value chains and digitalization=hot topics for development
- Great potential in new knowledge and tools
- Standards and big data are strong enablers
- Knowledge of customer demands and communication are key to capture this potential