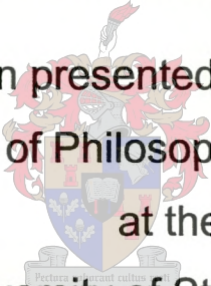


Volume 2

Development of a Method to Forecast Future Systems in the Forest Engineering Value Chain

By

Michal Philippus Brink

Dissertation presented for the Degree of
Doctor of Philosophy in Forestry
at the

University of Stellenbosch

PROMOTERS: External promoter: Prof LD Kellogg (Oregon State University)
Internal co-promoter: Dr HJE Uys (University of Stellenbosch)
External co-promoter: Prof A Buys (University of Pretoria)

December 2001

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Annexure 1

Questionnaire used in the Forest Technical Survey

FOREST TECHNICAL SURVEY

1. FOREST STRUCTURE

1.1 Name of Contact Person.....
Tel.....

Fax.....

Name and Address of Enterprise
.....
.....
.....

1.2 Total Afforested Areas (ha) **Total area (ha)**

Hardwood (HW)

Softwood (SW)

1.3 Annual Cut

o.b. = overbark

u.b. = underbark

Softwood (SW) m³ *o.b.* or tons*

Hardwood (HW) m³ *o.b.* or tons

Hardwood (HW) m³ *o.b.* or tons

*Where tons are used, please supply conversion factor to m³:

Type of operation as percentage of annual cut:

SW : thinning %
 : clearcut %
 Total 100 %

HW : thinning %
 : clearcut %
 Total 100 %

2. LABOUR SITUATION

2.1 Felling and Conversion SW = Softwood HW = Hardwood

	SW (m ³)	HW (m ³)
With own labour		
By contractor		
By others (e.g. sale by stump or standing)		

2.2 Extraction

	SW m ³	HW m ³
With own labour		
By contractor		
By others (specify)		

2.3 Total Number of Labourers for Felling, Conversion and Extraction employed by the Company

	Number
30.06.1996	
31.12.1996	

How long have the labourers been employed?

	Male	Female
Up to 3 months		
4 to 6 months		
7 to 9 months		
10 to 12 months		
13 to 24 months		
> 24 months		
Total		

2.4 Total Number of Labourers for Silviculture and Nurseries

30.06.1996	
31.12.1996	

How long have the labourers been employed?

	Male	Female
Up to 3 months		
4 to 6 months		
7 to 9 months		
10 to 12 months		
13 to 24 months		
> 24 months		
Total		

2.5 Task Work Rate (Piece Work Rate) is based on:

	SW%	HW%
Free negotiations		
Standard time tables of Government Forestry		
Internal Company and work study rates		
Others (specify)		
Total	100	100

3. HARVESTING SITUATION

3.1 Harvesting Methods

With own labour force [OL] and contractors [C] in percent
SW = Softwood HW = Hardwood

	SW%		HW%	
	OL	C	OL	C
<u>Assortment method</u> (felling, conversion infield, extraction of assortments)				
<u>Tree length method</u> (felling and de branching infield and conversion after extraction)				
<u>Full tree method</u> (extraction of trees, including branches)				
<u>Whole tree method</u> (extraction of trees, including roots and branches)				
Total	100	100	100	100

3.2 Debranching in the Forest

With own labour force [OL] and contractors [C] in percent

	SW%		HW%	
	OL	C	OL	C
By hatchet				
By axe (+/- 1,5 kg. Head & 7 mm handle)				
By chainsaw				
By mobile debranching machine				
By processor				
By harvester				
Other (specify)				
Total	100	100	100	100

3.3 Debarking in the Forest
With own labour force [OL] and contractors [C] in percent

		SW%		HW%	
		OL	C	OL	C
Manual					
Mobile debarking machine					
By processor					
By harvester					
Other (specify)					
No debarking					
	Total	100	100	100	100

3.4 Number of Chainsaws In Operation:

Displacement	(Output)	Number
< 40 cc	(< 2 kW)	
40 - 60 cc	(2 - 3 kW)	
61 - 75 cc	(3 - 4 kW)	
> 76 cc	(> 4 kW)	

3.5 Chainsaw Operators Using Felling Aids

	Number
Felling levers	
Assistant with push rod	
Others (specify)	
.....	
Total number of operators employed	

3.6 Extraction
With own labour force [OL] and contractors [C] in percent.

(Refer to Appendix 1)

		SW%		HW%	
		OL	C	OL	C
Manual e.g. carrying, rolling					
Slipping with animals					
Chutes					
Agricultural tractor without a winch					
Agricultural tractor and trailer configuration					
Agricultural tractor with a winch					
Crawler Tractors					
Skidders (Articulated unit)					
Cable					
Skidders (Articulated unit)					
Grapple					
Forwarders: Articulated unit					
Modified Agricultural Tractor without front wheels					
Forwarders: Non-articulated e.g. Bosthor					
Cable Yarding: High lead					
Cable Yarding: Skylines					
3 wheel loader					
Trucks loaded infield *					
Other (specify)					
.....					
	Total	100	100	100	100

* Truck loaded on skid road, at stump or in the compartment before extraction. Not loaded at road side or depot.

3.7 Timber Chutes

	Number of systems	Total running meters
Half pipe		
Full pipe		

3.8 Number of Articulated Skidders

	<37 kW (<50HP)	38-59 kW (51-80HP)	60-80 kW (81-110HP)	>81 kW (>110HP)
Skidder - single drum winch				
Skidder - double drum winch				
Skidder - grapple				
Skidder - clambunk				
Other				

3.9 Number of Forwarders

	<37 kW (<50HP)	38-59 kW (51-80HP)	60-80 kW (81-110HP)	>81 kW (>110HP)
Articulated Forwarder				
Non-articulated Forwarder (e.g. Bosthor)				
Modified Agric. Tractor (without front wheels)				
Other				

3.10 Number of Agricultural Tractors (not articulated steering & equipped with forestry equipment)

	<37 kW (<50HP)	38-59 kW (51-80HP)	60-80 kW (81-110HP)	>81 kW (>110HP)
Equal sized wheels				
Small front wheels - 2 x 4				
Small front wheels - 4 x 4				

111

	Number
Tractor mounted cable drum winch (permanent)	
• single drum	
• double drum	
3 point hydraulic mounted winch (detachable)	
• single drum	
• double drum	
Skidding sulky (additional axle)	
Trailer (used for extraction)	
Other (specify)	
.....	

3.11 Number of Crawler Tractors used for Harvesting

	<37 kW (<50HP)	38-59 kW (51-80HP)	60-80 kW (81-110HP)	>81 kW (>110HP)
Cable drum winch				
• single drum				
• double drum				
Other				

3.12 Loaders

Loading Capacity Tons

	0 - 1.5	1.5 - 2.5	> 2.5
3 wheel loaders			
• with telescopic arm			
• without telescopic arm			
Articulated loaders (e.g. frontend loaders)			
Non-articulated loaders (e.g. truck mounted crane)			
Other (specify)			

3.13 Cable Yarding

	Number
Mobile skyline - < 1.0 ton lifting capacity	
Mobile skyline - 1.0 - 2.0 lifting capacity	
Mobile skyline - > 2.0 ton lifting capacity	
Mobile highlead	
Other (specify)	
Carriages:	
• Nonslack pulling Full Block (not lock-up)	
• Mechanical: Lock Up mainline	
• Mechanical: Lockup skyline and mainline	
• Slackpulling (engine in carriage)	

3.14 Felling Machines, Processors and Harvesters

	Number
Felling machine with:	
• chainsaw felling head	
• shears (blades)	
• circular saw	
Processor for small sized timber (<35 cm dbh)	
Processor for larger sized timber (>35 cm dbh)	
Mobile harvester (Fells and processes trees)	
Other (specify)	

3.15 Other Harvesting Machines

	Number
Mobile debarking machine	
Stationary debarking machine	
Mobile debranching machine	
Stationary debranching machine	
Wood splitting (cleaving) machine	
Mobile chipper	
Stationary chipper	
Tractor mounted stump grinder	
3 wheel stump grinder	
Mobile workshop	
Other harvesting machines (specify)	

3.16 Transport Method from Plantation to Mill (percent)

	To Depot		Retransport from a Depot	
	SW	HW	SW	HW
Rigid truck - without trailer				
Rigid truck - with trailer				
Tractor and trailer				
Slingersteer transport				
Interlink				
Rail				
Other (specify)				
Total	100	100	100	100

3.18 Number of Animals Used for Extraction

	Number
Mules	
Horses	
Other	

3.17 Trucks for Timber Transport (number)

Type of truck	with crane	without crane	No. of trailers
4 x 2 truck			
4 x 4 truck			
6 x 4 truck			
10 x 4 truck			
3 axle articulated			
4 axle articulated			
5 axle articulated			
6 axle articulated			
Double combination (interlink)			
Slingersteer			
Other (specify)			

4. ROAD CONSTRUCTION

4.1 Earth Moving Equipment

	<37kW (<50HP)	38-59kW (51-80HP)	60-79kW (81-107HP)	80-150kW (108-204HP)	>150kW (>203HP)
Bulldozer					
Wheeldozer					
Grader					
Excavator					
Front-end loader					
Loader back-hoe (tractor with blade & scoop)					
Tractor drawn trailer					
Other (specify)					

4.2 Trucks for Dumping

Truck type	Tipper	Standard
4 x 2		
4 x 4		
6 x 4		
8 x 4		
Tractor drawn trailer		

4.3 Blasting and Drilling Equipment

Specify	Number
.....	

4.4 Soil Compaction Machines

	Number
Static steel drum roller	
Pneumatic tyre rollers	
Sheep's foot roller	
Grid roller	
Vibratory roller	
Plate vibrators	
Stamping machines	
Other (Specify)	

4.5 Length of Forest Roads

	km
Total length of plantation roads	
Of these, length of:	
Plantation main road: (well constructed, permanently drained, wide well maintained surface, used all year round)	
Secondary roads: (relatively well constructed, well drained, useable for most of the year)	
Machine roads: (low construction standard, only used occasionally and not always negotiable, skid roads not included!!)	

5. OTHER COMPANY OWNED VEHICLES

5.1 Vehicles Used for Personnel Transport

	Number
Motor car	
Bakkie 2 x 4	
Bakkie 4 x 4	
Bakkie with 5 th wheel trailer	
Mini bus	
Tractor with passenger trailer	
Bus	
Truck	
Motorbike	
All terrain vehicle (3 or 4 wheel motorbike)	
Other (specify)	
.....	

5.2 Equipment Used for Soil Preparation

	Own	Contractor
Planting machines		
Rotacutter (rotavator)		
Plough		
Ripper		
Disk		
Other (specify)		
.....		

5.3 Fire Fighting Trucks

Tank capacity (liters)

	<2001	201-500	501-1000	1001-2000	>2001
Fire Truck - 4 x 2					
Fire Truck - 4 x 4					
Fire Truck - 6 x 4					
UNIMOG					
Tractor drawn trailer					
Aeroplane					
LDV units (Bakkie-sakkie)					
Others (specify):					
.....					
.....					
.....					

5.4 Other Forestry Equipment not listed

Annexure 2

Questionnaire used and results of first round of Delphi Study

QUESTIONNAIRE**HARVESTING DEVELOPMENTS IN:** _____

1. What is the current annual cut of commercial timber in your country?
_____ m³.
2. How has ground based harvesting systems progressed over time in your country specifically? Use year of inception of new technology in the commercial forestry industry.

	Year	Tree size (m ³)	Major reason for change (see list below)
Manual extraction			
Animal extraction			
Agricultural tractor			
Cable skidder			
Feller buncher/Grapple skidder			
Chainsaw/Forwarder			
Harvester/Forwarder			
Other			
Other			
Other			

3. In the last decade, which factors have contributed most significantly to change (please weight your answer out of 10)?

Aspect	Weighting
Environmental impacts	
Labour cost	
Fuel cost	
Capital cost	
Social pressure	
Technological/productivity improvements	
Other	
Total	10

4. In the next decade what do you believe to be the greatest change drivers (please weight your answer out of 10)?

Aspect	Weight
Environmental impacts	
Labour costs	
Fuel costs	
Capital costs	
Social pressure	
Technological/productivity improvements	
Other	
Total	10

5. In your view what do you believe to be the greatest three changes in your harvesting systems by the year 2010? Consider developments in both pulpwood and saw timber harvesting.

1.
2.
3.

6. From the list below rank the most important requirements of a harvesting forester for the year 2010.

Requirement	Ranking (1 to 11)
Theoretical mechanical knowledge	
Theoretical mechanical skills	
Machine operator skills	
Practical mechanical skills	
Harvesting systems and value chain knowledge	
Chainsaw operator skills	
Management skills	
Interpersonal skills	
Harvest planning knowledge and skills	
Business skills	
Other (please specify)	

7. From the list below rank the most important requirements of a harvesting contractor for the year 2010.

Requirement	Ranking (1 to 11)
Theoretical mechanical knowledge	
Theoretical mechanical skills	
Machine operator skills	
Practical mechanical skills	
Harvesting systems and value chain knowledge	
Chainsaw operator skills	
Management skills	
Interpersonal skills	
Harvest planning knowledge and skills	
Business skills	
Other (please specify)	

	Australia	BC	ent Cana	Chile2	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany
Man ext	1860	1800	1800	1900	1655	1700		1800	1800	1655		1800		1492	
Animal ext	1860	1870	1870	1910	1750	1700		1900	1800	1700		1870	1930	1700	
Tractor	1930	Never	Marginal	1950	1970	0	1965	1920	1950	1925		1920	1955	1930	1950
Cable skid	1961	1955	1958	1970	1965	1960	Never	1965	1955	1960	1960	1960	1965	1960	1962
FB/G skid	1978	1975	1975	1987	1975	1970	Never	1982	1975	1970	1970	1965	1970	1967	1975
Chains/forw	1978	Never	Marginal	1990	1965	0	1970	never	1965	1980	1980	1985	1960	1965	1955
Harv/Forw	1978	1990	1990	1992	1995	1990	1990	1995	1990	1990	1985	1986	1975	1976	1987
Infield chip	1996		1989												

3. In the last decade, which factors have contributed most significantly to change (please weight your answer out of 10)

	Australia	BC	ent Cana	Chile 1	Chile 2	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Weight	Median	Std dev	Variance
Environmental	3	1.5	3	2	3	3	3	2	3	2	4	1	3	3	2	1	38.5	2.55	3.00	0.85	0.72
Labour cost	0	1.5	1	2	1	0	2	4	1	1	0	1	1	4	2	5	21.5	1.42	1.00	1.49	2.22
Fuel cost	2	0	1	0	0	0	0	0	0	0.25	0	0	0	0	0	0	3.25	0.21	0.00	0.54	0.29
Capital cost	1	0.5	1	0	0	0	1	1	0	1	0	2	0	0	2	0	9.5	0.63	0.25	0.71	0.51
Social pressure	4	0	2	2	0	3	1	0	2	2	1	2	2	0	1	1	22	1.45	1.50	1.15	1.33
Technological/prod	0	3.5	2	2	6	4	3	3	4	1	5	3	2	3	2	3	43.5	2.88	3.00	1.46	2.14
Health & safety	0	0.5	0	2	0	0	0	0	0	0	0	1	0	0	0	0	3.5	0.23	0.00	0.55	0.30
Forest practices code	0	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	0.17	0.00	0.67	0.45
Labour availability	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.07	0.00	0.27	0.07
Education of logging	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.07	0.00	0.27	0.07
Availability of stumpa	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.07	0.00	0.27	0.07
Cost of stumpage	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.07	0.00	0.27	0.07
Partial cutting/thinnin	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0.13	0.00	0.53	0.29
Changing markets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.07	0.00	0.27	0.07
Total	10	10	10	10	10	10	10	10	10	11.25	10	10	10	10	10	10	151.25	10.0			

4. In the next decade what do you believe to be the greatest change drivers

	Australia	BC	ent Cana	Chile 1	Chile 2	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Weight	Median	Std dev	Variance
Environmental	1	1	3	2	3	3	3	2	4	1	4	2	3	2	2	1	36	2.38	2.00	1.01	1.03
Labour cost	0	0.5	1	1.5	2	0	2	2	0	1.5	0	1	1	4	2	3	18.5	1.22	1.25	1.15	1.32
Fuel cost	0	0	2	1.5	0	1	0	2	0	1	2	0	0	0	1	0	10.5	0.69	0.00	0.83	0.69
Capital cost	2	1	1	1.5	1	2	1	2	2	1	1	2	0	1	2	0	20.5	1.36	1.00	0.68	0.47
Social pressure	1	0	2	1.5	0	3	1	0	2	2	1	2	2	0	1	4	18.5	1.22	1.25	1.14	1.31
Technological/prod	3	3.5	1	0	4	1	1	2	2	1	2	2	2	3	2	2	29.5	1.95	2.00	1.04	1.08
Health & safety	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0.13	0.00	0.34	0.12
Forest practices code	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	5	0.33	0.00	0.93	0.86
From forest to plant	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.20	0.00	0.80	0.64
Global competition	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0.13	0.00	0.53	0.29
Labour availability	0	0	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0.7	0.05	0.00	0.19	0.04
Education of logging	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.6	0.04	0.00	0.16	0.03
Availability of stumpa	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.6	0.04	0.00	0.16	0.03
Cost of stumpage	0	0	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.6	0.04	0.00	0.16	0.03
Partial cutting/thinnin	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0.13	0.00	0.53	0.29
Total	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	150	9.92	10.00		

5. In your view, the 3 greatest changes in harvesting systems by 2010

Excavator based harvesters			
Infield chipping			
Increase in CTL	1+1+1		
Fibre recovery			
Adapable systems - small openings		SME's	1+1+1
Systems compatable with non timber values			
smaller sized equipment (CTL)	1+1+1		
More fuel efficient			
More productive Euc systems			
More accurate measuring on harvesters			
Links between machine and control room	Bucking on demand		1+1
Environmental & worker friendly machines			
Increased mechanization of hardwoods	1+1		
Increased mechanization	1+1		
Double shifting			
Increase in cable yarding	1+1		
Increase in thinnings and thinning capable harvesters			
More versatile mechanised suystems with regard to slopes and conditions			
Blending of systems to meet environmental objectives			
Reduction of capital cost of mechanized systems			
Value recovery through processing yards			
Better planning to meet environmental & social concerns			
Use of GPS to track equipment activities			
Robotics technology			
Delimiting head will also extract grade material in future			
Operator skills			
Information/comm technology			
Logistics			

6. Ranking of harvesting forester

	Australia	BC	ent Cana	Chile 1	Chile 2	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Theor mech knowl	10	7	7	3	7	8	7	6	6	0	7	9	7	6	0	6	96	6	7.00	2.78	7.73
theor mech skills	9	9	7	4	8	7	8	7	10	0	8	8	8	7	0	7	107	7	7.50	2.91	8.50
machine oper skill	7	8	6	1	9	9	9	9	8	0	10	10	10	9	0	9	114	9	9.00	3.54	12.52
pract mech skills	8	6	10	2	6	10	6	10	9	0	9	9	9	8	0	8	110	8	8.00	3.38	11.45
value chain	2	5	3	10	3	1	5	5	5	10	5	1	4	1	4	1	65	4	4.00	2.82	7.93
chainsaw op	11	10	9	9	10	11	10	8	7	0	11	11	11	10	0	10	138	10	10.00	3.56	12.65
management skill	4	2	4	5	2	4	3	1	2	0	4	2	3	3	2	3	44	1	3.00	1.29	1.67
interpersonal skill	5	3	1	11	4	2	1	2	1	1	3	3	2	4	1	2	46	2	2.00	2.50	6.25
harvest planning	1	1	1	7	1	3	2	4	3	9	1	6	1	5	3	5	53	3	3.00	2.50	6.23
business skill	3	4	5	8	5	5	4	3	4	0	6	4	5	2	5	4	67	5	4.00	1.76	3.10
Enviro/resource mgm	6	0	0	6	11	6	0	0	0	2	2	5	6	0	0	0	44			3.44	11.80
foreign languages	0	0	0	0		0	0	11	0	0	0	0	0	0	0	0	11			2.84	8.07
Legal safety requirem	0	0	0	0		0	0	0	0	0	0	5	0	0	0	0	5			1.29	1.67
e- business	0	0	0	0		0	0	0	0	0	0	5	0	0	0	0	5			1.29	1.67
aesthetics	0	0	0	0		0	0	0	0	7	0	0	0	0	0	0	7			1.81	3.27
certification	0	0	0	0		0	0	0	0	5	0	0	0	0	0	0	5			1.29	1.67
Contractor mgmt	0	0	0	0		0	0	0	0	6	0	0	0	0	0	0	6			1.55	2.40
Stress mgmt	0	0	0	0		0	0	0	0	11	0	0	0	0	0	0	11			2.84	8.07

934

7. Ranking of harvesting contractor

	Australia	BC	ent Cana	Chile 1	Chile 2	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Theor mech knowl	10	7	8	6	6	6	9	10	5	0	11	10	10	8	0	9	115	8	8.00	3.33	11.10
theor mech skills	9	8	8	5	7	10	10	9	10	11	10	8	11	9	0	8	133	9	9.00	2.70	7.30
machine oper skill	6	5	6	4	9	5	8	6	7	10	8	7	8	4	5	7	105	7	6.50	1.75	3.06
pract mech skills	4	6	7	2	8	3	7	7	9	1	6	9	6	5	6	6	92	6	6.00	2.29	5.27
value chain	3	9	4	1	5	7	5	4	6	9	5	4	5	2	3	4	76	4	4.50	2.21	4.87
chainsaw op	11	10	10	11	10	11	9	8	8	0	9	11	9	10	0	10	137	10	10.00	3.48	12.13
management skill	1	3	1	7	2	2	1	2	3	3	3	2	3	6	1	2	42	2	2.00	1.71	2.92
interpersonal skill	8	4	5	10	3	9	4	3	2	7	7	3	1	7	0	3	76	4	4.00	2.93	8.60
harvest planning	5	2	3	3	1	1	3	5	4	8	4	6	7	3	4	5	64	3	4.00	1.97	3.87
business skill	2	1	1	8	4	4	2	1	1	2	1	1	2	1	2	1	34	1	1.50	1.86	3.45
Environm/resource m	7			9		8	0	0			2	10	4			0	40			4.13	17.03
Risk taking								6	0				10			0	16			4.90	24.00
Relationship with locals									11				5			0	16			5.51	30.33
Flexibility												5				0	5			3.54	12.50
Marketing skills										5						0	5			3.54	12.50
Labour relations										4						0	4			2.83	8.00
Legal safety requirements												5				0	5			3.54	12.50
e- business												5				0	5			3.54	12.50
Skills of variety of equip										6						0	6			4.24	18.00

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Annexure 3

Questionnaire used and results of 2nd round of Delphi Study

QUESTIONNAIRE**HARVESTING DEVELOPMENTS IN: Idaho, USA**

3. In the last decade, which factors have contributed most significantly to change? After considering the summarised results of all the participants, please revise your weighting in the last column of the table below. **Please weight your answer out of 10.**

Aspect	Average weighting of respondents (10)	Your first weighting	Your revised weighting
Environmental impacts	2.5	3	
Labour cost	1.4	1	
Fuel cost	0.2		
Capital cost	0.6		
Social pressure	1.5	2	
Technological/productivity improvements	2.9	4	
Health and safety	0.2		
Forest Practices code	0.2		
Labour availability	0.1		
Education of logging contractors	0.1		
Availability of stumpage	0.1		
Cost of stumpage	0.1		
Partial cutting/thinnings	0.1		
Changing markets	0.1		
Total	10	10	10

4. In the next decade what do you believe to be the greatest change drivers? After considering the summarised results of all the participants, please revise your weighting in the last column of the table below. **Please weight your answer out of 10.**

