A multi-criteria decision support system for industrial forest plantations interactive management groups based on compromise programming

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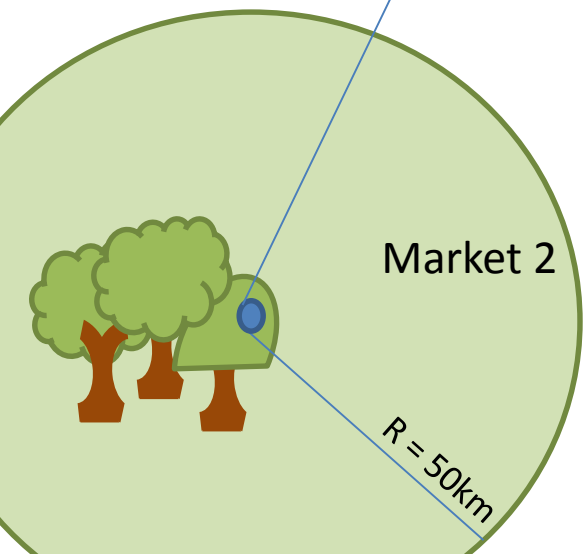
Case Study (1)

Methodology (2)

Results and Discussions (3)

Conclusions (4)

(1) Case Study



Area		20,423 ha
Management Units		36
Area of each unit		From 500 to 1,900ha
Prescriptions		Clear cut at 6 years old or Thinning at 4 – Final cut 9
Silvicultural Costs		R$ 9,500.00/ha
Pulp and Energy wood price		R$34/$m^3$
Sawn wood		R$155/$m^3$
Discount rate		4%
	Groups	Average Productivity (m^3/ha.year at 7 years old)
Species Eucalyptus spp	GenMat1	42
	GenMat2	48
	GenMat3	52

(2) Methodology

MOLP:
Maximize NPV
Min Market Balance Deviation

$$Eff \quad f(x_i, xMarket_{p,sp,prd,m}) = [Maximize\ NPV,$$
$$Minimize\ Market\ Balance\ Deviation]$$

$$Subject\ to$$

Extension of Model II formulation

$$Initial\ Area$$
$$Conservation\ of\ Area$$
$$AgeClass\ Control$$
$$AccountingVariablesCalculations$$
$$production, costs, revenues, areas, conversions \ldots$$
$$GeneticMaterialSecurity$$
$$Multicriteria\ Attribute\ Calculations$$
$$Deviations\ Calculations$$