Aspect	Average weighting of respondents	Your first weighting	Your revised weighting
Environmental impacts	2.4	4	
Labour cost	1.2		
Fuel cost	0.8		
Capital cost	1.4	2	
Social pressure	1.3	2	
Technological/productivity improvements	1.8	2	
Health and safety	0.1		
Forest Practices code	0.4		
Systems approach from forest to processor	0.2		
Global competition	0.1		
Labour availability	0.1		
Education of logging contractors	0.0		
Availability of stumpage	0.0		
Cost of stumpage	0.0		
Partial cutting/thinnings	0.1		
Total	10	10	10

5. In your view what do you believe to be the greatest changes in your harvesting systems by the year 2010? Consider developments in both pulpwood and saw timber harvesting. Please rank the criteria below from 1 to 25. **Note: 1 is the highest ranking and 25 the lowest ranking.**

Changes to harvesting systems by 2010	Ranking (1 to 25)
A focus on the whole value chain (logistics)	
Better planning to meet environmental & social concerns	
Increased mechanization	
Increase in excavator based harvesters	
Increase in cut to length systems	
Increase in smaller sized cut to length equipment	
Adaptable systems to work in small openings in the forest	
More accurate measuring on harvesters	
Increase in thinnings and thinning capable harvesters	
Infield chipping	
Increase in Fibre recovery	
More versatile mechanised systems with regard to terrain conditions	
Harvesting systems compatible with non timber and environmental values	
More fuel efficient equipment	
More productive systems for harvesting of <i>Eucalyptus</i>	
Improvement in operator skills	
Improvement in machine ergonomics	
Double shifting of harvesting operations	
Reduction of capital cost of mechanized systems	
Delimiting head will also extract grade material in future	
Value recovery through processing yards	
Links between machine and control room (bucking on demand) Communications technology	
Use of GPS to track equipment activities	
Robotics technology	
Increase in cable yarding	

6. From the list below rank the most important requirements for a harvesting forester in the year 2010. Please consider the ranking of all the respondents, **including the criteria, which were not ranked in the first round** and then re-rank your options in the last column. A harvesting forester refers to a company employed forester who either manages contractors or runs in-house harvesting operations for the company he is employed by. **Note: 1 is the highest ranking and 18 the lowest ranking.**

Requirement	Ranking of respondents	Your first Ranking (1 to 11)	Your revised ranking (1 to 18)
Theoretical mechanical knowledge (engine, drive train & electrical systems on machine)	6	6	
Theoretical mechanical skills (understand what is required to repair and service a machine)	7	10	
Machine operator skills	9	8	
Practical mechanical skills (able to repair and service a machine)	8	9	
Harvesting systems and value chain knowledge	4	5	
Chainsaw operator skills	10	7	
Management skills	3	2	
Interpersonal skills	1	1	
Harvest planning knowledge and skills	2	3	
Business skills	5	4	
Environmental/resource management	Not ranked		
Foreign languages	Not ranked		
Competence in legal safety requirements	Not ranked		
Competence in e-business (internet, e-mail, etc.)	Not ranked		
Knowledge of aesthetics in forestry	Not ranked		
Certification	Not ranked		
Contractor management	Not ranked		
Stress management	Not ranked		

7. From the list below rank the most important requirements for a harvesting contractor in the year 2010. Please consider the ranking of all the respondents, **including the criteria, which were not ranked in the first round** and then re-rank your options in the last column. A harvesting contractor refers to an individual who runs his or her own harvesting operation and is contracted in by a forestry company or processing company to do the harvesting. **Note: 1 is the highest ranking and 18 the lowest ranking.**

Requirement	Ranking of respondents	Your first Ranking (1 to 11)	Your revised ranking (1 to 18)
Theoretical mechanical knowledge	8	5	
Theoretical mechanical skills	9	10	
Machine operator skills	7	7	
Practical mechanical skills	6	9	
Harvesting systems and value chain knowledge	4	6	
Chainsaw operator skills	10	8	
Management skills	2	3	
Interpersonal skills	5	2	
Harvest planning knowledge and skills	3	4	
Business skills	1	1	
Environmental/resource management	Not ranked		
Ability to take risks	Not ranked		
Good relationship with local communities	Not ranked		
Flexibility in harvesting systems/skilled on various equipment	Not ranked		
Marketing skills	Not ranked		
Labour relations	Not ranked		
Competence in legal safety requirements	Not ranked		
Competence in e-business (internet, e-mail, etc.)	Not ranked		

8. New question

Please reply to the following regarding the use of contractors in your region. Choose one description, which best describes the position in your region currently and one for the expected position in 2010. **Harvesting operations are:**

	Current status of contractors	Status of contractors in 2010
totally outsourced to contractors		
predominantly outsourced to contractors		
equally distributed between company operations and contractor operations		
predominantly done with company owned crews		
exclusively done with company crews		

3. In the last decade, which factors have contributed most significantly to change (please weight your answer out of 10)

	Australia	BC	ent Cana	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Weight	Median	Std dev	Variance
Environmental	3	1.9	2	3	3	2.5	2	3.5	1.6	1	2	2.5	3	2	2	34.975	2.33	2.00	0.67	0.45
Labour cost	0	1.4	1	1	0	1	0	1	1	1	1	1	3	1	4	17.375	1.16	1.00	1.06	1.13
Fuel cost	0	0.0	1	0	0	0	0	0	0.25	0	0	0	0	0	0	1.25	0.08	0.00	0.26	0.07
Capital cost	2	0.4	1	0	0	1	0	0	1	2	2	0.3	1	2	0	12.675	0.84	1.00	0.82	0.68
Social pressure	1	1.4	1	2	3	1	0	2	1.6	2	2	1.5	0	1	1	20.45	1.36	1.35	0.79	0.63
Technological/prod	3	2.2	1	4	4	2.5	3	3.5	0	3	3	2	3	2	2.5	38.725	2.58	3.00	1.06	1.12
Health & safety	1	0.4	1	0	0	0.5	0	0	0	0	0	0.2	0	0	0	3.075	0.20	0.00	0.36	0.13
Forest practices code	0	1.9	1	0	0	0	0	0	1.6	1	0	0.2	0	0	0	5.675	0.38	0.00	0.65	0.43
Labour availability	0	0.0	1	0	0	0	1	0	1	0	0	0.3	0	1	0.5	4.8	0.32	0.00	0.45	0.20
Contractor education	0	0.0	0	0	0	0.5	1	0	1	0	0	0	0	0	0	2.5	0.17	0.00	0.36	0.13
Stumpage availability	0	0.0	0	0	0	0	0	0	0.5	0	0	0.5	0	0	0	1	0.07	0.00	0.18	0.03
Cost of stumpage	0	0.4	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0.9	0.06	0.00	0.16	0.03
Partial cutting	0	0.0	0	0	0	0	3	0	0	0	0	1.5	0	0	0	4.5	0.30	0.00	0.84	0.71
Changing markets	0	0.2	0	0	0	1	0	0	0	0	0	0	0	1	0	2.15	0.14	0.00	0.35	0.12
Total	10	10	10	10	10	10	10	10	10.05	10	10	10	10	10	10	150.05	10.00	10.00		

4. In the next decade what do you believe to be the greatest change drivers

	Australia	BC	ent Cana	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Weight	Median	Std dev	Variance
Environmental	1	1.98	1	3	3	2	3	3	1.3	2	2	2.3	2	2	1	30.575	2.04	2.00	0.73	0.54
Labour cost	0	1.00	1	1	0	1.5	0	0	1	1	1	0.8	3	2	2	15.3	1.02	1.00	0.86	0.73
Fuel cost	0	0.25	1	1	1	0	0	0	1	0	0	0	0	1	0.5	5.75	0.38	0.00	0.47	0.22
Capital cost	2	0.50	1	1	2	1	0	1	1	2	2	0.2	1	2	0.5	17.2	1.15	1.00	0.70	0.49
Social pressure	1	1.00	1	1	2	1	0	0	1.3	2	2	1.4	0	1	3	17.7	1.18	1.00	0.84	0.70
Technological/prod	3	2.35	1	3	1	1	2	2	1	2	2	1.5	2	2	2	27.85	1.86	2.00	0.66	0.43
Health & safety	2	0.25	1	0	0	1.5	0	0	0	0	0	0.5	0	0	0	5.25	0.35	0.00	0.64	0.41
Forest practices code	0	1.10	1	0	0	0	0	0	1.34	0	0	0.3	0	0	0	3.74	0.25	0.00	0.48	0.23
From forest to plant	1	0.13	1	0	0	0.5	0	0	0	1	1	0.2	0	0	0	4.825	0.32	0.00	0.44	0.20
Global competition	0	0.58	1	0	0	1	0	0	0	0	0	1	2	0	1	6.575	0.44	0.00	0.62	0.39
Labour availability	0	0.00	0	0	0	0.5	2	0	0.5	0	0	0.5	0	0	0	3.5	0.23	0.00	0.53	0.28
Education of logging	0	0.00	0	0	0	0	1	0	0.5	0	0	0	0	0	0	1.5	0.10	0.00	0.28	0.08
Avallability of stumpa	0	0.25	0	0	1	0	0	2	0.5	0	0	0.3	0	0	0	4.05	0.27	0.00	0.55	0.31
Cost of stumpage	0	0.38	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0.875	0.06	0.00	0.16	0.02
Partial cutting/thinnin	0	0.25	0	0	0	0	2	2	0	0	0	1	0	0	0	5.25	0.35	0.00	0.72	0.52
Total	10	10	10	10	10	10	10	10	9.94	10	10	10	10	10	10	149.94	10.00	10.00		

5. In your view, the 3 greatest changes in harvesting systems by 2010

	Australia	BC	ent Cana	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Value chain focus	1	2	4	2	6	1	1	12	24	2	2	1	1	2	2	63	2	2.00	6.19	38.31
Better planning	10	1	1	1	3	2	4	2	1	4	4	4	12	1	1	51	1	2.00	3.36	11.26
Increased mechaniz	13	8	25	3	18	4	25	21	18	3	3	17	17	17	5	197	10	17.00	8.11	65.70
Excavator harvesters	5	14	13	20	20	21	25	22	13	15	15	23	18	13	24	261	23	18.00	5.45	29.69
Cut to length	6	15	3	12	1	23	25	16	9	12	12	21	20	16	22	213	15	15.00	7.32	53.60
smaller CTL	15	17	8	13	23	20	11	5	5	19	19	9	7	21	17	209	12	15.00	6.08	36.92
Adapatable systems	16	9	9	14	8	14	25	13	6	24	24	11	21	14	12	220	18	14.00	6.16	37.95
Measuring on harvest	14	20	14	23	9	10	2	19	12	11	11	10	6	15	21	197	10	12.00	5.78	33.41
Incr in thinnings	7	7	5	21	2	11	3	4	4	22	22	18	8	10	14	158	6	8.00	7.16	51.27
Infield chipping	3	13	15	22	13	18	12	24	20	20	20	19	22	11	15	247	20	18.00	5.50	30.27
> in fibre recovery	2	3	7	24	12	25	25	23	10	21	21	6	10	6	19	214	16	12.00	8.55	73.07
Machine/terrain versa	11	5	16	6	5	7	25	20	2	6	6	15	14	12	6	156	4	7.00	6.50	42.26
non timber values	12	6	2	5	4	12	10	1	11	9	9	5	13	3	8	110	3	8.00	3.90	15.24
fuel efficieny	17	10	6	17	10	16	25	18	8	17	17	14	9	7	18	209	12	16.00	5.34	28.50
> product for Euc	4	25	25	16	25	24	25	25	25	25	25	25	25	25	25	344	25	25.00	5.73	32.78
> in operator skills	18	16	10	4	7	17	7	15	7	8	8	12	15	9	4	157	5	9.00	4.69	21.98
> in ergonomics	19	21	12	7	14	9	25	17	16	16	16	13	11	8	10	214	16	14.00	5.04	25.35
Double shifting	8	23	25	15	17	19	25	11	3	23	23	24	19	18	11	264	24	19.00	6.77	45.83
< in capital cost of ma	9	18	18	10	19	22	25	3	15	14	14	16	3	22	18	226	19	16.00	6.51	42.35
Delimbers - process	20	23	19	25	21	13	25	10	17	7	7	20	16	5	20	248	21	19.00	6.64	44.12
Merchandising yards	23	4	21	9	11	6	8	6	21	10	10	2	23	20	16	190	8	10.00	7.31	53.38
Links machine & cont	21	12	22	8	16	5	9	8	22	5	5	3	2	19	3	160	7	8.00	7.41	54.95
GPS	22	19	11	18	15	15	5	7	19	18	18	8	4	4	9	192	9	15.00	6.22	38.74
Robotics technolgy	25	21	17	11	22	8	6	9	23	13	13	7	5	23	7	210	14	13.00	7.17	51.43
> cable yarding	24	10	20	19	24	3	25	14	14	1	1	22	24	24	23	248	21	20.00	8.89	78.98

6. Ranking of harvesting forester

	Australia	BC	ent Cana	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Theor mech knowl	8	11	14	10	15	9	9	13	14	11	11	14	14	8	13	174	10	11.00	2.41	5.83
theor mech skills	9	12	13	11	14	10	10	14	13	10	10	12	15	9	14	176	11	12.00	2.02	4.07
machine oper skill	7	15	12	12	16	13	11	11	16	13	13	15	16	11	16	197	15	13.00	2.59	6.70
pract mech skills	10	16	16	9	17	7	13	10	15	12	12	18	17	10	15	197	15	13.00	3.42	11.70
value chain	5	5	3	4	1	5	1	12	11	1	1	4	1	4	2	60	4	4.00	3.44	11.86
chainsaw op	12	17	15	18	18	18	17	15	12	14	14	16	18	18	18	240	18	17.00	2.20	4.86
management skill	3	2	4	3	4	3	2	2	6	2	2	3	2	3	3	44	2	3.00	1.10	1.21
interpersonal skill	2	3	2	2	2	1	3	1	3	3	3	1	3	1	1	31	1	2.00	0.88	0.78
harvest planning	1	1	1	1	3	2	4	3	1	6	6	2	5	2	10	48	3	2.00	2.60	6.74
business skill	4	4	5	5	7	4	6	8	10	4	4	7	4	5	4	81	5	5.00	1.84	3.40
Enviro/resource mgn	6	7	6	6	6	6	5	9	4	5	5	5	6	12	11	99	6	6.00	2.29	5.26
foreign languages	18	18	18	17	13	12	7	18	18	18	18	13	13	16	12	229	17	17.00	3.39	11.50
Legal safety requirem	13	8	7	7	10	8	14	4	9	9	9	9	8	15	9	139	8	9.00	2.84	8.07
e- business	14	10	17	16	12	14	15	17	17	8	8	11	12	13	5	189	12	13.00	3.68	13.54
aesthetics	16	13	9	15	9	15	18	6	8	17	17	17	11	6	17	194	14	15.00	4.35	18.92
certification	15	8	11	13	8	11	8	7	7	15	15	6	9	14	6	153	9	9.00	3.43	11.74
Contractor mgmt	11	6	8	8	5	10	12	5	5	7	7	8	7	7	7	113	7	7.00	2.10	4.41
Stress mgmt	17	14	10	14	11	16	16	16	2	16	16	10	10	17	8	193	13	14.00	4.27	18.27

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7. Ranking of harvesting contractor

	Australia	BC	ent Cana	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Theor mech knowl	10	13	14	13	7	13	5	17	8	18	18	16	16	16	17	201	16	14.00	4.15	17.26
theor mech skills	9	14	13	12	13	18	12	18	6	16	16	17	17	15	16	212	17	15.00	3.40	11.55
machine oper skill	7	8	11	11	5	11	13	12	7	14	14	15	4	17	15	164	12	11.00	3.94	15.50
pract mech skills	6	10	12	10	3	9	14	15	5	17	14	10	8	10	13	156	10	10.00	3.89	15.11
value chain	4	5	7	6	8	5	2	16	15	4	4	9	2	4	4	95	5	5.00	4.20	17.67
chainsaw op	11	18	15	18	18	15	18	14	16	13	13	18	18	18	18	241	18	18.00	2.40	5.78
management skill	1	3	2	3	2	1	4	3	9	2	2	2	6	2	2	44	2	2.00	2.09	4.35
interpersonal skill	5	4	6	4	15	4	6	2	10	3	3	3	7	5	3	80	4	4.00	3.35	11.24
harvest planning	3	2	8	1	1	3	7	4	4	6	6	11	3	3	5	67	3	4.00	2.75	7.55
business skill	2	1	1	2	4	2	1	1	3	1	1	1	1	1	1	23	1	1.00	0.92	0.84
Environm/resource m	8	12	16	5	9	8	9	13	2	5	5	8	5	11	13	129	6	8.00	3.85	14.83
Risk taking	18	8	18	16	16	7	17	10	11	12	12	4	13	6	6	174	13	12.00	4.70	22.11
Relationship with loca	17	7	10	7	14	17	16	5	17	15	15	14	14	12	10	190	14	14.00	3.98	15.81
Flexibility	12	6	9	14	6	10	11	11	14	10	10	13	9	13	12	160	11	11.00	2.50	6.24
Marketing skills	15	16	5	15	10	14	15	9	1	7	7	5	12	6	9	146	9	9.00	4.61	21.21
Labour relations	16	14	3	8	11	6	3	6	13	8	8	6	15	7	8	132	7	8.00	4.11	16.89
Legal safety requirem	13	11	4	9	12	12	8	7	12	9	9	7	10	8	7	138	8	9.00	2.48	6.17
e- business	14	17	17	17	17	16	10	8	18	11	11	12	11	9	11	199	15	12.00	3.43	11.78

8. Contractors vs own operations

		Tot con	Pred con	Half/Half	Pred own	Tot own
Australia	2001		1			
	2010	1				
BC	2001		1			
	2010	1				
Cent Cana	2001		1			
	2010	1				
Chile	2001		1			
	2010	1				
E Canada	2001		1			
	2010		1			
Appal usa	2001		1			
	2010		1			
Finland	2001	1				
	2010	1				
Germany	2001				1	
	2010			1		
Idaho usa	2001	1				
	2010	1				
Lakes usa	2001	1				
	2010	1				
NE usa	2001	1				
	2010	1				
N Zealand	2001	1				
	2010	1				
PNW usa	2001		1			
	2010		1			
Sweden	2001	1				
	2010	1				
S usa	2001	1				
		1				
Total	2001	7	7	0	1	0
	2010	11	3	1	0	0
		18				

15
15

Annexure 4

Questionnaire used and results of 3rd round of Delphi Study

QUESTIONNAIRE 3rd round**HARVESTING DEVELOPMENTS IN: Minisota, Wisconsin and Michigan (USA)**

3. In the last decade, which factors have contributed most significantly to change? We are trying to move closer to a consensus result. After considering the summarised results of all the participants, please revise your weighting in the last column of the table below. **Please weight your answer out of 10.**

Aspect	Average of respondents (10)	Your second weighting	Your revised weighting
Environmental impacts	2.46	1.6	
Labour cost	1.16	1	
Fuel cost	0.08	0.25	
Capital cost	0.74	1	
Social pressure	1.30	1.6	
Technological/productivity improvements	2.61	0	
Health and safety	0.20	0	
Forest Practices code	0.38	1.6	
Labour availability	0.32	1	
Education of logging contractors	0.17	1	
Availability of stumpage	0.07	0.5	
Cost of stumpage	0.06	0.5	
Partial cutting/thinnings	0.30	0	
Changing markets	0.14	0	
Total	10	10	10

4. In the next decade what do you believe to be the greatest change drivers? After considering the summarised results of all the participants, please revise your weighting in the last column of the table below. **Please weight your answer out of 10.**

Aspect	Average weighting of respondents	Your second weighting	Your revised weighting
Environmental impacts	2.11	1.3	
Labour cost	1.02	1	
Fuel cost	0.45	1	
Capital cost	1.08	1	
Social pressure	1.11	1.3	
Technological/productivity improvements	1.86	1	
Health and safety	0.35	0	
Forest Practices code	0.32	1.34	
Systems approach from forest to processor	0.26	0	
Global competition	0.44	0	
Labour availability	0.23	0.5	
Education of logging contractors	0.10	0.5	
Availability of stumpage	0.27	0.5	
Cost of stumpage	0.06	0.5	
Partial cutting/thinnings	0.35	0	
Total	10	10	10

5. In your view what do you believe to be the greatest changes in your harvesting systems by the year 2010? Consider developments in both pulpwood and saw timber harvesting. Please rank the criteria below from 1 to 20. **Note: 1 is the highest ranking and 20 the lowest ranking.**

Changes to harvesting systems by 2010	Average Ranking (1 to 20)	Your Ranking (1 to 20)	Your new ranking (1 to 20)
A focus on the whole value chain (logistics)	2	20	
Better planning to meet environmental & social concerns	1	1	
Increased mechanization	15	14	
Increase in excavator based harvesters	17	10	
Increase in cut to length systems	10	6	
More accurate measuring on harvesters	9	9	
Increase in equipment adapted to work in thinnings and partial cutting (smaller and more maneuverable)	4	4	
Infield chipping	16	16	
Increase in Fibre recovery	12	7	
More versatile mechanised systems with regard to terrain conditions (slope, soil conditions, ground roughness)	6	2	
Harvesting systems compatible with non-timber and environmental values	3	8	
Improvement in operator skills	5	5	
Improvement in machine ergonomics	11	12	
Multi shifting of harvesting operations	19	3	
Delimiting head on stroke boom delimiters will also extract grade material in future	17	13	
Value recovery through processing yards	13	17	
Links between machine and control room (bucking on demand) Communications technology	7	18	
Use of GPS to track equipment activities	8	15	
Robotics technology	14	19	
Increase in cable yarding	20	11	

6. From the list below rank the most important requirements for a **harvesting forester** in the year 2010. Please consider the ranking of all the respondents and then re-rank your options in the last column. A harvesting forester refers to a company-employed forester who either manages contractors or runs in-house harvesting operations for the company he is employed by. Please rank all 14 of the criteria. **Note: 1 is the highest ranking and 14 the lowest ranking.**

Requirement	Ranking of respondents	Your second Ranking (1 to 14)	Your revised ranking (1 to 14)
Theoretical mechanical knowledge (engine, drive train & electrical systems on machine)	9	11	
Theoretical mechanical skills (understand what is required to repair and service a machine)	10	10	
Machine operator skills	11	13	
Practical mechanical skills (able to repair and service a machine)	12	12	
Harvesting systems and value chain knowledge (includes machine assessment for a job, combining machines to optimise value chain and costing out of the system).	4	8	
Chainsaw operator skills	14	9	
Management skills (planning, leading, organising and controlling, including labour relations).	3	5	
Interpersonal skills (includes relationship with local communities)	1	2	
Specific knowledge and skills in harvest planning (includes both operational and tactical (3-5 year) planning)	2	1	
Business skills (strategy, financial & marketing skills, including risk assessment, use of e-business and stress management)	5	7	
Environmental/resource management (including certification & understanding of aesthetics)	6	3	
Foreign languages	13	14	
Competence in legal safety requirements	8	6	
Contractor management	7	4	

7. From the list below rank the most important requirements for a **harvesting contractor** in the year 2010. Please consider the ranking of all the respondents and then re-rank your options in the last column. A harvesting contractor refers to an individual who runs his or her own harvesting operation and is contracted in by a forestry company or processing company to do the harvesting. Please rank all 13 of the criteria. **Note: 1 is the highest ranking and 13 the lowest ranking.**

Requirement	Ranking of respondents	Your second Ranking (1 to 13)	Your revised ranking (1 to 13)
Theoretical mechanical knowledge	11	7	
Theoretical mechanical skills	12	5	
Machine operator skills	9	6	
Practical mechanical skills	8	4	
Harvesting systems and value chain knowledge	5	12	
Chainsaw operator skills	13	13	
Management skills (Planning, leading, organising and controlling of the business, including labour relations.	2	8	
Interpersonal skills (Includes relationship with local communities)	4	9	
Specific knowledge and skills in harvest planning	3	3	
Business skills (strategy, financial & marketing skills, including risk assessment & use of e-business	1	2	
Environmental/resource management	7	1	
Flexibility in harvesting systems/skilled on various equipment	10	11	
Competence in legal safety requirements	6	10	

Question 8

In your region, what **percentage** of harvesting operations will be outsourced and what percentage will be company-owned (in-house) by 2010?

	2001	2010
Average of respondents. e.g. 40% of respondents = totally outsourced in 2001 and 73% of respondents = totally outsourced in 2010.	Totally outsourced:40% Pred outsourced: 53% Half/half : 0% Pred inhouse: 7% Total inhouse: 0%	Totally outsourced:73% Pred outsourced: 20% Half/half : 7% Pred inhouse: 0% Total inhouse: 0%
Your previous answer	Totally outsourced	Totally outsourced
Your new answer in percent	Outsourced: % Inhouse: %	Outsourced: % Inhouse: %

Question 9

In your region, what will be the size of the contracts that will be put out per year to contractors for ground based harvesting (not cable yarding)? The objective of this question is to determine how forestry companies view the size of the contractors they would be working with in 2010, e.g. will companies be working with a few large contractors, many small contractors, or a combination of the above. **Please state the percentage for each category given below:**

	Current size of annual contracts	Size of annual contracts in 2010
Less than 50 000 m ³ /year	%	%
50 000 to 100 000 m ³ /year	%	%
100 000 to 200 000 m ³ /year	%	%
200 000 to 500 000 m ³ /year	%	%
500 000 to 1 million m ³ /year	%	%
> 1 million m ³ /year	%	%

3. In the last decade, which factors have contributed most significantly to change (please weight your answer out of 10)

	Australia	BC	ent Canad	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Weight	Median	Std dev	Variance
Environmental	3	1	3	3	3	2.5	3	3	1.5	2	2	2.1	2	2	2.0	35.1	2.34	2.10	0.64	0.41
Labour cost	0	0.3	1	1	0	1	1	1	1	1	1	1	3	1	3.0	16.3	1.09	1.00	0.86	0.74
Fuel cost	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.1	0.01	0.00	0.03	0.00
Capital cost	1	0.3	1	1	1	1	0	0	1	1	2	0.3	1	1	0.0	11.6	0.77	1.00	0.55	0.30
Social pressure	1	1.5	1	2	2	1	0	2	1.5	2	2	1.3	0	2	1.0	20.3	1.35	1.50	0.69	0.48
Technological/prod	3	2	2	3	3	2	4	3	1	3	3	2	3	2	2.5	38.5	2.57	3.00	0.73	0.53
Health & safety	1	0.3	1	0	0.5	0.5	0	0	0	0	0	0.2	0	0	0.0	3.5	0.23	0.00	0.36	0.13
Forest code	0.5	2.5	1	0	0	0.5	0	0	0.5	1	0	0.4	1	0	0.0	7.4	0.49	0.40	0.68	0.46
Labour availability	0	0.1	0	0	0.5	0.25	0	0	1	0	0	0.3	0	1	0.5	3.65	0.24	0.00	0.36	0.13
Contractor education	0	0	0	0	0	0.5	0	0	1	0	0	0.2	0	0	0.0	1.7	0.11	0.00	0.28	0.08
Stumpage availability	0	0.5	0	0	0	0	0	1	0.5	0	0	0.5	0	0	0.0	2.5	0.17	0.00	0.31	0.10
Cost of stumpage	0	0.3	0	0	0	0	2	0	0.5	0	0	0	0	0	0.0	2.8	0.19	0.00	0.52	0.27
Partial cutting	0.5	1	0	0	0	0.25	0	0	0.5	0	0	1.5	0	0	0.0	3.75	0.25	0.00	0.45	0.21
Changing markets	0	0.1	0	0	0	0.5	0	0	0	0	0	0.2	0	1	1.0	2.8	0.19	0.00	0.36	0.13
Total	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	150	10.00	10.00		

4. In the next decade what do you believe to be the greatest change drivers

	Australia	BC	ent Canad	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Weight	Median	Std dev	Variance
Environmental	2	1.3	2	3	2.5	2	3	3	1.25	2	2	2.1	2	2	2.00	32.15	2.14	2.00	0.53	0.29
Labour cost	0	0.1	1	1	0	1.25	1	0	1	1	1	0.8	2	1	2.00	13.15	0.88	1.00	0.64	0.41
Fuel cost	0	0.2	1	1	1	0	0	1	1	1	0	0.2	0	1	0.50	7.9	0.53	0.50	0.48	0.23
Capital cost	2	0.1	1	1	1	0.75	0	1	1	1	2	0.4	1	1	0.50	13.75	0.92	1.00	0.56	0.31
Social pressure	0	1.6	1	1	2	0.75	0	0	1.25	2	2	1.3	0	1	1.00	14.9	0.99	1.00	0.74	0.54
Technological/prod	2	0.7	2	3	1	1	3	2	1	2	2	1.6	2	2	2.00	27.3	1.82	2.00	0.67	0.45
Health & safety	2	0.5	1	0	0	1.5	0	0	0	0	0	0.5	0	0	0.50	6	0.40	0.00	0.63	0.40
Forest code	0	1.3	0	0	0.5	0.5	0	0	1.25	0	0	0.4	0	1	0.00	4.95	0.33	0.00	0.48	0.23
From forest to plant	1	0.1	1	0	0	0.5	0	0	0	0	1	0.2	0	0	0.00	3.8	0.25	0.00	0.41	0.17
Global competition	1	1.5	0	0	0	1	1	0	0	1	0	0.7	2	1	1.00	10.2	0.68	1.00	0.64	0.41
Labour availability	0	0.2	0	0	0	0.25	1	1	0.5	0	0	0.5	1	0	0.00	4.45	0.30	0.00	0.40	0.16
Contractor educ	0	0.1	0	0	0	0.25	0	0	0.5	0	0	0.2	0	0	0.50	1.55	0.10	0.00	0.18	0.03
Avail of stumpage	0	0.8	0	0	1	0	0	2	0.5	0	0	0.3	0	0	0.00	4.6	0.31	0.00	0.57	0.33
Cost of stumpage	0	0.5	0	0	0	0	0	0	0.5	0	0	0	0	0	0.00	1	0.07	0.00	0.18	0.03
Partial cutting	0	1	0	0	1	0.25	1	0	0.25	0	0	0.8	0	0	0.00	4.3	0.29	0.00	0.43	0.18
Total	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	150	10.00	10.00		

5. In your view, the 3 greatest changes in harvesting systems by 2010

	Australia	BC	ent Canad	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Value chain focus	1	3	2	2	6	1	1	4	15	2	2	1	1	2	2	45	2	2.00	3.59	12.86
Better planning	3	1	1	1	3	2	2	2	1	1	4	2	9	1	1	34	1	2.00	2.09	4.35
Increased mechaniz	10	19	20	12	16	5	12	16	14	7	3	12	15	15	7	183	13	12.00	5.00	25.03
Excavator harvesters	5	16	11	15	17	17	20	17	10	16	14	19	16	12	19	224	18	16.00	3.99	15.92
Cut to length	6	6	4	11	1	18	20	13	6	10	12	16	19	14	17	173	12	12.00	5.91	34.98
Measuring on harv	15	9	12	18	8	8	3	9	9	9	11	8	5	13	16	153	8	9.00	4.04	16.31
Incr in thinnings	7	4	5	3	2	9	4	3	4	6	19	14	6	9	12	107	5	6.00	4.75	22.55
Infield chipping	4	14	13	16	11	16	11	18	16	15	17	15	17	10	13	206	15	15.00	3.61	13.07
> in fibre recovery	2	5	6	19	10	19	13	10	7	14	18	6	7	6	15	157	9	10.00	5.53	30.55
Machine/terrain	9	8	7	6	5	4	9	7	2	4	6	11	11	11	6	106	4	7.00	2.76	7.64
non timber values	8	2	3	5	4	10	10	1	8	3	9	3	10	3	5	84	3	5.00	3.22	10.40
> in operator skills	12	7	8	4	7	15	8	5	5	5	8	9	13	8	4	118	6	8.00	3.29	10.84
> in ergonomics	13	10	9	9	12	11	20	12	12	11	15	10	8	7	11	170	11	11.00	3.13	9.81

Multi shifting	14	17	19	20	15	20	20	19	3	20	20	20	12	16	10	245	20	19.00	4.92	24.24
Delimbers - process	16	18	15	17	18	14	20	8	13	17	7	17	14	5	18	217	17	16.00	4.47	19.98
Merchandising yards	18	11	17	8	14	7	20	11	17	13	10	4	18	14	200	14	14.00	4.75	22.52	
Links machine & cont	11	15	18	7	9	6	7	6	18	12	5	5	2	17	3	141	7	7.00	5.45	29.69
GPS	17	13	10	13	13	13	5	15	20	8	16	7	3	4	9	166	10	13.00	5.02	25.21
Robotics technology	20	20	14	10	19	12	6	14	19	18	13	13	4	19	8	209	16	14.00	5.24	27.50
> cable yarding	19	12	16	14	20	3	20	12	11	19	1	18	20	20	20	225	19	18.00	6.22	38.71

6. Ranking of harvesting forester

	Australia	BC	ent Canad	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Theor mech knowl	10	9	11	10	11	10	9	11	11	9	10	9	10	8	10	148	9	10.00	0.92	0.84
theor mech skills	11	10	10	11	10	11	11	12	10	10	9	10	11	9	11	156	10	10.00	0.83	0.69
machine oper skill	9	11	9	12	12	12	10	9	13	11	12	12	12	11	13	168	11	12.00	1.37	1.89
pract mech skills	12	12	13	9	13	8	13	10	12	12	11	14	13	10	12	174	12	12.00	1.68	2.83
value chain	5	5	3	4	1	5	1	4	8	4	1	4	1	4	2	52	4	4.00	2.00	3.98
chainsaw op	13	13	12	14	14	14	14	13	9	13	13	13	14	14	14	197	14	13.00	1.30	1.70
management skill	3	2	4	3	4	3	2	2	5	2	2	3	2	3	3	43	2	3.00	0.92	0.84
interpersonal skill	2	1	2	2	2	1	3	1	2	1	3	1	3	1	1	26	1	2.00	0.80	0.64
harvest planning	1	3	1	1	3	2	4	3	1	3	6	2	5	2	7	44	3	3.00	1.87	3.50
business skill	4	4	5	5	7	4	6	5	7	5	4	5	4	5	4	74	5	5.00	1.03	1.07
Enviro/resource mgmt	6	6	6	6	6	6	5	6	3	6	5	6	6	6	8	87	6	6.00	1.01	1.03
foreign languages	14	14	14	13	9	13	7	14	14	14	14	11	9	13	9	182	13	13.00	2.45	5.98
Legal safety requirem	7	8	8	7	8	7	8	7	6	8	8	8	8	12	6	116	8	8.00	1.39	1.92
Contractor mgmt	8	7	7	8	5	9	12	8	4	7	7	7	7	7	5	108	7	7.00	1.86	3.46

7. Ranking of harvesting contractor

	Australia	BC	ent Canad	Chile	E Canada	Appal usa	Finland	Idaho usa	Lakes usa	NE usa	N Zealand	PNW usa	Sweden	S usa	Germany	Total	Ranking	Median	Std dev	Variance
Theor mech knowl	12	11	12	11	7	11	7	12	11	13	13	11	11	11	12	165	11	11.00	1.77	3.14
theor mech skills	11	12	11	10	11	12	11	13	12	11	12	12	12	10	11	171	12	11.00	0.83	0.69
machine oper skill	9	9	9	9	5	10	10	8	8	9	10	10	5	12	10	133	9	9.00	1.85	3.41
pract mech skills	8	8	8	8	4	7	6	10	9	8	11	8	9	7	9	120	8	8.00	1.65	2.71
value chain	4	5	6	6	8	5	2	5	7	5	4	7	2	4	4	74	5	5.00	1.71	2.92
chainsaw op	13	13	13	13	13	13	13	11	13	12	9	13	13	13	13	188	13	13.00	1.13	1.27
management skill	1	1	2	3	2	1	3	2	2	2	2	2	4	2	2	31	2	2.00	0.80	0.64
interpersonal skill	5	2	4	4	12	4	4	3	4	3	3	3	7	5	3	66	4	4.00	2.41	5.83
harvest planning	3	4	5	1	3	3	5	4	3	4	6	5	3	3	5	57	3	4.00	1.26	1.60
business skill	2	3	1	2	1	2	1	1	1	1	1	1	1	1	1	20	1	1.00	0.62	0.38
Environ/resource mg	7	7	7	5	10	6	8	7	5	7	5	6	6	8	8	102	7	7.00	1.37	1.89
Flexibility	10	10	10	12	6	8	12	9	10	10	8	9	8	9	7	138	10	9.00	1.66	2.74
Legal safety requirem	6	6	3	7	9	9	9	6	6	6	7	4	10	6	6	100	6	6.00	1.91	3.67

8. Contractors vs own operations

		Outsource	Inhouse	100-200 0	00-50000	500-1mil	>1mil	
Australia	2001	95	5	35	35	0	0	30
	2010	100	0	40	30	0	0	30
BC	2001	75	25	25	30	15	5	25
	2010	75	25	25	35	15	5	20
Cent Canad	2001	75	25					0
	2010	90	10					0
Chile	2001	75	25	30	20	0	0	50
	2010	90	10	35	25	5	0	35
E Canada	2001	85	15	5	0	0	0	95
	2010	95	5	10	0	0	0	90
Appal usa	2001	100	0	0	0	0	0	100
	2010	100	0	0	0	0	0	100
Finland	2001	95	5	10	5			85
	2010	99	1	25	7	2	1	65
Germany	2001	30	70	15	5	0	0	80
	2010	50	50	30	30	15	5	20
Idaho usa	2001	93	7	10	0	0	0	90
	2010	93	7	10	0	0		90
Lakes usa	2001	100	0					0
	2010	100	0					0
NE usa	2001	95	5	4	1			95
	2010	98	2	3	1			96
N Zealand	2001	98	2					0
	2010	90	10					0
PNW usa	2001	75	25	20	10	0	0	70
	2010	85	15	20	10	0	0	70
Sweden	2001	70	30					0
	2010	80	20					0
S usa	2001	100	0	25	0	0	0	75
	2010	100	0	35	0	0	0	65
Average	2001	84	16	179	106	15	5	795
Average	2010	90	10	233	138	37	11	681
				23	13	2	1	100
				29	17	5	1	85.66038

PRIORITY PRESS RELEASE

Date: Release on 01 October 2001

From:

The Mayor's Parlour
Mkhondo Local Municipality
(previously Piet Retief)
Tel : 017 682 2211
Fax : 017 826 0330

The President's Office
China South Africa Trade & Investment Promotion Centre
1177 Pretorius Street, Hatfield
Tel : 012 430 6330 (15 lines)
Fax : 012 430 6333

In April 2001, Mr AM Gamede, Mayor of Mkhondo Local Municipality, previously Piet Retief, led delegation to China on a Municipal Local Economic Development Mission facilitated by China South Africa Trade & Investment Promotion Centres to invite potential investors to come to South Africa to set up their projects. Many potential investment opportunities were identified with the help of the Chinese local authorities and MOFTEC offices who invited approved companies with projects earmarked for outward investment to attend the investment seminars that were arranged by China South Africa Trade & Investment Promotion Centres, and to open discussions on a 1-on-1 basis with the participants.

Since the mission in April the Mkhondo Municipality, assisted by China South Africa Trade & Investment Promotion Centres in Pretoria, together with the local participants, have been busy with negotiations and preparing for the investors visits to South Africa. Several potential investors have already made exploratory visits to South Africa and completed their feasibility studies. They are now busy preparing their projects for establishment.

One of these companies, Skyway Enterprises Group, have been engaged in investigations, deliberations and negotiations with Mkhondo Municipality on the establishment of an **INDUSTRIAL PARK of 10 hectares in Piet Retief**.

On 20 September, Mr Rambol Ho, Chairman, of Skyway Enterprises Group, and Ms Ally Tan, Managing Director of ChongQing Sino-Hongda Motor Industries, arrived in South Africa, to conclude their preparatory work.

After meetings with Trade & Investment SA, DTI, SABS and other

Included in the Media Pack attached :

Mayor's Speech at reception

Letter to TISA and SABS

institutions the final negotiations were concluded successfully, and on 27th September 2001 the parties signed an agreement to establish the **INDUSTRIAL PARK** with immediate effect. The Industrial Park will initially accommodate the following factories.

1. Motor Cycles Assembly Plant and component factory.

- 1000 to 2000 units per month of motor bikes and tri-cycle "tuk-tuk" bikes will be manufactured for RSA and SADC. Engines and chassis will be imported for the 1st year. Other components will be manufactured locally by sub-contracted SMMEs from the start. Value of the initial investment R4,5 million.

2. Timber Products Factory.

For the production of building materials including wooden window and door frames, laminated wooden panels, flooring and a variety consumer products for the export market. Paper pulp, timber, and allied products will be processed. Value of investment R9 million.

The purchase of an existing sawmill is also under consideration which would increase the investment to over R39 million.

3. Pharmaceutical Supplies factory

to manufacture solutions bags, capsules casings and tablets. Value of investment R54 million.

4. Construction Company

To develop :-

- The Industrial Park
- Low cost housing - 1000 units
- Flats and townhouses - 100 units
- Other construction projects, especially on B.O.T. basis as Public/Private Partnership, such as Waste Water Treatment plants are also being explored.

5. Liquid Soap & Shampoo factory

to manufacture the highest quality products for export.

6. Plastics extrusion factory for the manufacture of motor cycle components for the above factory as well as toys and other consumer goods for local market to substitute imports.

7. An Export Company for the export of pulp, wood chips, timber products, coal, agricultural and other commodities.

8. Container depot and dry port will be established to facilitate the export of local commodities and the inputs and outputs to and from the industrial park.

9. Other manufacturing projects still under investigation include :-

- Motor vehicle tyres
- Iron and steel rolling mill
- Several imported items that can be substituted by locally made products.

The total value of the initial commitment from the signed agreements will exceed **R100 million**, delivering a total of **1350 new sustainable jobs**. The projects still under consideration are valued at 2 to 3 times this amount and the SMME cluster to be formed will increase the number of jobs substantially.

A concerted effort will now be launched to attract further investments into the industrial park. Not only from China but also from India, SE Asia, Japan, Middle East, Europe and America as well.

Although local partners have been identified for most of the projects agreed upon South African parties wishing to participate or invest in some of the other projects, or who have an interest in joining the local project consortia are welcome to contact the office of the Mayor of Piet Retief, or office of the President of China SA Trade & Investment Promotion Centres for details of how they can get involved.

Previously published news article

SKYWAY Brief Introduction

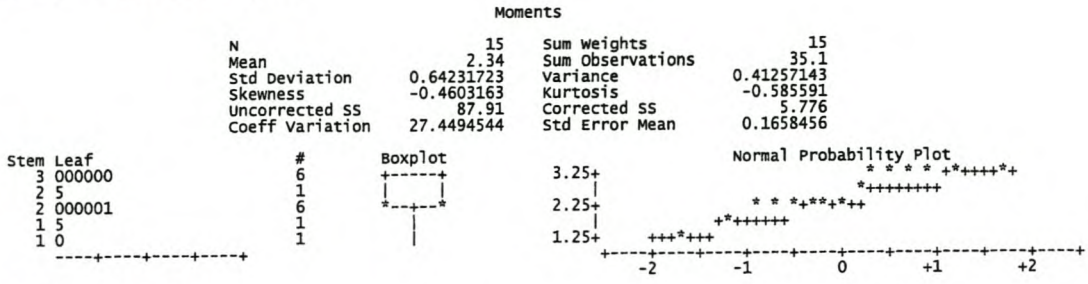
Photos

Annexure 5

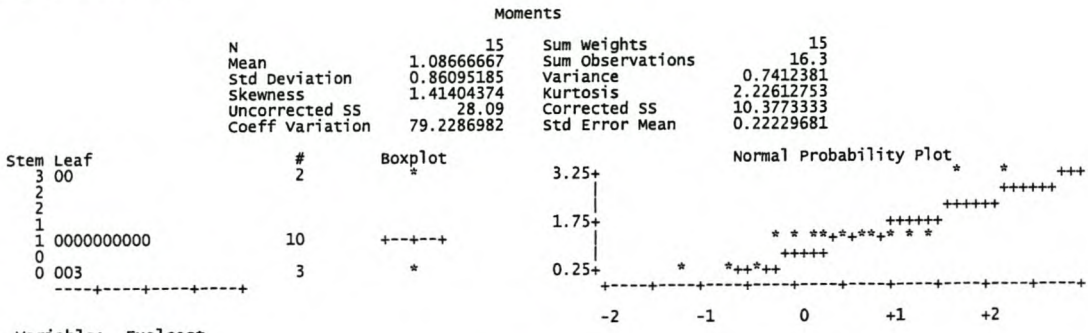
Box Plot results of Question 3 of the Delhpi study

Question 3

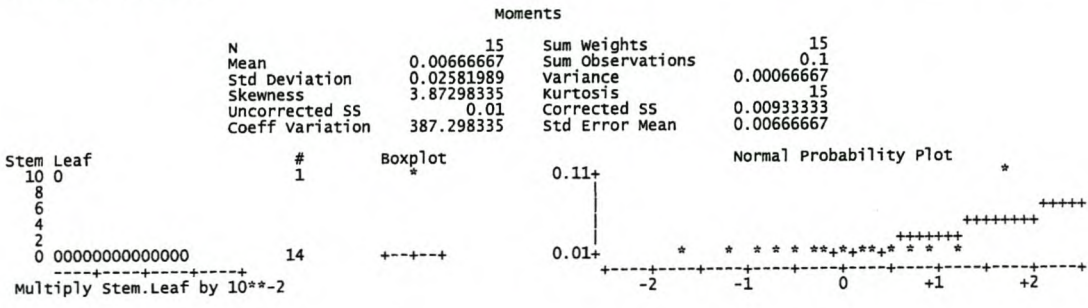
Variable: Environmental Impacts



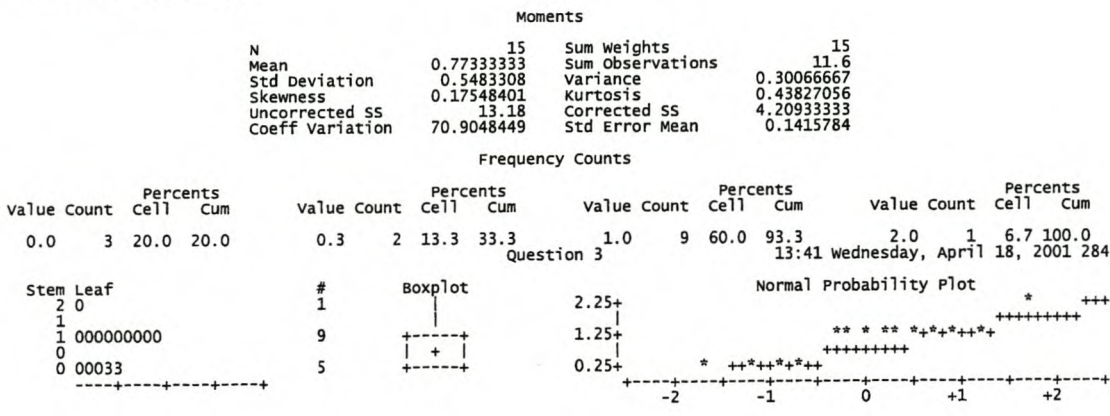
Variable: Labour Cost



Variable: Fuelcost



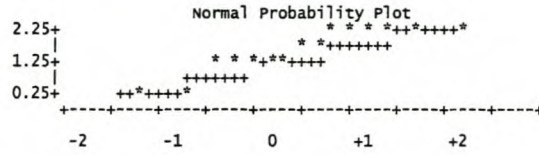
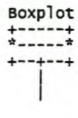
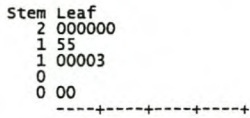
Variable: Capital Cost