MCDM approach
Pareto Frontier
Compromise Programming

(2) Methodology

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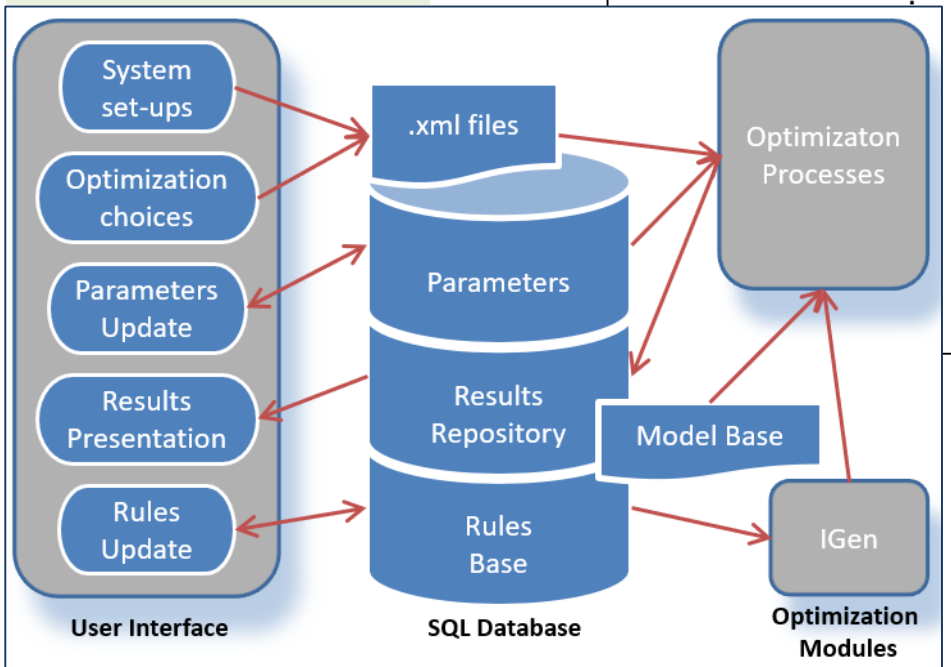
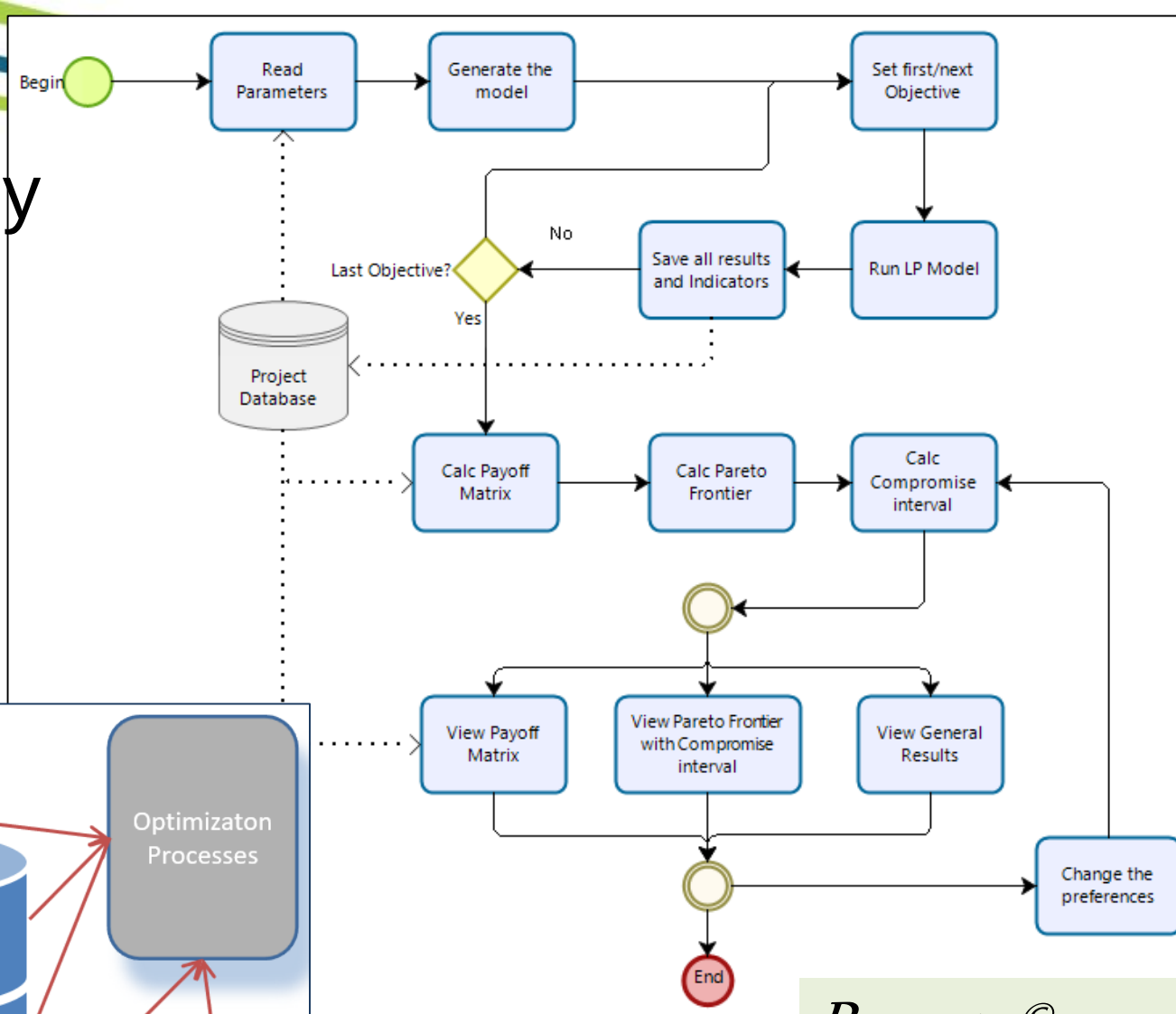
Main
Components