Variable: Social Pressure

Moments

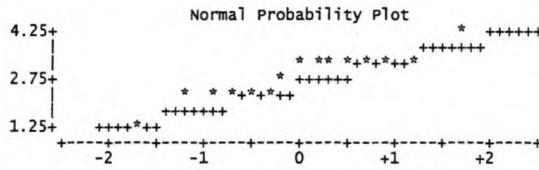
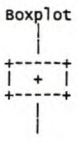
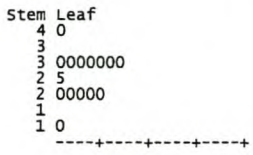
N	15	Sum Weights	15
Mean	1.3533333	Sum Observations	20.3
Std Deviation	0.69268285	Variance	0.47980952
Skewness	-0.8691819	Kurtosis	-0.035833
Uncorrected SS	34.19	Corrected SS	6.71733333
Coeff Variation	51.1834615	Std Error Mean	0.17884994



Variable: Technological/Productivity improvements

Moments

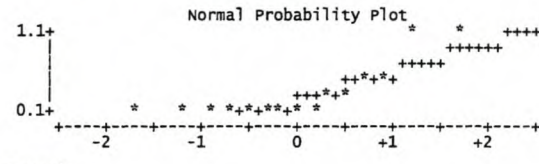
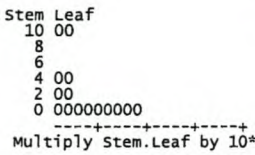
N	15	Sum Weights	15
Mean	2.5666667	Sum Observations	38.5
Std Deviation	0.72866479	Variance	0.53095238
Skewness	-0.2643913	Kurtosis	0.52152667
Uncorrected SS	106.25	Corrected SS	7.43333333
Coeff Variation	28.3895374	Std Error Mean	0.18814044



Variable: Health and safety

Moments

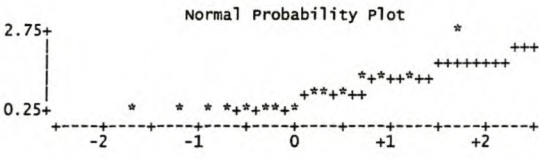
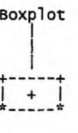
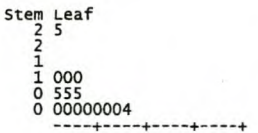
N	15	Sum Weights	15
Mean	0.23333333	Sum Observations	3.5
Std Deviation	0.35989416	Variance	0.12952381
Skewness	1.45884077	Kurtosis	0.99791223
Uncorrected SS	2.63	Corrected SS	1.81333333
Coeff Variation	154.240356	Std Error Mean	0.09292427



Variable: Forcode

Moments

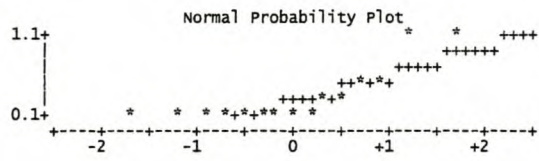
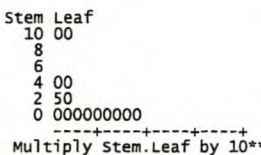
N	15	Sum Weights	15
Mean	0.49333333	Sum Observations	7.4
Std Deviation	0.68187417	Variance	0.46495238
Skewness	1.98328739	Kurtosis	4.78426071
Uncorrected SS	10.16	Corrected SS	6.50933333
Coeff Variation	138.217737	Std Error Mean	0.17605915



Variable: Labour availability

Moments

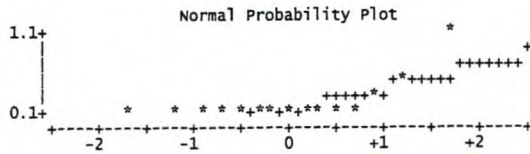
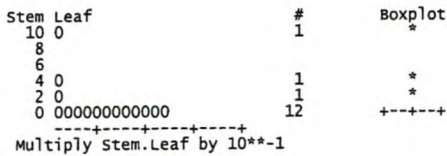
N	15	Sum Weights	15
Mean	0.24333333	Sum Observations	3.65
Std Deviation	0.35600294	Variance	0.1267381
Skewness	1.42889312	Kurtosis	0.97030587
Uncorrected SS	2.6625	Corrected SS	1.77433333
Coeff Variation	146.302579	Std Error Mean	0.09191956



Variable: Education of logging contractors

Moments

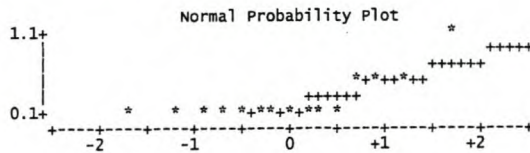
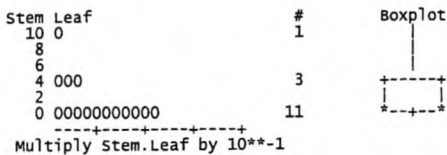
N	15	Sum Weights	15
Mean	0.11333333	Sum Observations	1.7
Std Deviation	0.27996598	Variance	0.07838095
Skewness	2.77205775	Kurtosis	7.72254581
Uncorrected SS	1.29	Corrected SS	1.09733333
Coeff Variation	247.02881	Std Error Mean	0.07228691



Variable: Availability of stumpage

Moments

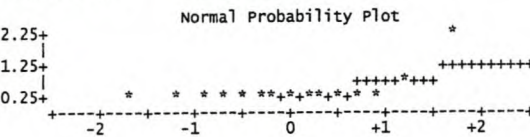
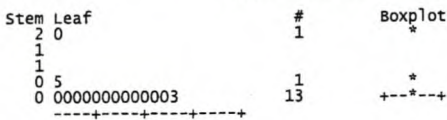
N	15	Sum Weights	15
Mean	0.16666667	Sum Observations	2.5
Std Deviation	0.3086067	Variance	0.0952381
Skewness	1.79155091	Kurtosis	2.625
Uncorrected SS	1.75	Corrected SS	1.33333333
Coeff Variation	185.16402	Std Error Mean	0.07968191



Variable: Cost of stumpage

Moments

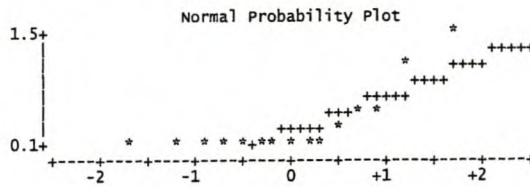
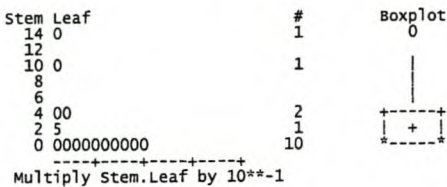
N	15	Sum Weights	15
Mean	0.18666667	Sum Observations	2.8
Std Deviation	0.52217494	Variance	0.27266667
Skewness	3.42494394	Kurtosis	12.2478368
Uncorrected SS	4.34	Corrected SS	3.81733333
Coeff Variation	279.736574	Std Error Mean	0.13482499



Variable: Partial Cutting/thinnings

Moments

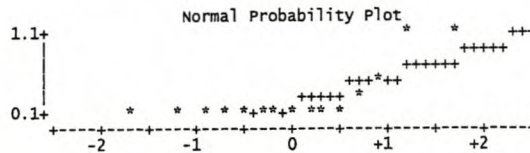
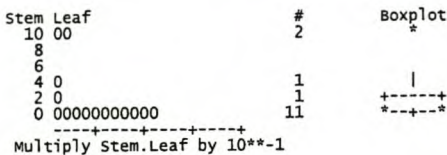
N	15	Sum Weights	15
Mean	0.25	Sum Observations	3.75
Std Deviation	0.45316348	Variance	0.20535714
Skewness	1.99268049	Kurtosis	3.5391886
Uncorrected SS	3.8125	Corrected SS	2.875
Coeff Variation	181.265393	Std Error Mean	0.11700631



Variable: Changing markets

Moments

N	15	Sum Weights	15
Mean	0.18666667	Sum Observations	2.8
Std Deviation	0.35630378	Variance	0.12695238
Skewness	1.89698149	Kurtosis	2.3470041
Uncorrected SS	2.3	Corrected SS	1.77733333
Coeff Variation	190.877023	Std Error Mean	0.09199724



Annexure 6

Box Plot results of Question 4 of the Delhpi study

Question 4

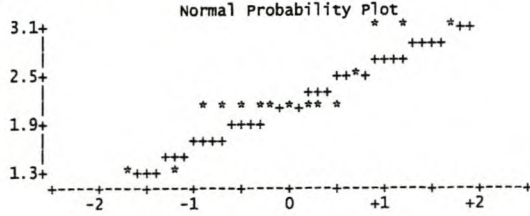
Variable: Environmental impacts

Moments

N	15	Sum Weights	15
Mean	2.1433333	Sum Observations	32.15
Std Deviation	0.53481194	Variance	0.28602381
Skewness	0.32062697	Kurtosis	-0.0377199
Uncorrected SS	72.9125	Corrected SS	4.00433333
Coeff Variation	24.9523455	Std Error Mean	0.13808785

Stem Leaf	#
30 000	3
28	
26	
24 0	1
22	
20 00000000	9
18	
16	
14	
12 50	2

Multiply Stem.Leaf by 10**=-1



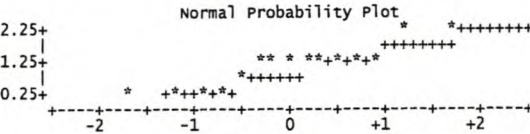
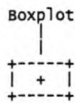
Variable: Labour cost

Moments

N	15	Sum Weights	15
Mean	0.87666667	Sum Observations	13.15
Std Deviation	0.63719998	Variance	0.40602381
Skewness	0.1306001	Kurtosis	-0.2086019
Uncorrected SS	17.2125	Corrected SS	5.68433333
Coeff Variation	72.6844079	Std Error Mean	0.16452433

Stem Leaf	#
2 00	2
1	
1 00000002	8
0 8	1
0 0001	4

Multiply Stem.Leaf by 10**=-1



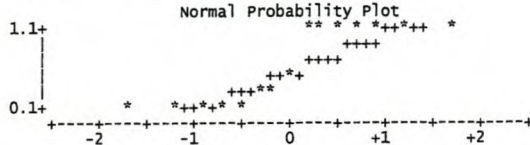
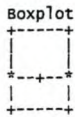
Variable: Fuel cost

Moments

N	15	Sum Weights	15
Mean	0.52666667	Sum Observations	7.9
Std Deviation	0.47579507	Variance	0.22638095
Skewness	-0.0442508	Kurtosis	-2.1420783
Uncorrected SS	7.33	Corrected SS	3.16933333
Coeff Variation	90.3408368	Std Error Mean	0.12284976

Stem Leaf	#
10 0000000	7
8	
6	
4 0	1
2 00	2
0 00000	5

Multiply Stem.Leaf by 10**=-1



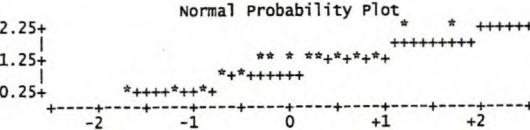
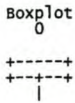
Variable: Capital cost

Moments

N	15	Sum Weights	15
Mean	0.91666667	Sum Observations	13.75
Std Deviation	0.55922991	Variance	0.3127381
Skewness	0.47955938	Kurtosis	0.73419134
Uncorrected SS	16.9825	Corrected SS	4.37833333
Coeff Variation	61.0068996	Std Error Mean	0.14439254

Stem Leaf	#
2 00	2
1	
1 00000000	8
0 58	2
0 014	3

Multiply Stem.Leaf by 10**=-1



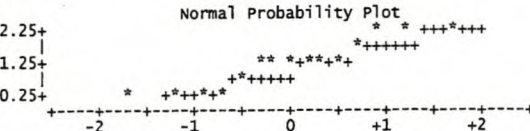
Variable: Social pressure

Moments

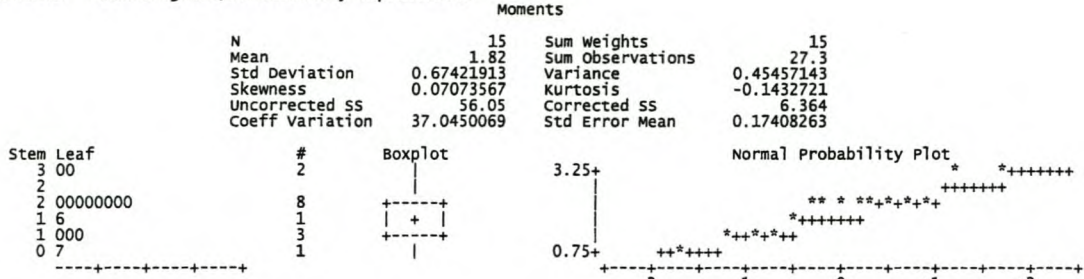
N	15	Sum Weights	15
Mean	0.99333333	Sum Observations	14.9
Std Deviation	0.73554321	Variance	0.54102381
Skewness	-0.1254053	Kurtosis	-1.0934306
Uncorrected SS	22.375	Corrected SS	7.57433333
Coeff Variation	74.0479739	Std Error Mean	0.18991644

Stem Leaf	#
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1 6	1
1 000023	6
0 8	1
0 0000	4

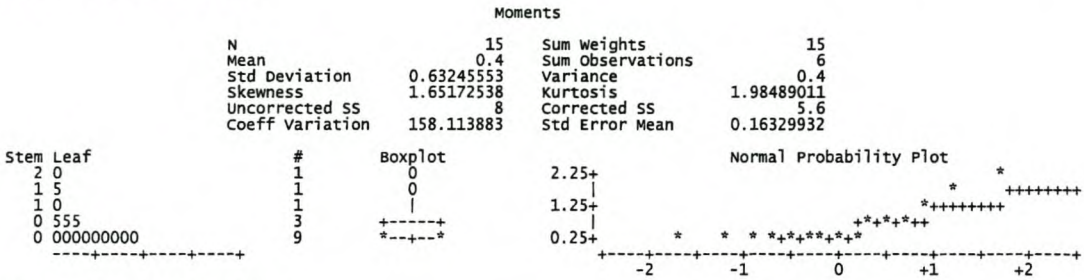
Multiply Stem.Leaf by 10**=-1



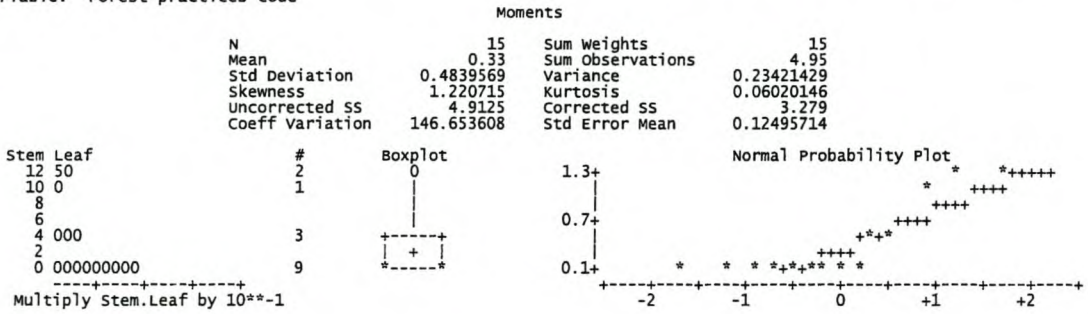
Variable: Technological/Productivity improvements



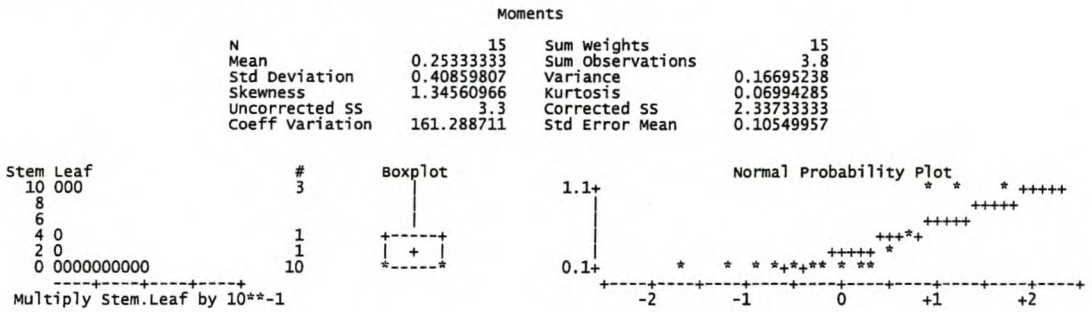
Variable: Health and safety



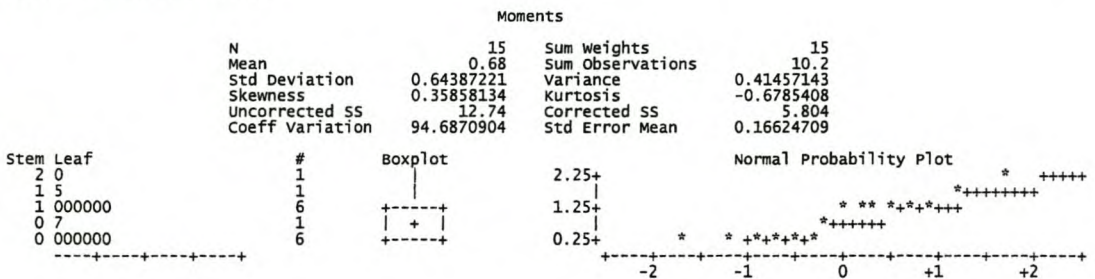
Variable: Forest practices code



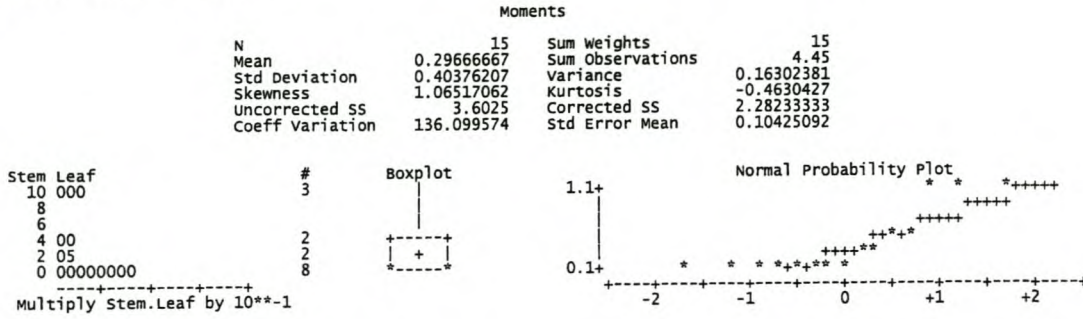
Variable: Systems approach from forest to processor



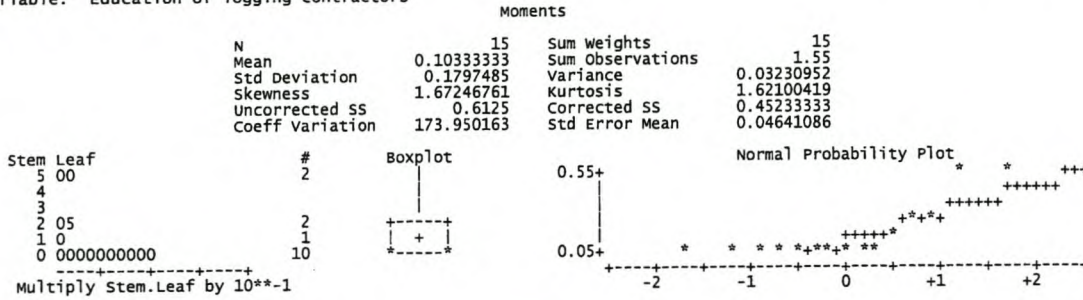
Variable: Global competition



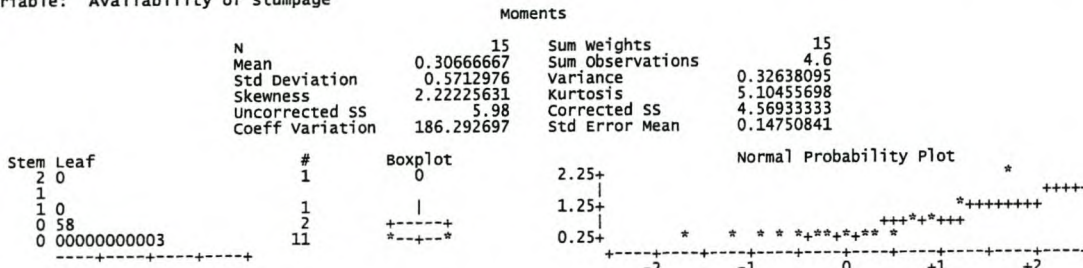
variable: Labour availability



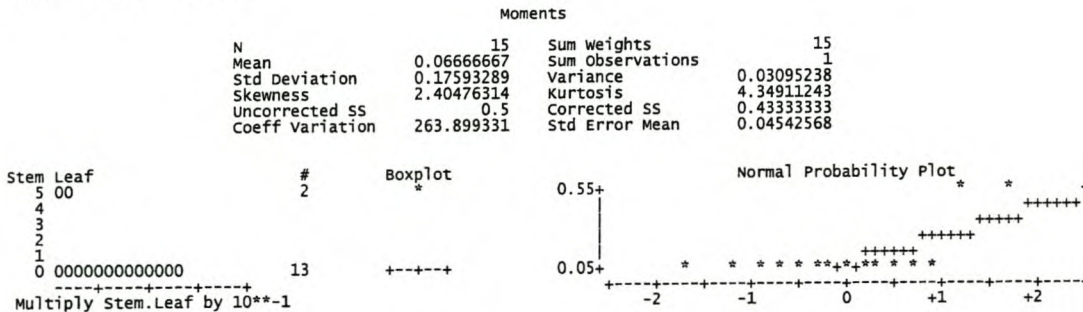
variable: Education of logging contractors



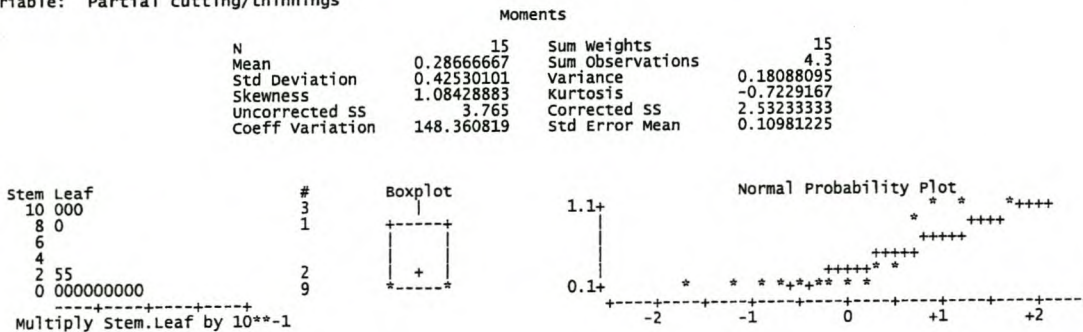
variable: Availability of stumpage



variable: Cost of stumpage



variable: Partial cutting/thinnings

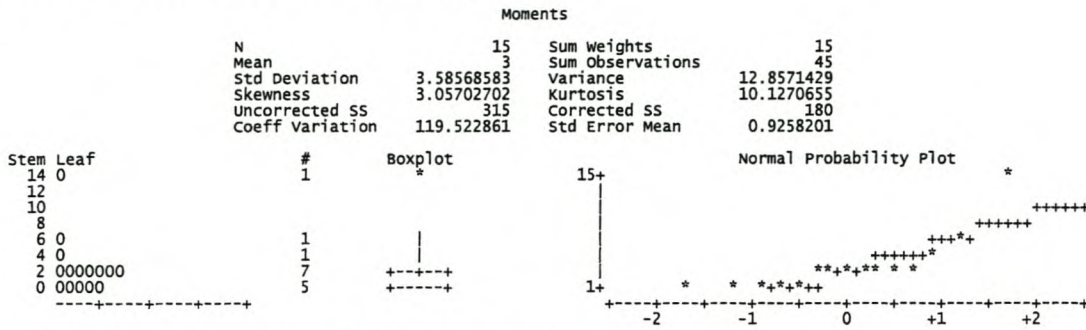


Annexure 7

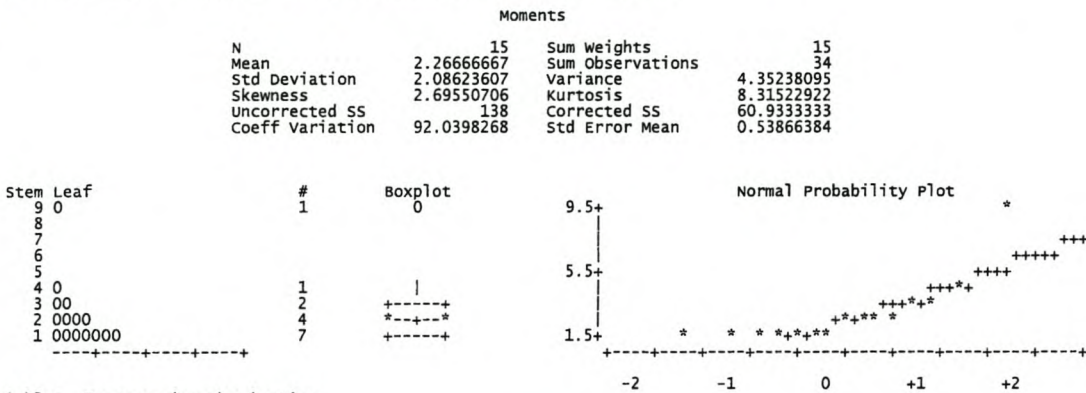
Box Plot results of Question 5 of the Delhpi study

Question 5

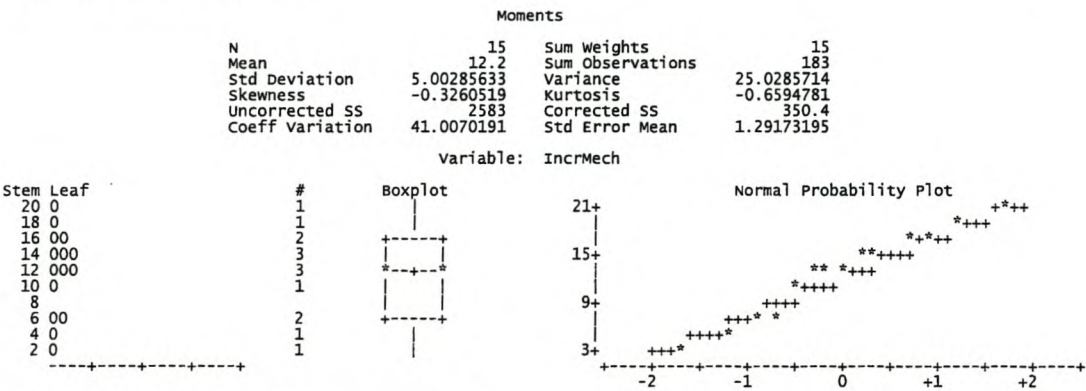
variable: A focus on the whole value chain (logistics)



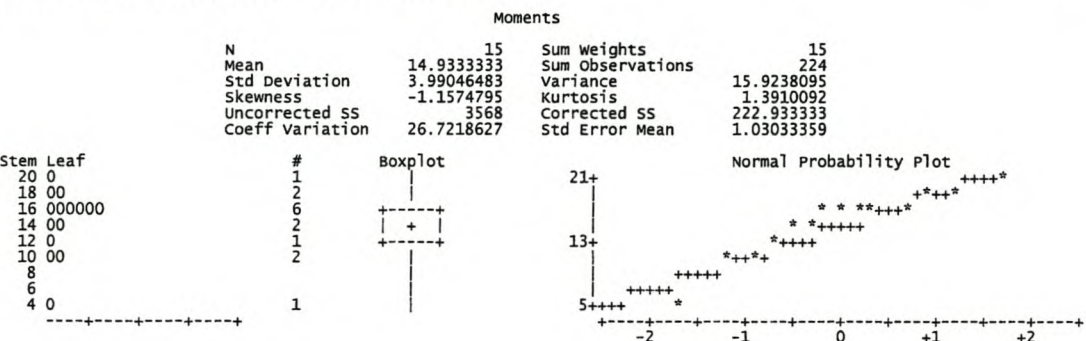
variable: Better Planning to meet environmental and social concerns



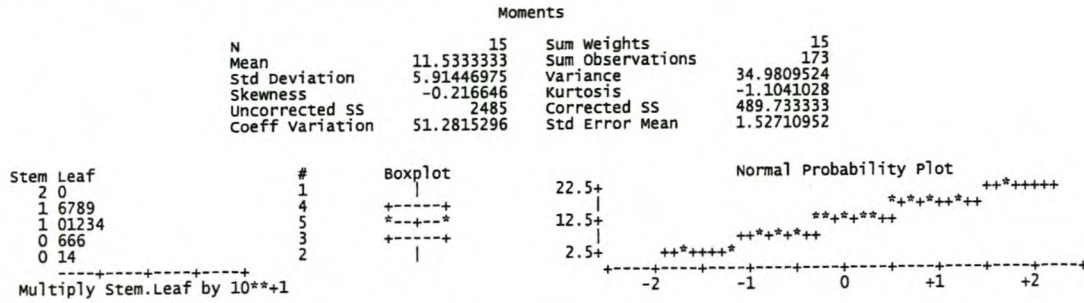
variable: Increased mechanisation



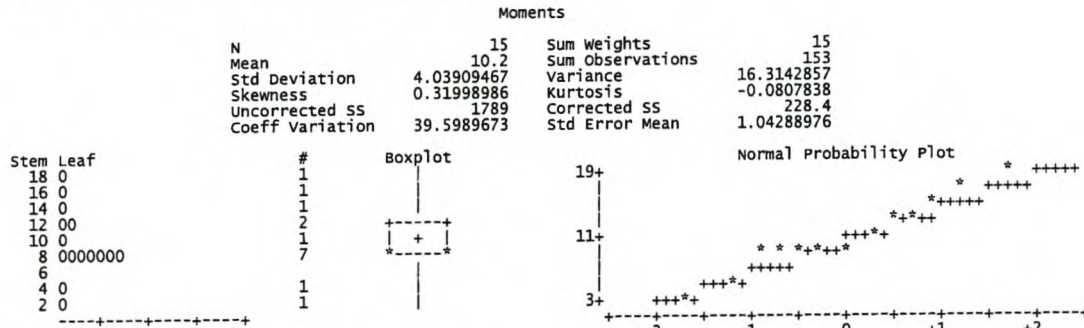
variable: Increase in excavator-based harvesters



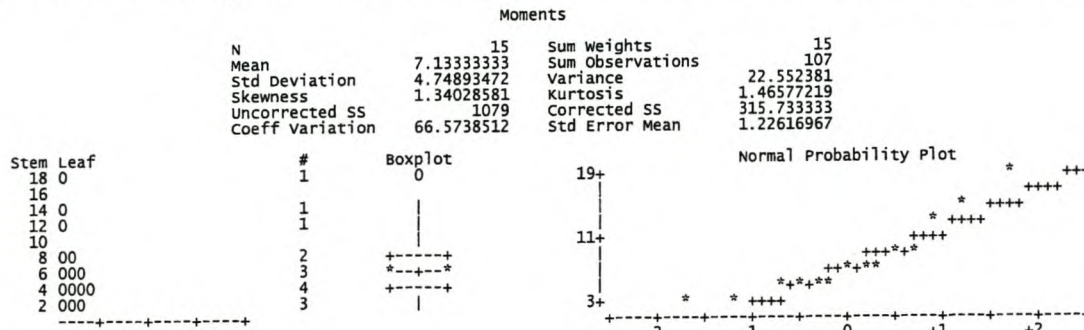
Variable: Increase in cut-to-length systems



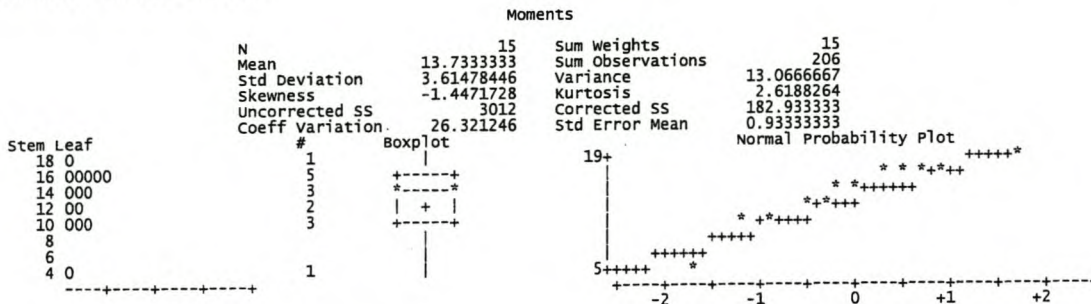
Variable: More accurate measuring on harvesters



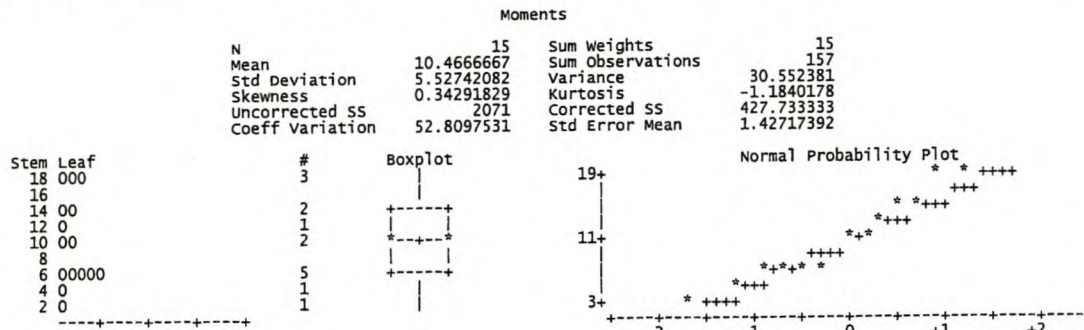
Variable: Increase in equipment adapted to work in thinnings and partial cutting (smaller and more maneuverable)



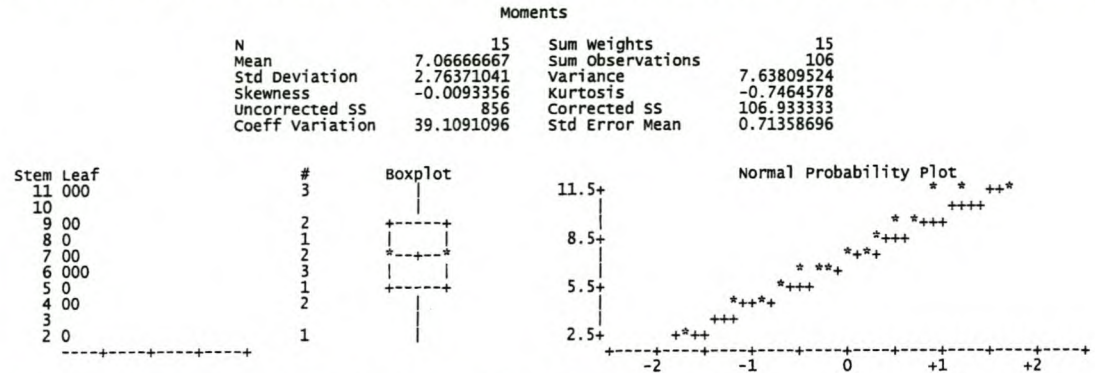
Variable: Infield chipping



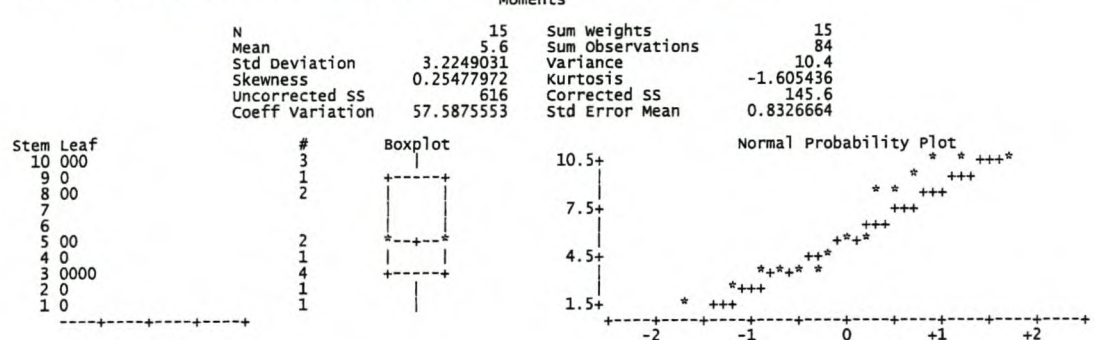
Variable: Increase in fibre recovery



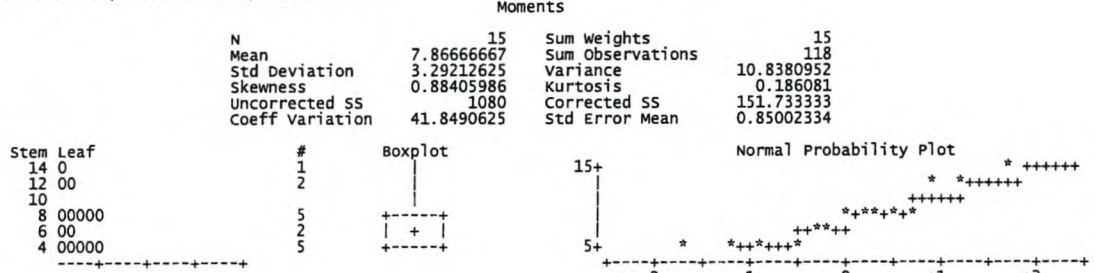
Variable: More versatile mechanized systems with regard to terrain conditions (slope, soil conditions, ground roughness)



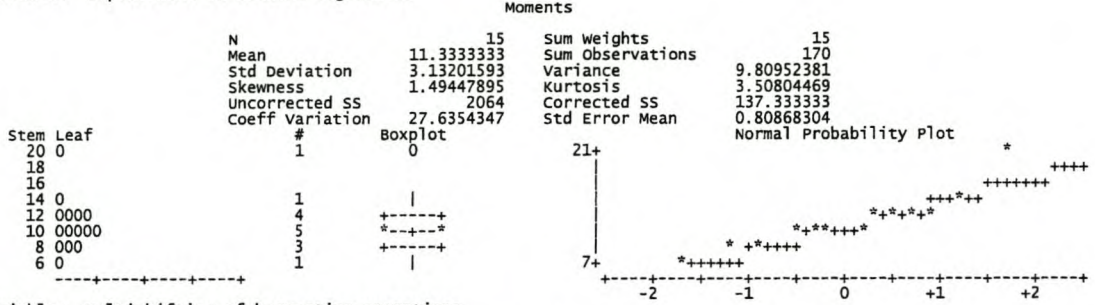
Variable: Harvesting systems compatible with non-timber and environmental values



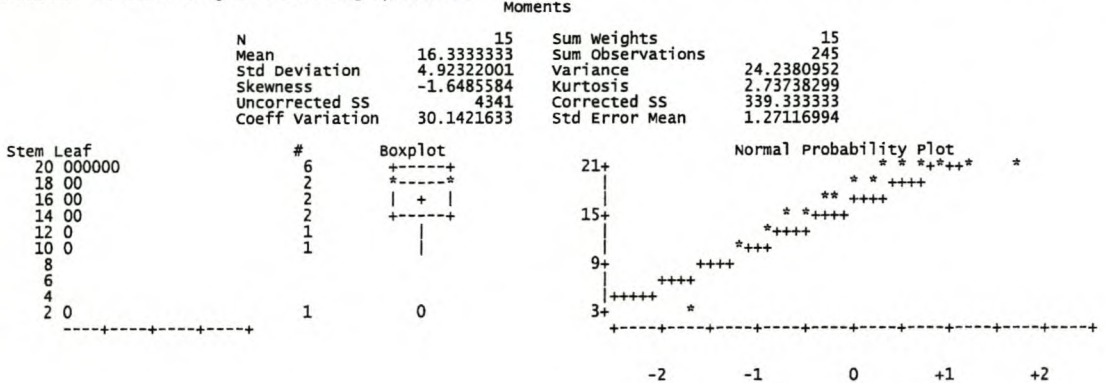
Variable: Improvement in operator skills



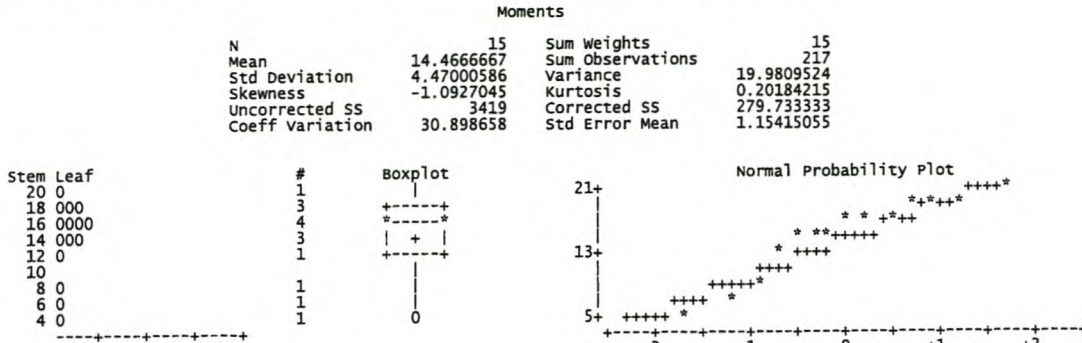
Variable: Improvement in machine ergonomics



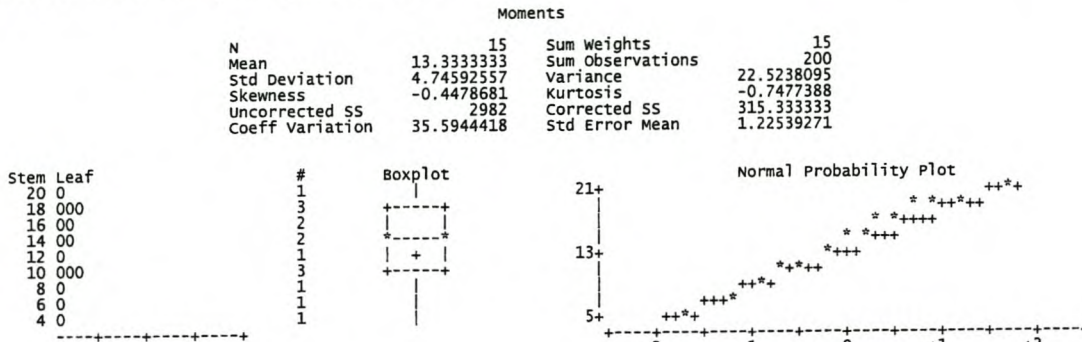
Variable: Multishifting of harvesting operations



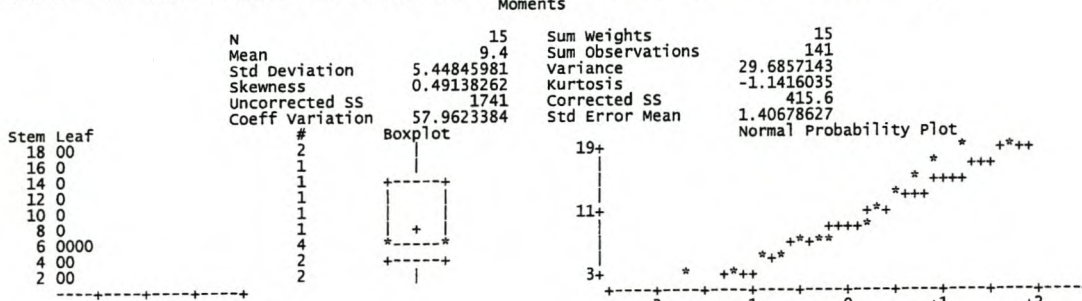
Variable: Delimiting head on stroke boom delimiters will also extract grage material in future



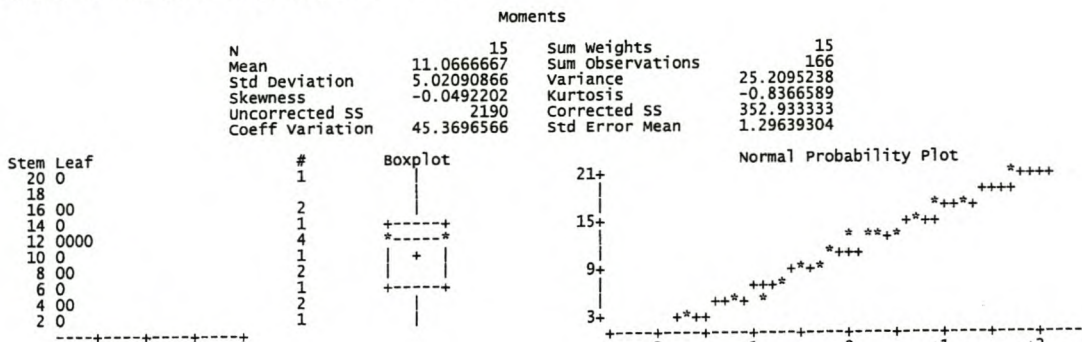
variable: Value recovery through processing yards



variable: Links between machine and control room (bucking on demand). Communications technology



variable: use of GPS to track equipment activities

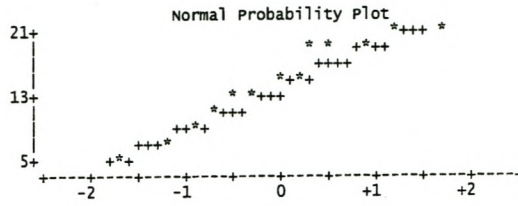
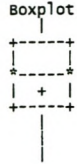


Variable: Robotics technology

Moments

N	15	Sum weights	15
Mean	13.9333333	Sum Observations	209
Std Deviation	5.24359019	Variance	27.4952381
Skewness	-0.488198	Kurtosis	-0.8400901
Uncorrected SS	3297	Corrected SS	384.933333
Coeff Variation	37.6334224	Std Error Mean	1.35388917

Stem	Leaf	#
20	00	2
18	0000	4
16		
14	00	2
12	000	3
10	0	1
8	0	1
6	0	1
4	0	1



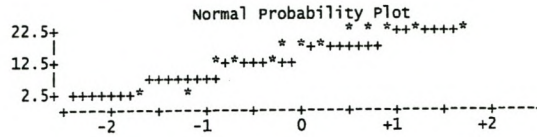
Variable: Increase in Cable yarding

Moments

N	15	Sum weights	15
Mean	15	Sum Observations	225
Std Deviation	6.2220805	Variance	38.7142857
Skewness	-1.3035808	Kurtosis	0.87112418
Uncorrected SS	3917	Corrected SS	542
Coeff Variation	41.4805366	Std Error Mean	1.60653428