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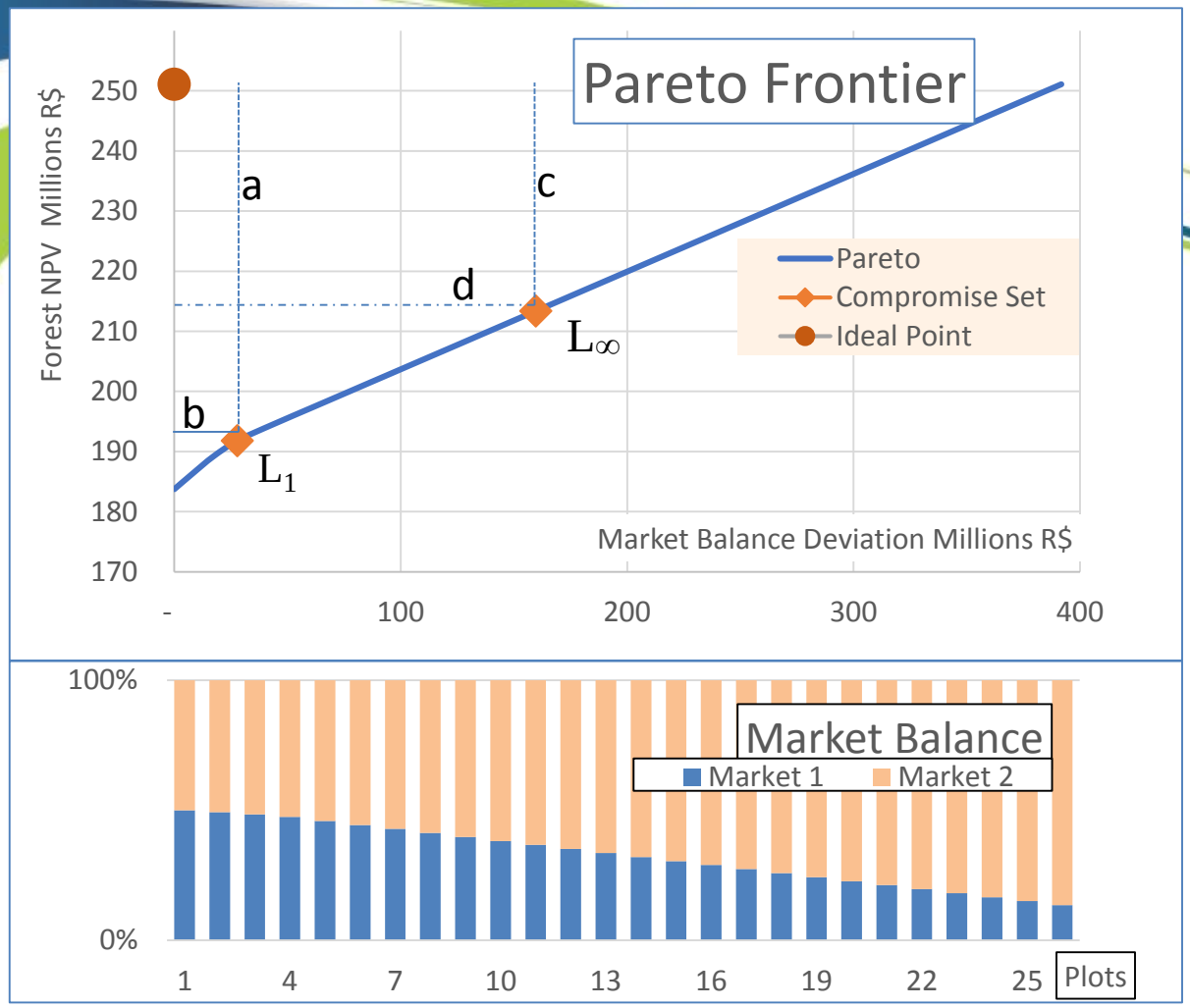
Calc Processes



(3) Results and Discussions

	Plot	Total Mkt Balance Deviation	Total NPV	Normalized Distance
Ideal Point		-	251,099,471	
Extreme Points	1	391,761,149	251,099,471	
L∞	15	159,669,294	213,384,545	d = 0.3846
L1	23	27,889,204	191,833,158	a + b = 0.6545
Extreme Points	26	0	183,751,388	

(3) Conclusions

- Harvest Scheduling formulations
- Strategic Planning
- Scenario Analyses
- Supported by Multicriteria Decision Theory
  - Compromise Programming

= It is possible to support Interactive Decision-making

DSS – Decision Support System

Thanks