Stem	Leaf	#
2	00000	5
1	6899	4
1	1224	4
0	13	2

Multiply Stem.Leaf by 10**+1



Annexure 8

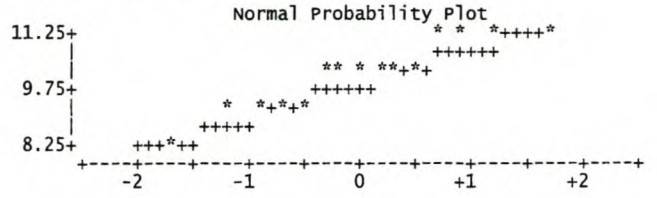
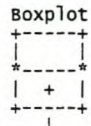
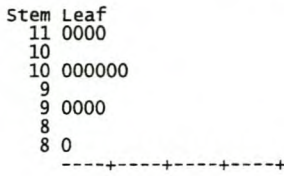
Box Plot results of Questions 6 and 7 of the Delhpi study

Question 6

The UNIVARIATE Procedure
Variable: TMecknow

Moments

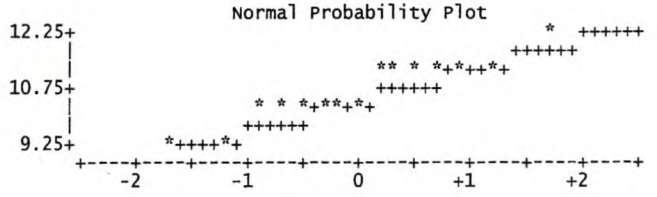
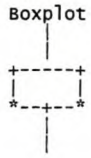
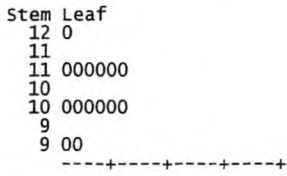
N	15	Sum Weights	15
Mean	9.8666667	Sum Observations	148
Std Deviation	0.91547542	Variance	0.83809524
Skewness	-0.3513784	Kurtosis	-0.4839479
Uncorrected SS	1472	Corrected SS	11.7333333
Coeff Variation	9.27846706	Std Error Mean	0.23637474



Variable: TMecSkill

Moments

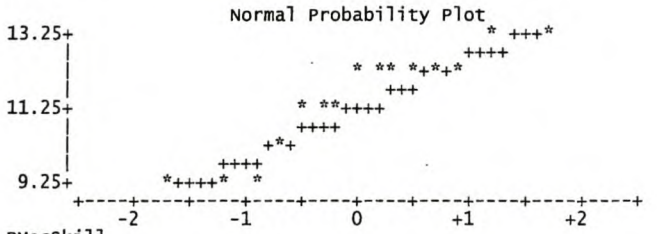
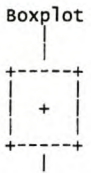
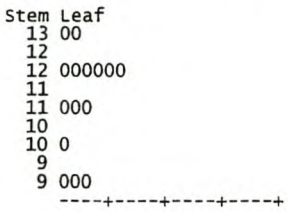
N	15	Sum Weights	15
Mean	10.4	Sum Observations	156
Std Deviation	0.82807867	Variance	0.68571429
Skewness	-0.0696701	Kurtosis	-0.224359
Uncorrected SS	1632	Corrected SS	9.6
Coeff Variation	7.96229492	Std Error Mean	0.21380899



Variable: Operskill

Moments

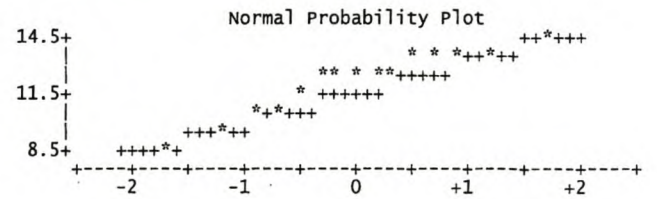
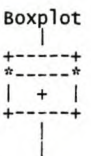
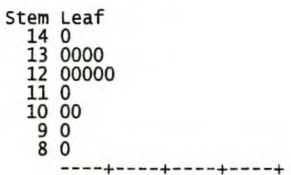
N	15	Sum Weights	15
Mean	11.2	Sum Observations	168
Std Deviation	1.37321312	Variance	1.88571429
Skewness	-0.6034543	Kurtosis	-0.808434
Uncorrected SS	1908	Corrected SS	26.4
Coeff Variation	12.2608315	Std Error Mean	0.3545621



Variable: PMecSkill

Moments

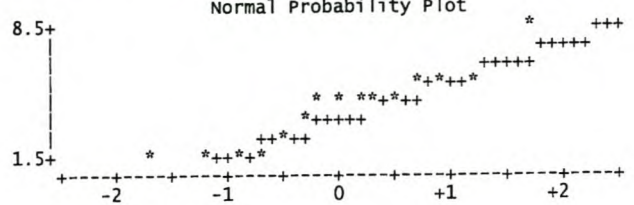
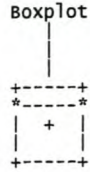
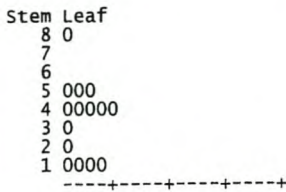
N	15	Sum Weights	15
Mean	11.6	Sum Observations	174
Std Deviation	1.68183573	Variance	2.82857143
Skewness	-0.8232762	Kurtosis	0.01565774
Uncorrected SS	2058	Corrected SS	39.6
Coeff Variation	14.4985839	Std Error Mean	0.43424812



Variable: valChain

Moments

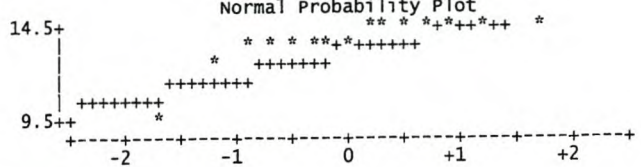
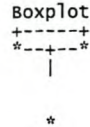
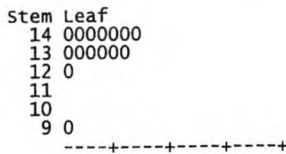
N	15	Sum Weights	15
Mean	3.4666667	Sum Observations	52
Std Deviation	1.99523241	Variance	3.98095238
Skewness	0.43008301	Kurtosis	0.33634585
Uncorrected SS	236	Corrected SS	55.7333333
Coeff Variation	57.5547811	Std Error Mean	0.51516679



Variable: ChainsOp

Moments

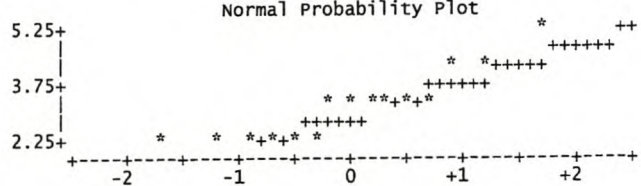
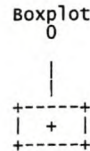
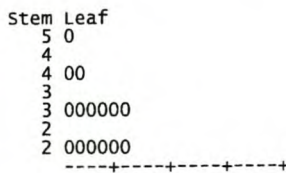
N	15	Sum Weights	15
Mean	13.1333333	Sum Observations	197
Std Deviation	1.30201309	Variance	1.6952381
Skewness	-2.5215258	Kurtosis	7.60582871
Uncorrected SS	2611	Corrected SS	23.7333333
Coeff Variation	9.91380528	Std Error Mean	0.33617834



Variable: ManSkill

Moments

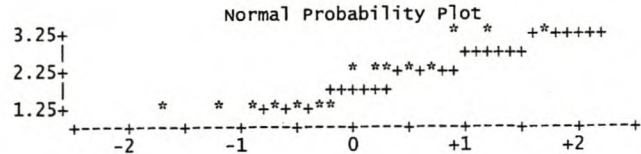
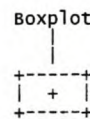
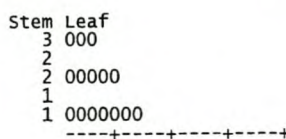
N	15	Sum Weights	15
Mean	2.8666667	Sum Observations	43
Std Deviation	0.91547542	Variance	0.83809524
Skewness	0.93764572	Kurtosis	0.51732359
Uncorrected SS	135	Corrected SS	11.7333333
Coeff Variation	31.9351889	Std Error Mean	0.23637474



Variable: IPerskill

Moments

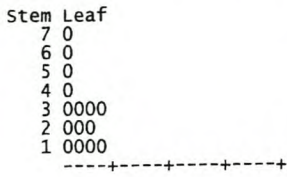
N	15	Sum Weights	15
Mean	1.73333333	Sum Observations	26
Std Deviation	0.79880864	Variance	0.63809524
Skewness	0.55478716	Kurtosis	-1.1317408
Uncorrected SS	54	Corrected SS	8.93333333
Coeff Variation	46.0851137	Std Error Mean	0.2062515



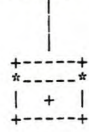
variable: HarvPlan

Moments

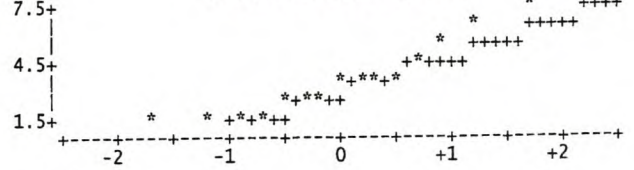
N	15	Sum Weights	15
Mean	2.9333333	Sum Observations	44
Std Deviation	1.8695559	Variance	3.4952381
Skewness	0.94331059	Kurtosis	0.18535864
Uncorrected SS	178	Corrected SS	48.9333333
Coeff Variation	63.7348496	Std Error Mean	0.48271718



Boxplot



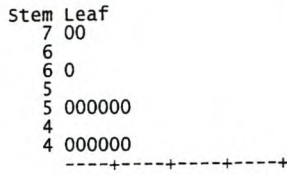
Normal Probability Plot



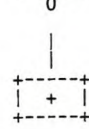
variable: BusSkill

Moments

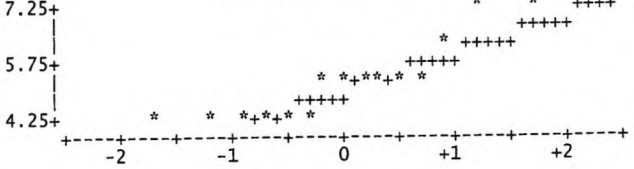
N	15	Sum Weights	15
Mean	4.9333333	Sum Observations	74
Std Deviation	1.03279556	Variance	1.06666667
Skewness	1.04671631	Kurtosis	0.31936813
Uncorrected SS	380	Corrected SS	14.9333333
Coeff Variation	20.9350451	Std Error Mean	0.26666667



Boxplot



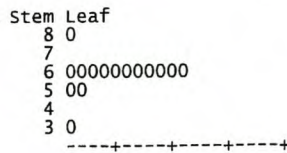
Normal Probability Plot



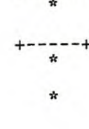
variable: EnvMgmt

Moments

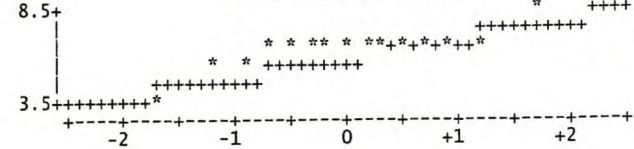
N	15	Sum Weights	15
Mean	5.8	Sum Observations	87
Std Deviation	1.01418511	Variance	1.02857143
Skewness	-0.9670515	Kurtosis	5.13532764
Uncorrected SS	519	Corrected SS	14.4
Coeff Variation	17.4859501	Std Error Mean	0.26186147



Boxplot



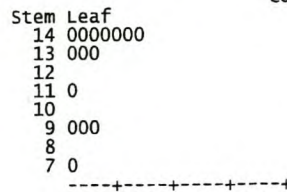
Normal Probability Plot



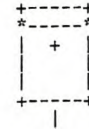
variable: ForLange

Moments

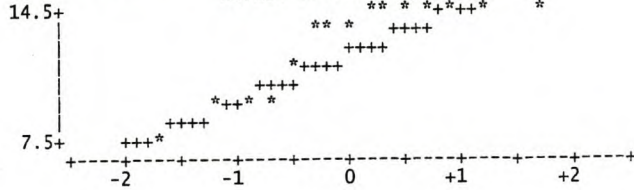
N	15	Sum Weights	15
Mean	12.1333333	Sum Observations	182
Std Deviation	2.44559857	Variance	5.98095238
Skewness	-1.0228457	Kurtosis	-0.4764431
Uncorrected SS	2292	Corrected SS	83.7333333
Coeff Variation	20.1560322	Std Error Mean	0.63145084



Boxplot



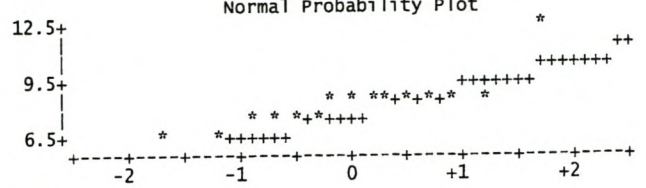
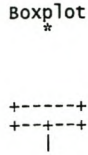
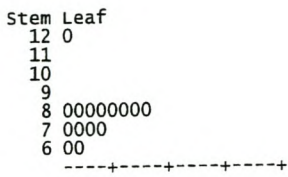
Normal Probability Plot



Variable: SafetyReq

Moments

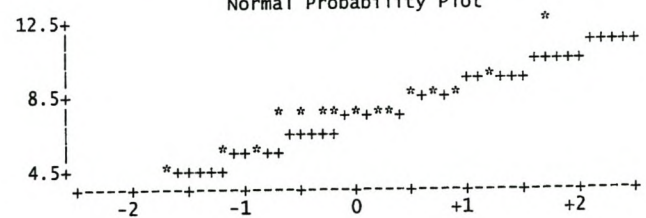
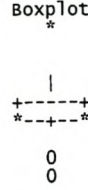
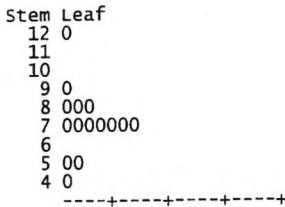
N	15	Sum Weights	15
Mean	7.73333333	Sum Observations	116
Std Deviation	1.38701461	Variance	1.92380952
Skewness	2.03333039	Kurtosis	6.6422221
Uncorrected SS	924	Corrected SS	26.9333333
Coeff Variation	17.9355337	Std Error Mean	0.35812563



Variable: ContMgmt

Moments

N	15	Sum Weights	15
Mean	7.2	Sum Observations	108
Std Deviation	1.85933936	Variance	3.45714286
Skewness	0.81853407	Kurtosis	2.61433908
Uncorrected SS	826	Corrected SS	48.4
Coeff Variation	25.8241578	Std Error Mean	0.48007936



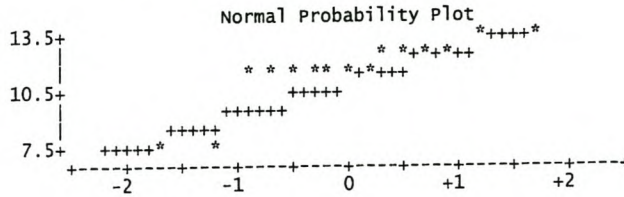
Question 7

variable: TMecknow

Moments

N	15	Sum Weights	15
Mean	11	Sum Observations	165
Std Deviation	1.77281052	Variance	3.14285714
Skewness	-1.5975581	Kurtosis	2.32739987
Uncorrected SS	1859	Corrected SS	44
Coeff Variation	16.1164593	Std Error Mean	0.45773771

Stem Leaf	#	Boxplot
13 00	2	
12 0000	4	+-----+
11 0000000	7	*-----*
10		
9		
8		
7 00	2	*

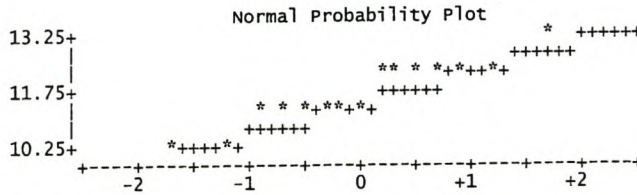


variable: TMecSkill

Moments

N	15	Sum Weights	15
Mean	11.4	Sum Observations	171
Std Deviation	0.82807867	Variance	0.68571429
Skewness	-0.0696701	Kurtosis	-0.224359
Uncorrected SS	1959	Corrected SS	9.6
Coeff Variation	7.26384799	Std Error Mean	0.21380899

Stem Leaf	#	Boxplot
13 0	1	
12 000000	6	+-----+
11 000000	6	*-----*
10		
10 00	2	

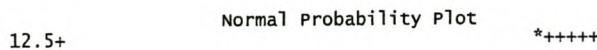


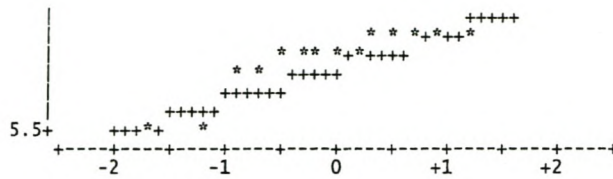
variable: OpersSkill

Moments

N	15	Sum Weights	15
Mean	8.86666667	Sum Observations	133
Std Deviation	1.84648959	Variance	3.40952381
Skewness	-1.0325171	Kurtosis	1.45677533
Uncorrected SS	1227	Corrected SS	47.7333333
Coeff Variation	20.8250706	Std Error Mean	0.47676156

Stem Leaf	#	Boxplot
12 0	1	
11		
10 00000	5	+-----+
9 00000	5	*-----*
8 00	2	+-----+
7		
6		
5 00	2	



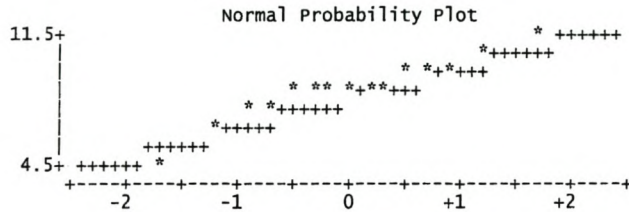


Variable: PMecSkill

Moments

N	15	Sum Weights	15
Mean	8	Sum Observations	120
Std Deviation	1.64750894	Variance	2.71428571
Skewness	-0.6634971	Kurtosis	1.80929043
Uncorrected SS	998	Corrected SS	38
Coeff Variation	20.5938618	Std Error Mean	0.42538498

Stem Leaf	#	Boxplot
11 0	1	
10 0	1	
9 000	3	
8 000000	6	
7 00	2	
6 0	1	
5		
4 0	1	
-----+-----+		

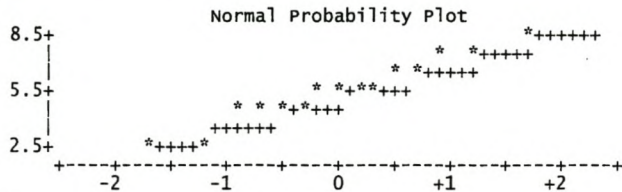


Variable: valChain

Moments

N	15	Sum Weights	15
Mean	4.93333333	Sum Observations	74
Std Deviation	1.70991506	Variance	2.92380952
Skewness	-0.0792759	Kurtosis	-0.1875923
Uncorrected SS	406	Corrected SS	40.9333333
Coeff Variation	34.6604405	Std Error Mean	0.44149817

Stem Leaf	#	Boxplot
8 0	1	
7 00	2	
6 00	2	
5 0000	4	
4 0000	4	
3		
2 00	2	
-----+-----+		



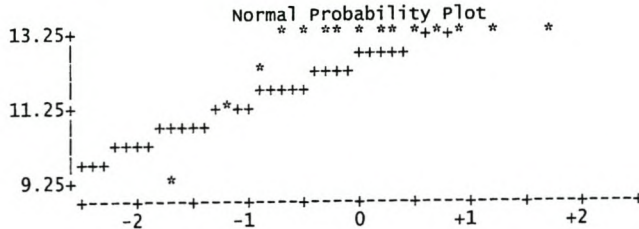
Variable: ChainsOp

Moments

N	15	Sum Weights	15
Mean	12.5333333	Sum Observations	188
Std Deviation	1.12546287	Variance	1.26666667
Skewness	-2.6969175	Kurtosis	7.32900064
Uncorrected SS	2374	Corrected SS	17.7333333
Coeff Variation	8.97975692	Std Error Mean	0.29059326

Variable: ChainsOp

Stem	Leaf	#	Boxplot
13	000000000000	12	+-----+
12			+
12	0	1	*
11			
11	0	1	*
10			
10			
9			
9	0	1	*

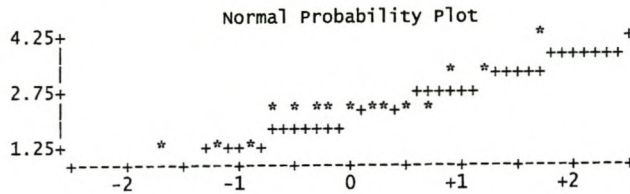


Variable: Manskill

Moments

N	15	Sum Weights	15
Mean	2.06666667	Sum Observations	31
Std Deviation	0.79880864	Variance	0.63809524
Skewness	0.84224164	Kurtosis	1.45920798
Uncorrected SS	73	Corrected SS	8.93333333
Coeff Variation	38.6520308	Std Error Mean	0.2062515

Stem	Leaf	#	Boxplot
4	0	1	*
3			
3	00	2	*
2			
2	000000000	9	+-----+
1			
1	000	3	*

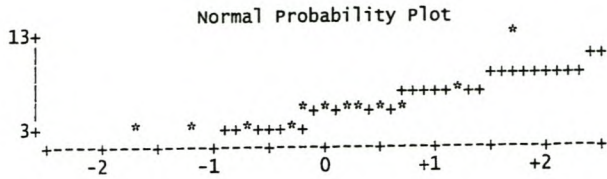


Variable: IPerskill

Moments

N	15	Sum Weights	15
Mean	4.4	Sum Observations	66
Std Deviation	2.41424345	Variance	5.82857143
Skewness	2.5133643	Kurtosis	7.34096353
Uncorrected SS	372	Corrected SS	81.6
Coeff Variation	54.8691693	Std Error Mean	0.62335498

Stem	Leaf	#	Boxplot
12	0	1	*
10			
8			
6	0	1	
4	0000000	7	+-----+
2	000000	6	+-----+

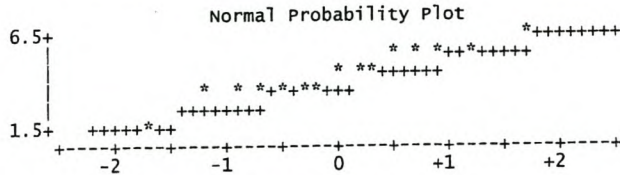


Variable: HarvPlan

Moments

N	15	Sum Weights	15
Mean	3.8	Sum Observations	57
Std Deviation	1.26491106	Variance	1.6
Skewness	-0.3029792	Kurtosis	0.33653846
Uncorrected SS	239	Corrected SS	22.4
Coeff Variation	33.2871333	Std Error Mean	0.32659863

Stem Leaf	#	Boxplot
6 0	1	
5 0000	4	+-----+
4 000	3	*-----*
3 000000	6	+-----+
2		
1 0	1	

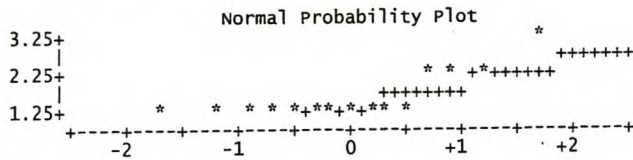


variable: BusSkill

Moments

N	15	Sum Weights	15
Mean	1.33333333	Sum Observations	20
Std Deviation	0.6172134	Variance	0.38095238
Skewness	1.79155091	Kurtosis	2.625
Uncorrected SS	32	Corrected SS	5.33333333
Coeff Variation	46.291005	Std Error Mean	0.15936381

Stem Leaf	#	Boxplot
3 0	1	
2		
2 000	3	+-----+
1		
1 0000000000	11	*-----*

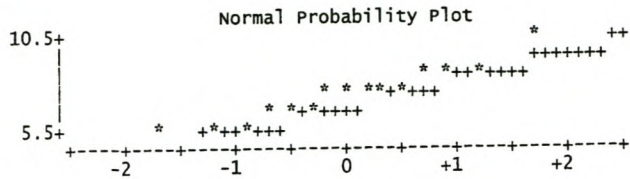


Variable: EnvMgmt

Moments

N	15	Sum weights	15
Mean	6.8	Sum Observations	102
Std Deviation	1.37321312	Variance	1.88571429
Skewness	0.60345427	Kurtosis	0.67493113
Uncorrected SS	720	Corrected SS	26.4
Coeff Variation	20.1943107	Std Error Mean	0.3545621

Stem Leaf	#	Boxplot
10 0	1	
9		
8 000	3	+-----+
7 00000	5	*-----*
6 000	3	+-----+
5 000	3	

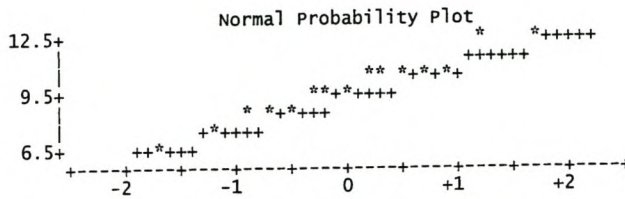


Variable: Flexibil

Moments

N	15	Sum Weights	15
Mean	9.2	Sum Observations	138
Std Deviation	1.65615734	Variance	2.74285714
Skewness	-0.0391894	Kurtosis	0.02103365
Uncorrected SS	1308	Corrected SS	38.4
Coeff Variation	18.0017102	Std Error Mean	0.42761799

Stem Leaf	#	Boxplot
12 00	2	
11		
10 00000	5	+-----+
9 000	3	*-+-*
8 000	3	+-----+
7 0	1	
6 0	1	

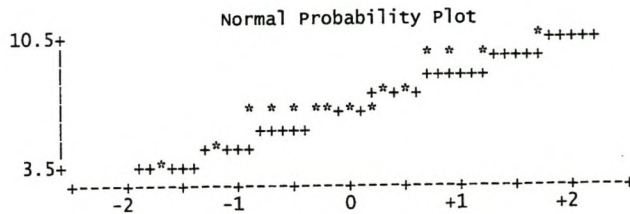


Variable: SafetyReq

Moments

N	15	Sum Weights	15
Mean	6.66666667	Sum Observations	100
Std Deviation	1.91485422	Variance	3.66666667
Skewness	0.05738824	Kurtosis	-0.1310508
Uncorrected SS	718	Corrected SS	51.3333333
Coeff Variation	28.7228132	Std Error Mean	0.49441323

Stem Leaf	#	Boxplot
10 0	1	
9 000	3	+-----+
8		
7 00	2	+-----+
6 0000000	7	*-+-*
5		
4 0	1	
3 0	1	



Annexure 9

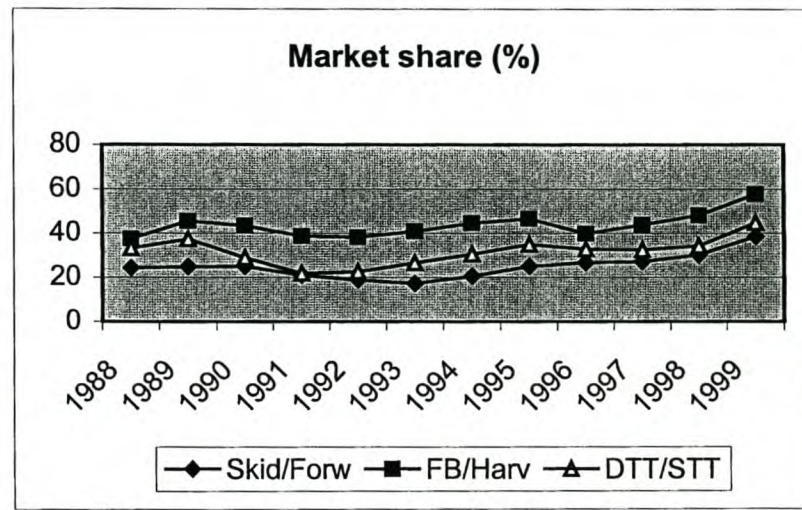
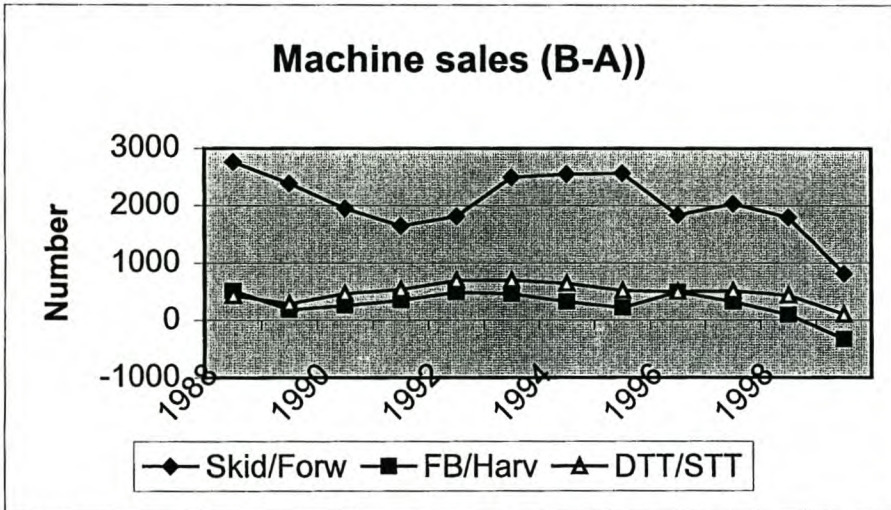
Fisher-Pry regression

Results of machine

Substitution curves

Changes in market share

	Actual				Percent		
	Skid/Forw	FB/Harv	DTT/STT		Skid/Forw	FB/Harv	DTT/STT
1988	2760	515	434	1988	24	37	33
1989	2390	183	289	1989	25	46	37
1990	1951	255	463	1990	25	43	29
1991	1647	350	537	1991	21	39	22
1992	1815	485	694	1992	19	38	23
1993	2494	458	695	1993	17	41	27
1994	2548	323	642	1994	21	45	30
1995	2568	217	514	1995	25	47	35
1996	1833	490	499	1996	27	40	33
1997	2037	319	509	1997	27	44	32
1998	1795	95	430	1998	30	48	34
1999	810	-337	99	1999	38	58	45



Regression Analysis for Market share of Forwarder (as a percent of skidder + forwarder)

Year	Percent	ln(N/L-N)	Regression	
			ln(N/L-N)	Percent
1988	24.3			
1989	24.9			
1990	25.0			
1991	21.0			
1992	18.9	-1.455831	-1.584974	17.0
1993	17.2	-1.570205	-1.445719	19.1
1994	20.6	-1.348102	-1.306465	21.3
1995	25.1	-1.095507	-1.16721	23.7
1996	26.7	-1.010647	-1.027956	26.3
1997	27.2	-0.986075	-0.888701	29.1
1998	30.1	-0.842341	-0.749447	32.1
1999	38.4	-0.471956	-0.610192	35.2
2000			-0.470938	38.4
2001			-0.331683	41.8
2002			-0.192429	45.2
2003			-0.053174	48.7
2004			0.08608	52.2
2005			0.225335	55.6
2006			0.364589	59.0
2007			0.503844	62.3
2008			0.643098	65.5
2009			0.782353	68.6
2010			0.921607	71.5

100

Residual SS

- L=100 0.07656963 Best fit!
- L=95 0.08024995
- L=90 0.08471003
- L=80 0.097202
- L=70 0.11865325
- L=50 0.30008257

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.9560679
R Square	0.9140658
Adjusted R Square	0.8997434
Standard Error	0.1129673
Observations	8

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.81445627	0.814456	63.82083	0.000205
Residual	6	0.07656963	0.012762		
Total	7	0.8910259			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-278.9799	34.7840397	-8.020343	0.000201	-364.0935	-193.8664	-364.09348	-193.8664
X Variable 1	0.1392545	0.01743123	7.988794	0.000205	0.096602	0.181907	0.09660179	0.181907

Regression Analysis for Market share of harvester (as a percent of FB + harvester)

Year	Percent	ln(N/L-N)	Regression	
			ln(N/L-N)	Percent
1988	37.5			
1989	45.6			
1990	43.4			
1991	38.8			
1992	38.1	-0.484026	-0.482508	38.2
1993	40.9	-0.369978	-0.403132	40.1
1994	44.5	-0.219639	-0.323755	42.0
1995	46.6	-0.136906	-0.244379	43.9
1996	39.8	-0.413444	-0.165003	45.9
1997	43.8	-0.249046	-0.085627	47.9
1998	48.2	-0.072857	-0.006251	49.8
1999	57.6	0.308367	0.073125	51.8
2000			0.152501	53.8
2001			0.231877	55.8
2002			0.311254	57.7
2003			0.39063	59.6
2004			0.470006	61.5
2005			0.549382	63.4
2006			0.628758	65.2
2007			0.708134	67.0
2008			0.78751	68.7
2009			0.866886	70.4
2010			0.946262	72.0

100

Residual SS

L=100 0.17169599 Best fit
 L=95 0.19065098
 L=90 0.21585937

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.778775
R Square	0.6064905
Adjusted R Square	0.5409056
Standard Error	0.1691626
Observations	8

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.26462384	0.264624	9.247409	0.022775
Residual	6	0.17169599	0.028616		
Total	7	0.43631983			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-158.5997	52.0872967	-3.044883	0.02266	-286.0528	-31.14661	-286.05285	-31.14661
X Variable 1	0.0793761	0.02610236	3.040955	0.022775	0.015506	0.143246	0.01550589	0.143246

Regression Analysis for Market share of swing to tree feller buncher (as a percent of STT FB + DTT FB)

Year	Percent	ln(N/L-N)	Regression	
			ln(N/L-N)	Percent
1988	33.1			
1989	37.2			
1990	28.9			
1991	21.9	-0.787805	-0.783986	21.9
1992	22.5	-0.744107	-0.645143	24.1
1993	26.5	-0.493423	-0.506301	26.3
1994	30.4	-0.264216	-0.367458	28.6
1995	34.8	-0.008760	-0.228616	31.0
1996	32.8	-0.128323	-0.089773	33.4
1997	32.4	-0.148163	0.049069	35.9
1998	34.1	-0.051575	0.187912	38.3
1999	44.7	0.568831	0.326754	40.7
2000			0.465597	43.0
2001			0.60444	45.3
2002			0.743282	47.4
2003			0.882125	49.5
2004			1.020967	51.5
2005			1.15981	53.3
2006			1.298652	55.0
2007			1.437495	56.6
2008			1.576337	58.0
2009			1.71518	59.3
2010			1.854022	60.5

70
Residual SS
L=100 0.12982937 Best fit
L=95 0.13751191
L=90 0.14698337
l=70 0.22531122

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.9148557
R Square	0.8369609
Adjusted R Square	0.8136696
Standard Error	0.1794082
Observations	9







ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>ignificance F</i>
Regression	1	1.1566349	1.156635	35.93449	0.000545
Residual	7	0.22531122	0.032187		
Total	8	1.38194612			








	<i>Coefficients</i>	<i>tandard Erro</i>	<i>t Stat</i>	<i>P-value</i>	<i>ower 95% Upper 95%</i>	<i>ower 95.0% pper 95.0%</i>
Intercept	-277.2195	46.20724	-5.999481	0.000543	-386.4821	-167.9568
X Variable 1	0.1388425	0.0231615	5.994539	0.000545	0.084074	0.193611

Annexure 10







Matrices representing 4 pine sawtimber value chains

Locality Activity	Stand	Extraction road	Roadside landing	Forest road	Sawmill
Fell Debranch					
Extract					
X-cut					
Stack Load					
Transport					
Unload					






Pine sawtimber: System 1

Locality Activity	Stand	Extraction route	Central landing	Forest road	Merchand yard	Sawmill
Fell						
Debranch						
Extract						
Load						
Transport						
Merchand						
Transport						

Pine sawtimber: System 2

Locality Activity	Stand	Extraction road	Central landing	Forest road	Sawmill
Fell					
Extract					
Debranch X-cut Stack					
Load					
Transport					
Unload					

Pine sawtimber: System 3

Locality Activity	Stand	Extraction route	Roadside landing	Forest road	Sawmill
Fell Debranch X-cut Stack					
Extract					
Load					
Transport					
Off load					

Pine sawtimber: System 4

Annexure 11

Matrices representing

5 pine pulpwood

value chains






Locality Activity	Stand	Extraction route	Forest road	Depot	Pulpmill
Fell Debranch X-cut					
Stack Load					
Extract					
Load					
Transport					

Fig. 5: Pine pulpwood: System 1






Locality Activity	Stand	Extraction route	Roadside landing	Forest road	Pulpmill
Fell Debranch X-cut					
Stack					
Extract					
Load					
Transport					

Fig. 6: Pine pulpwood: System 2





Locality Activity	Stand	Extraction road	Central landing	Forest road	Pulpmill
Fell					
Extract					
Delimb X-cut Stack Load					
Transport					

Fig. 7: Pine pulpwood: System 3





Locality Activity	Stand	Extraction road	Central landing	Forest road	Pulpmill
Fell					
Extract					
DDCL					
Transport					

Fig: 8: Pine pulpwood: System 4





Locality Activity	Stand	Extraction route	Roadside landing	Forest road	Pulpmill
Fell Debranch X-cut Stack					
Extract					
Load					
Transport					

Fig. 9: Pine pulpwood: System 5

Annexure 12

Matrices representing 5 *Eucalyptus* pulpwood value chains







Locality Activity	Stand	Extraction road	Forest road	Depot	Pulpmill
Fell Debranch X-cut					
Debark Stack					
Load					
Extract					
Load					
Transport					

Fig. 10: *Eucalyptus* pulpwood: System 1






Locality Activity	Stand	Extraction route	Roadside landing	Forest road	Pulpmill
Fell Debranch X-cut					
Debark Stack					
Extract					
Load					
Transport					

Fig. 11: *Eucalyptus* pulpwood: System 2





Locality Activity	Stand	Extraction road	Central landing	Forest road	Pulpmill
Fell					
Extract					
Delimb X-cut Stack Load					
Transport					

Fig. 12: *Eucalyptus* pulpwood: System 3





Locality Activity	Stand	Extraction road	Central landing	Forest road	Pulpmill
Fell					
Extract					
DDCL					
Transport					

Fig. 13: *Eucalyptus* pulpwood: System 4





Locality Activity	Stand	Extraction route	Roadside landing	Forest road	Pulpmill
Fell Debark X-cut Stack					
Extract					
Load					
Transport					
Off load					

Fig. 14: *Eucalyptus* pulpwood: System 5

Annexure 13

Financial evaluation of the pine sawtimber value chain

Current saw timber	Financial Inputs											Pine (1m ³)			Time worked			
	Machine name	Purchase price	Useful life (mhrs)	Resale value	Fuel cons (l/mhr)	R & M (R/mhr or R/km)	License (R/yr)	Insurance (R/yr)	L&I (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/km)	LF	(m ³ /sh/ft)	m ³ /year	no of shifts	mhrs/shift	Days/yr
Chainsaw fell & delimb	3500	1100	700	1.8	4.8	0	175	175	N/A	0	N/A	2	115	25415	1.0	6	221	1105
Chainsaw crosscut	3500	1100	700	1.8	4.8	0	175	175	N/A	0	N/A	-	215	47515	1.0	5	221	1105
112kW Cable skidder	1114314	10000	222863	16.0	45.0	24	65716	65740	16000	4	2700	5	214	47294	1.0	7	221	1547
130kW Grapple skidder	1491369	10000	268446	18.0	65.0	24	74568	74592	18000	4	2500	5	371	139385	1.7	6	221	2254
TJ1010 forwarder	2036309	10000	407262	8.7	35.0	24	101815	101839	18000	6	12000	N/A	N/A	N/A	2.0	7	221	3094
Timbco feller buncher disc	1800000	10000	360000	35.0	53.6	24	90000	90024	200000	1	6000	N/A	N/A	N/A	2.0	6	221	2652
Timbco feller buncher c&b	1800000	10000	360000	27.0	53.0	24	90000	90024	200000	1	6000	4	630	278480	2.0	5	221	2210
Cato excavator HD 820	945000	10000	189000	9.8	64.0	24	47250	47274	145118	1	6000	3	336	100246	1.4	7	221	2088
Bell 220 A logger	275000	10000	55000	8.0	20.0	24	13750	13774	3400	3	1800	3	273	60333	1.0	6	221	1326
Bell ADT timber truck	1130000	15000	226000	14.0	45.0	24	56500	56524	11500	6	3500	-	1	442	2.0	7	221	3094
5 X 4 truck	500000	450000	100000	0.5	0.6	1200	25000	26200	1400	10	25000	-	60	19890	1.5	320	221	106080
5 X 4 truck with trailer	980000	700000	196000	0.6	70.0	1500	49000	50500	1400	18	30000	-	50	11050	1.0	800	221	176800
Front end loader	1100000	10000	220000	18.0	45.0	24	55000	55024	12500	4	4000	-	420	139230	1.5	7	221	2321
Stinger steer truck	950000	750000	190000	0.7	0.7	1500	47500	49000	1600	18	50000	-	160	53040	1.5	320	221	106080
Biswood Waratah F/D/C	2960000	15000	592000	24.0	55.0	24	148000	148024	160000	1	6000	-	336	141086	1.9	7	221	2636
Biswood Waratah Proc	2960000	15000	592000	24.0	55.0	24	148000	148024	160000	1	6000	-	400	141440	1.6	7	221	2475
Waratah 616 F/D	2350000	15000	470000	23.0	23.0	24	117500	117524	145000	1	6000	N/A	N/A	N/A	2.0	7	221	3094
Waratah 616 F/D/C	2350000	15000	470000	23.0	23.0	24	117500	117524	145000	1	6000	N/A	N/A	N/A	2.0	7	221	3094
Timberjack 1810 forwarder	3749469	15000	749894	21.0	45.0	24	167473	167497	18000	8	12000	-	220	94809	2.0	7	221	3017
Bell tractor/trailer	510000	10000	102000	12.0	25.0	24	25500	25524	4375	8	3000	-	105	23205	1.0	7	221	1547
Interlink truck	1180000	1000000	232000	0.7	0.8	1500	58000	59500	1600	18	50000	-	50	22100	2.0	7	221	3094
Prentice 410 and stasher	1163280	15000	232656	28.0	67.0	24	58164	58188	145000	1	15000	N/A	N/A	N/A	1.5	7	221	2321
Timbco clamfunk skidder	1800000	10000	360000	22.0	35.0	24	90000	90024	1066	6	10000	-	210	69615	1.5	7	221	2321
Peterson Pacific DDCL	6704183	10000	1340837	80.0	120.0	24	335209	335233	N/A	0	N/A	-	0	0	2.0	7	221	3094

Labour cost Input data: current figures

	R/day	Days/yr	Total/year
Supervisor	200	221	44200
Chainsaw operator	120	221	26520
Harvester operator	200	221	44200
Machine operator	170	221	37570
Truck driver 6 X 4	170	221	37570
Truck driver EC1	200	221	44200
Tallyman	100	221	22100
Checkerman	100	221	22100
Labourer	80	221	17680
Diesel price	3.25		
Patrol Price	3.80		

Scenario Inputs

	Mechanised
Diesel price	1.00
Patrol Price	1.00
Oil as a % of fuel	0.05
Supervisor	1.00
Chainsaw operator	1.00
Harvester operator	1.00
Machine operator	1.00
Truck driver 6 X 4	1.00
Truck driver EC1	1.00
Tallyman	1.00
Checkerman	1.00
Labourer	1.00
Purchase price	1.00
Useful life (mhrs)	1.00
Resale value	0.20
Fuel cons (l/mhr)	1.00
R & M (R/mhr)	1.00
License (R/yr)	1.00
Insurance (R/yr)	0.05
Tyre/track cost per tyre	1.00
Tyre/track life (hrs/km)	1.00
Pine 1m3 (m ³ /sh/ft)	1.00
Pine 0.3m3 (m ³ /sh/ft)	1.00
Eucalyptus (m ³ /sh/ft)	1.00
mhrs/shift or km/shift	1.00
Days/yr	1.00
Tax rate	0.20
Hurdle rate	0.05

System Description:

1. Pine sawtimber System 1

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mhrs/kms	Annual vol. cub m	Number of Tyres/tracks	Type life Mhrs/km	Cost/tyre Rands	Type cycle VNR/yr	Cost/cycle Rands
1	Chainsaw	3500	11	38500	1100	279565	0	0	0	0	0
2	Cable skidder	1114314	6	6685884	10000	283784	24	2700	18000	2	384000
3	Chainsaw	3500	6	21000	1100	285090	0	0	0	0	0
4	3 wheeler	275000	9	2475000	10000	542987	23	1800	3400	1	78500
5	6 X 4 truck	500000	14	7000000	480000	278460	140	25000	1400	0	198000
6	FEL	1100000	2	2200000	10000	278460	8	4000	12800	2	100000
7											
8											
9											
Total		2996314	37	18381884			195	33500	33300		8478850

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Ins & lc R/year	shill length mhrs/km	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/year	
1	Chainsaw	7.2	4.8	175	8.0	1.0	221	1105	11	147658	
2	Cable skidder	54.8	45.0	85740	7.0	1.0	221	1547	6	1258925	
3	Chainsaw	7.2	4.8	175	8.0	1.0	221	1105	6	80557	
4	3 wheeler	27.3	20.0	13774	6.0	1.0	221	1326	9	688444	
5	6 X 4 truck	1.7	0.8	26200	320.0	1.5	221	106080	14	3791858	
6	FEL	61.4	45.0	95024	7.0	1.5	221	2321	2	603966	
7											
8											
9											
Total				120						8571430	

1.4: Labour cost							
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year
1 Chainsaw	26520	11	0	0	0	44200	336920
2 Cable skidder	37570	6	22100	12	12		490520
3 Chainsaw	26520	6	22100	12	12		424320
4 3 wheeler	37570	11	0	0	0		413270
5 6 X 4 truck	37570	28	0	0	0		1051960
6 FEL	37570	4	0	0	0		150280
7	0						0
8	0						0
9	0						0
Total	203320		44200	24	0	44200	2866370

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Cable skidder	Ownership Cost Chainsaw	Ownership Cost 3 wheeler	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Operating Cost	Labour Cost	Total Outflow
0	38500	6685884	21000	2475000	7000000	2200000			18420384
1	38500						784000	6571439	10260309
2	38500		21000				1344500	6571439	9849519
3	38500						860500	6571439	9344519
4	38500		21000				1288000	6571439	9773019
5	38500						860500	6571439	9344519
6							784000	6571439	9229519
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value n ³ /year	Price R/m ³
1	Chainsaw	1	7700	279565	0
2	Cable skidder	6	1337177	283784	
3	Chainsaw	1	4200	285090	
4	3 wheeler	6	594000	542987	
5	6 X 4 truck	4	1400000	278460	
6	FEL	4	440000	278460	
7					
8					
9					
Total				542987	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		0	0
1	7700	0	7700
2	7700	0	7700
3	11900	0	11900
4	7700	0	7700
5	7700	0	7700
6	3782077	0	3782077
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span

Years 6

Tax rate 0
Inflation rate 0.05

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	18420384	0	-18420384	-18420384	0	0	-18420384	1.000	-18420384		-18420384	
1	10260309	7700	-10252609	-28672993	-1844355	0	-10252609	0.952	-9764369	#REF!	-9764369	#NUM!
2	9849519	7700	-9841819	-38514811	-18395384	0	-9841819	0.907	-8928520	#REF!	-8928520	#NUM!
3	9344519	11900	-9332619	-47847430	-13008996	0	-9332619	0.864	-8061867	#REF!	-8061867	#NUM!
4	9773019	7700	-9765319	-57612749	-8765319	0	-9765319	0.823	-8033952	#REF!	-8033952	#NUM!
5	9344519	7700	-9336819	-66949568	-8336819	0	-9336819	0.784	-7315642	#REF!	-7315642	#NUM!
6	9229519	3783077	-5446442	-72396010	-5446442	0	-5446442	0.746	-4064219	#REF!	-4064219	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total												

-64587273 #NUM!

2. Pine sawtimber: System 2

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands
1	Feller buncher	180000	1	180000	10000	278460	1	6000	200000	3	200000
2	Chainsaw	3500	4	14000	1100	190060	0	N/A	0	N/A	0
3	Grapple skidder	1491388	2	2982736	10000	278789	8	2900	18000	1	1440000
4	Loader	845000	3	2535000	10000	300737	3	6000	145118	3	435384
5	Slinger steer	600000	6	3700000	750000	318240	108	60000	1600	0	172800
6	Chainsaw	3500	4	14000	1100	190060	0	N/A	0	N/A	0
7	Bell logger	275000	4	1100000	10000	241333	10	1800	3400	1	34000
8	FEL	1100000	2	2200000	10000	278460	8	4000	13500	2	100000
Total											
		6568369	21	14831738			138	70300	380618	0	5262384

1.3: Operating cost											
Item	Machine	Fuel & oil R/mhr	R/km	Int & M R/year	shft. length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/year	
1	Feller buncher	82.1	53.0	90024	5.0	2.0	221	2210	1	410778	
2	Chainsaw	7.2	4.8	175	6.0	1.0	221	1105	4	53705	
3	Grapple skidder	61.1	65.0	74592	6.0	1.7	221	2254	2	717694	
4	Loader	33.3	64.0	47274	7.0	1.4	221	2088	3	751478	
5	Slinger steer	2.3	0.7	49000	130.0	1.5	221	10980	6	2216488	
6	Chainsaw	7.2	4.8	175	6.0	1.0	221	1105	4	53705	
7	Bell logger	31.8	20.0	13774	6.0	1.0	221	1326	4	330450	
8	FEL	61.4	48.0	55294	7.0	1.6	221	2321	2	603666	
9									0	0	
Total											
				238939						5138283	

1.4: Labour cost							
Machine	Operator	Operator	Assistants	Assistants	Overheads	Supervision	Total cost
Description	R/Year	Number	R/year	Number	Percent	R/year	R/year
1 Feller buncher	37570	3	0	0	30	88400	97682
2 Chainsaw	26520	4	44200	12			63640
3 Grapple skidder	37570	4	0	0			150280
4 Loader	37570	6	0	0			225420
5 Slinger steer	44200	12	0	0			530400
6 Chainsaw	26520	4	22100	12			371280
7 Bell logger	37570	4					150280
8 FEL	37570	4					150280
9							0
Total							
		265090	66300	24	30	88400	2312102

2. Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Chainsaw	Ownership Cost Grapple skidder	Ownership Cost Loader	Ownership Cost Slinger steer	Ownership Cost Chainsaw	Ownership Cost Bell logger	Tyre Cost FEL	Operating Cost	Labour Cost	Total Outflow
0	180000	14000	2982738	2835000	5700000	14000	1100000	1100000	0	0	15645738
1		14000				14000			379501	5138293	7857896
2		14000				14000			479600	5138293	7857896
3		14000				14000			1158954	5138293	8637349
4		14000				14000			823600	5138293	8101985
5		14000				14000			523600	5138293	8001985
6									172800	5138293	7623195
7											0
8											0
9											0
10											0
11											0
12											0
13											0
14											0
15											0
16											0
17											0
18											0
19											0
20											0

2. CASH INFLOWS

Item	Machine	Machine life Years	Resale Rands	Volume m ³ /year	Price R/m ³
1	Feller buncher	5	360000	278460	8
2	Chainsaw	1	2800	190060	
3	Grapple skidder	4	268448	278789	
4	Loader	5	567000	300737	
5	Slinger steer	7	1140000	318240	
6	Chainsaw	1	2800	190060	
8	Bell logger	8	220000	241333	
9	FEL	4	440000	278460	
Total					
		4	3001048	318240	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	2673216	2673216
1	2	2673216	2673218
2	2	2673216	2673218
3	2	2673216	2673218
4	2	2673216	2673218
5	2	2673216	2673218
6	3001048	2673216	5674264
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	QJM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	15645738	2673216	-12872522	-12872522	0	0	-12872522	1.000	-12872522		-12872522	
1	7857896	2673218	-5184778	-16097801	-12003646	0	-3184779	0.952	-4937884	#REF!	-4937884	#REF!
2	7857896	2673218	-5284777	-23342078	-8734299	0	-6284777	0.907	-4793449	#REF!	-4793449	#REF!
3	8637349	2673218	-5964131	-26306209	-4630479	0	-5964131	0.864	-5152041	#REF!	-5152041	#REF!
4	8101985	2673218	-5428777	-34734967	-5428777	0	-5428777	0.823	-4468269	#REF!	-4468269	#REF!
5	8001985	2673218	-5328777	-40663764	-5328777	0	-5328777	0.784	-4175237	#REF!	-4175237	#REF!
6	7623195	5674264	-1948931	-42012695	-1948931	0	-1948931	0.746	-1454322	#REF!	-1454322	#REF!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-37851724	#NUM!

System Description: 3. Pine sawtimber System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Years	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yr	Cost/tyre Rands	Tyre cycle YRS#	Cost/cycle Rands
1	Feller buncher	180000	1	180000	10000	278450	1	6000	20000	3	20000
2	Grapple skidder	1481369	2	2962738	10000	278769	8	2500	18000	1	144000
3	Processor	268000	2	536000	15000	262800	2	8000	16000	2	320000
4	Loader	945000	3	2835000	10000	300737	3	4000	145118	3	435394
5	6 X 4 truck	600000	14	7000000	45000	278460	140	2800	1400	0	196000
6	FEL	1100000	2	2200000	10000	417680	8	4000	12500	2	100000
Total											
		8796369	23	20937738			162	49500	537018		8029816

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Ins & lic R/Year	shd length m/hr	# of shifts	Workdays Days/Year	Total hrs Mths/Yr	# machines	Total cost R/Year	
1	Feller buncher	82.1	53.0	90024	5.0	2.0	221	2210	1	410778	
2	Grapple skidder	81.1	65.0	74982	8.0	1.7	221	2254	2	717894	
3	Processor	81.9	58.0	148024	7.0	1.8	221	2475	2	973758	
4	Loader	33.3	64.0	47274	7.0	1.4	221	2088	3	751478	
5	6 X 4 truck	1.7	0.8	28200	320.0	1.3	221	105040	14	3781858	
6	FEL	61.4	48.0	56024	7.0	1.5	221	2321	2	603966	
7		0	0	0	0	0	0	0	0	0	
8		0	0	0	0	0	0	0	0	0	
9		0	0	0	0	0	0	0	0	0	
Total											
			283	351114						7249532	

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Feller buncher	37570	2	0	0	30	44200	97882	
2 Grapple skidder	37570	4	0	0			150280	
3 Processor	200	4	0	0			800	
4 Loader	37570	6	0	0			225420	
5 6 X 4 truck	37570	28	0	0			1051960	
6 FEL	37570	4					150280	
7	0						0	
8	0						0	
9	0						0	
Total								
		188050		0	0	30	44200	1676422

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidd	Ownership Cost Processor	Ownership Cost Loader	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0							0			22737738
1	1800000	2962738	5620000	2835000	7000000	2200000	732000	7249532	1874080	9855612
2							832000	7249532	1874080	9965612
3							1687354	7249532	1874080	10810966
4							832000	7249532	1874080	9965612
5							732000	7249532	1874080	9855612
6							392000	7249532	1874080	9515612
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³
1	Feller buncher	5	1440000	278450	8
2	Grapple skidder	4	1073786	278769	
3	Processor	6	2368000	282880	
4	Loader	5	1134000	300737	
5	6 X 4 truck	4	2800000	278400	
6	FEL	4	850000	417680	
7				0	
8				0	
9				0	
			8695786	417680	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		3508596	3508596
2		3508596	3508596
3		3508596	3508596
4		3508596	3508596
5		3508596	3508596
6	9895796	3508596	13204382
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	22737738	0	-22737738	-22737738	0	0	-22737738	1.000	-22737738		-22737738	
1	9855612	3508596	-6347016	-29084794	-15815685	0	-6347016	0.952	-6047777	#REF!	-6047777	#NUM!
2	9955612	3508596	-6447016	-35531771	-12728338	0	-6447016	0.907	-5847634	#REF!	-5847634	#NUM!
3	10810966	3508596	-7302370	-42834411	-11486918	0	-7302370	0.854	-6308062	#REF!	-6308062	#NUM!
4	9855612	3508596	-6447016	-49281157	-8447016	0	-6447016	0.823	-5303976	#REF!	-5303976	#NUM!
5	9855612	3508596	-6347016	-55628174	-6347016	0	-6347016	0.784	-4973053	#REF!	-4973053	#NUM!
6	9515612	13204382	3688769	-51939404	3688769	-737764	2961015	0.746	2202093	#REF!	2752616	#NUM!
7	0	0	0									
8	0	0	0									
9	0	0	0									
10	0	0	0									
11	0	0	0									
12	0	0	0									
13	0	0	0									
14	0	0	0									
15	0	0	0									
16	0	0	0									
17	0	0	0									
18	0	0	0									
19	0	0	0									
20	0	0	0									
											-48462625	#NUM!

4. System Description: Pine sawtimber, System 4

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mhrs/kms	Annual vol cub m	Number of Tyres/tracks	Tyre life Mhrs/km	Cost/tyre Rands	Tyre cycle YRS/KM	Cost/cycle Rands
1	Harvester	2960000	2	5920000	15000	262173	2	6000	160000	2	320000
2	Forwarder	374949	3	1124847	15000	264427	24	12000	18000	4	432000
3	Loader	945000	3	2835000	15000	302731	3	8000	145116	3	435354
4	6 X 4 Truck	500000	14	7000000	450000	278460	140	28000	1400	0	180000
5	FEL	1100000	2	2200000	10000	278460	8	4000	12500	2	100000
6											
7											
8											
9											
Total		9254469	22	23283407			177	53000	337018		5862186

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	ins & lic R/Year	stall length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year	
1	Harvester	81.8	55.0	148024	7.0	1.9	221	2936	2	1100828	
2	Forwarder	71.7	45.0	187497	7.0	2.0	221	3017	3	1618282	
3	Loader	32.3	64.0	47274	7.0	1.4	221	2088	3	751476	
4	6 X 4 Truck	1.7	0.8	2620	320.0	1.5	221	106080	14	3791856	
5	FEL	61.4	45.0	59024	7.0	1.5	221	2321	2	603596	
6											
7											
8											
9											
Total			210	315986						7865413	

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Harvester	44200	4	0	0	0	44200	221000
2 Forwarder	37570	6	22100	0	0	225420	225420
3 Loader	37570	6	0	0	0	225420	225420
4 6 X 4 Truck	37570	28	0	0	0	1051960	1051960
5 FEL	37570	4	0	0	0	160280	160280
6						0	0
7						0	0
8						0	0
9						0	0
Total	194480		22100	0	0	44200	1874080

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost 6 X 4 Truck	Ownership Cost FEL	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	5920000	1124847	2835000	7000000	2200000	0	0	0	0	29203407
1							588000	7865413	1874080	10328493
2							1008000	7865413	1874080	10748493
3							1023354	7865413	1874080	10763847
4							1440000	7865413	1874080	11180493
5							588000	7865413	1874080	10328493
6							392000	7865413	1874080	10132493
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2: CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Resale value m/Year	Price R/m ³
1	Harvester	5	940000	282173	0
2	Forwarder	5	2249681	284427	0
3	Loader	5	668568	300737	0
4	6 X 4 Truck	4	3758250	278460	0
5	FEL				
6					
7					
8					
9					
Total			7616520	300737	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		2526189	2526189
2		2526189	2526189
3		2526189	2526189
4		2526189	2526189
5		2526189	2526189
6	7616520	2526189	10142709
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	29203407	0	-29203407	-29203407	0	0	-29203407	1.000	-29203407		-29203407	
1	10328493	2526189	-7802304	-37005711	-16444007	0	-7802304	0.952	-7430766	#REF!	-7430766	#NUM!
2	10748493	2526189	-8222304	-45228015	-15207326	0	-8222304	0.907	-7457872	#REF!	-7457872	#NUM!
3	10763847	2526189	-8237658	-53465673	-12894339	0	-8237658	0.864	-7115999	#REF!	-7115999	#NUM!
4	11180493	2526189	-8654304	-62119977	-8654304	0	-8654304	0.823	-7119917	#REF!	-7119917	#NUM!
5	10328493	2526189	-7802304	-69922281	-7802304	0	-7802304	0.784	-6113309	#REF!	-6113309	#NUM!
6	10132493	10142709	10216	-69912065	10216	-2043	8173	0.746	6096	#REF!	7623	#NUM!
7												
8												
9												
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12												
13												
14												
15												
16												
17												
18												
19												
20												
Total											-64433647	#NUM!

Low cost sawtimber

Machine name	Purchase price	Useful life (mhrs)	Resale value	Fuel cons (l/mhr)	R & M (R/mhr or R/km)	Financial Inputs			Pine (1m ³)			Time worked						
						License (R/yr)	Insurance (R/yr)	LAI (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/km)	LF	(m ³ /shft)	m ³ /year	no of shifts	mhrs/shft km/shft	Days/yr	mhrs/yr km/yr
Chainsaw fell & delim	2450	1430	809	1.350	4.57	0	123	123	N/A	0	N/A	2	127	27957	1.0	5	221	1105
Chainsaw crosscut	2450	1430	809	1.350	4.57	0	123	123	N/A	0	N/A	-	237	52267	1.0	5	221	1105
112KW Cable skidder	780020	13000	257407	12.000	42.75	17	39001	39018	15200	4	3510	5	235	54625	1.1	7	221	1624
130kW Grapple skidder	1043958	13000	310056	13.500	61.75	17	52198	52215	17100	4	3250	5	408	148814	1.7	6	221	2188
TJ1010 forwarder	1425416	13000	470387	6.533	33.25	17	71271	71286	17100	6	15600		N/A	N/A	2.0	7	221	3094
Timbco feller buncher disc	1260000	13000	415800	26.250	60.95	17	63000	63017	190000	1	7800		N/A	N/A	2.1	6	221	2718
Timbco feller buncher c&b	1260000	13000	415800	20.250	50.35	17	63000	63017	190000	1	7800	4	693	306306	2.0	5	221	2298
Cato excavator HD 820	661500	13000	218295	7.320	60.80	17	33075	33092	137862	1	7800	3	370	138859	1.7	7	221	2630
Bell 220 A logger	192500	13000	63525	6.000	19.00	17	9625	9642	3230	3	2340	3	198	43758	1.0	6	221	1326
Bell ADT timber truck	791000	19500	261030	10.500	42.75	17	39550	39567	10925	6	4550		1	486	2.0	7	221	3094
6 X 4 truck	350000	585000	115500	0.375	0.57	840	17500	18340	1330	10	32500		66	21879	1.5	320	221	106080
6 X 4 truck with trailer	688000	910000	226380	0.465	66.50	1050	34300	35350	1330	18	39000		55	12155	1.0	800	221	178800
Front end loader	770000	13000	254100	13.500	42.75	17	38500	38517	11875	4	5200		462	153153	1.5	7	221	2321
Singer steer truck	665000	975000	219450	0.510	0.67	1050	33250	34300	1520	18	45000		176	58344	1.5	320	221	106080
Bigwood Waratah F/D/C	2072000	15000	683760	18.000	52.25	17	103600	103617	152000	1	7800		370	151111	1.9	7	221	2862
Bigwood Waratah Proc	2072000	15000	683760	18.000	52.25	17	103600	103617	152000	1	7800		440	150722	1.6	7	221	2396
Waratah 616 F/D	1645000	19500	542850	17.250	21.85	17	82250	82267	137750	1	7800		N/A	N/A	2.0	7	221	3094
Waratah 616 F/D/C	1645000	19500	542850	17.250	21.85	17	82250	82267	137750	1	7800		N/A	N/A	2.0	7	221	3094
Timberjack 1810 forwarder	2624628	15000	866127	15.750	42.75	17	131231	131248	17100	8	15600		242	100011	1.9	7	221	2893
Bell tractor/trailer	357000	13000	117810	9.000	23.75	17	17850	17867	4156	8	3900		116	25526	1.0	7	221	1547
Interlink truck	812000	1300000	287960	0.488	0.73	1050	40600	41650	1520	18	65000		55	24310	2.0	7	221	3094
Prentice 410 end slasher	814296	19500	268718	21.000	63.65	17	40715	40732	137750	1	19500	N/A	N/A		1.5	7	221	2321
Timbco clamshank skidder	1250000	13000	415800	16.500	33.25	17	63000	63017	1013	6	13000		231	76577	1.5	7	221	2321
Peterson Pacific DDCL	4692928	13000	1548666	60.000	114.00	17	234646	234663	N/A	0	N/A				2.0	7	221	3094

Labour cost input data: current figures

	R/day	Days/yr	Total/yr
Supervisor	1200	221	265200
Chainsaw operator	240	221	53040
Harvester operator	1400	221	309400
Machine operator	1020	221	225420
Truck driver 6 X 4	850	221	187850
Truck driver EC1	1000	221	221000
Tallyman	200	221	44200
Chockerman	200	221	44200
Labourer	216	221	47736

Diesel price 4.88
 Petrol Price 5.70

Scenario Inputs

	Low cost
Diesel price	1.50
Petrol Price	1.50
Oil as a % of fuel	0.05
Supervisor	6.00
Chainsaw operator	2.00
Harvester operator	7.00
Machine operator	6.00
Truck driver 6 X 4	5.00
Truck driver EC1	5.00
Tallyman	2.00
Chockerman	2.00
Labourer	2.70
Purchase price	0.70
Useful life (mhrs)	1.30
Resale value	0.33
Fuel cons (l/mhr)	0.75
R & M (R/mhr)	0.95
License (R/yr)	0.70
Insurance (R/yr)	0.05
Tyre/track cost per tyre	0.95
Tyre/track life (hrs/km)	1.30
Pine 1m ³ (m ³ /shft)	1.10
Pine 0.3m ³ (m ³ /shft)	1.10
Eucalyptus (m ³ /shft)	1.10
mhrs/shft or km/shft	1.00
Tax rate	20.00
Hurdle rate	0.04

System Description: Pina sawmiller, System 1

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol cu m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Chainsaw	2490	11	27390	1430	307522	0	0	0	0	0
2	Cable skidder	79000	5	395000	13000	273129	30	3910	15200	2	304000
3	Chainsaw	2490	6	14940	1430	313599	0	0	0	0	0
4	3 wheeler	192000	7	1344000	13000	306306	18	2340	3230	2	56529
5	6 X 4 truck	390000	14	5460000	585000	306306	140	32500	1330	0	186200
6	FEL	770000	2	1540000	13000	306306	8	8200	11875	2	85000
7											
Total		2097420	34	11702290			188	43550	31635		566200

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mtr	RAM R/mtr	hrs & lc R/Year	shift length mtr/km	# of shifts	Workdays Days/Year	Total hrs Mhrs/Yr	# machines	Total cost R/Year
1	Chainsaw	8.1	4.8	123	5	3	221	1105	11	152090
2	Cable skidder	81.4	42.8	39018	7	1	221	1624	5	1041172
3	Chainsaw	8.0	4.6	123	5	1	221	1105	6	84230
4	3 wheeler	30.7	19.0	8642	6	1	221	1326	7	528924
5	6 X 4 truck	1.9	0.6	18340	330	2	221	106080	14	3954013
6	FEL	69.1	42.8	38517	7	2	221	2321	2	596144
7										
8										
9										
Total				114	10639					6359582

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Chainsaw	53040	11	0	0	0	265200	848640	
2 Cable skidder	225420	5	44200	12			1657500	
3 Chainsaw	53040	6	44200	12			848640	
4 3 wheeler	225420	11	0	0			2479620	
5 6 X 4 truck	187850	28	0	0			6256800	
6 FEL	225420	4					901680	
7	0						0	
8	0						0	
9	0						0	
Total		970190		88400	24	0	265200	11995880

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Cable skidder	Ownership Cost Chainsaw	Ownership Cost 3 wheeler	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost	Operating Cost	Labour Cost	Total Outflow R
0	26950	390009	14700	1347500	4900000	1540000				11729249
1	26950						372400	6359582	11995880	18754812
2	26950		14700				1014125	6359582	9167080	16520437
3	26950						558600	6359582	9167080	16112212
4	26950		14700				1014125	6359582	9167080	16582437
5	26950						558600	6359582	9167080	16112212
6	26950						428925	6359582	9167080	15955687
7	0									0
8	0									0
9	0									0
10	0									0
11	0									0
12	0									0
13	0									0
14	0									0
15	0									0
16	0									0
17	0									0
18	0									0
19	0									0
20	0									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value %/Year	Price R/m ³
1	Chainsaw	1	8694	307522	0
2	Cable skidder	8	1287033	273129	
3	Chainsaw	1	4851	313599	
4	3 wheeler	6	533610	306306	
5	6 X 4 truck	6	1617000	306306	
6	FEL	6	508200	306306	
7				0	
8				0	
9				0	
				313599	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		0	0
1	8694	0	8694
2	13745	0	13745
3	8694	0	8694
4	13745	0	13745
5	8694	0	8694
6	3959587	0	3959587
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

1.5: Project life span

Years 6

Tax rate 20

hurdle rate 0.04

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	11729249	0	-11729249	-11729249	0	0	-11729249	1.00	-11729249		-11729249	
1	18754812	8694	-18746118	-30476967	-24587068	0	-18746118	0.50	-9372959	#REF!	-9372959	#NUM!
2	16582437	13745	-16568692	-47045659	-20079363	0	-16568692	0.33	-5522898	#REF!	-5522898	#NUM!
3	16112212	8694	-16103518	-63149177	-18443779	0	-16103518	0.25	-4025830	#REF!	-4025830	#NUM!
4	16582437	13745	-16568692	-79717872	-16586663	0	-16568692	0.20	-3313739	#REF!	-3313739	#NUM!
5	16112212	8694	-16103518	-95821390	-16103319	0	-16103319	0.17	-2683886	#REF!	-2683886	#NUM!
6	15955587	3959587	-11996000	-107815191								
7	0	0	0	-107815191								
8	0	0	0	-107815191								
9	0	0	0	-107815191								
10	0	0	0	-107815191								
11	0	0	0	-107815191								
12	0	0	0	-107815191								
13	0	0	0	-107815191								
14	0	0	0	-107815191								
15	0	0	0	-107815191								
16	0	0	0	-107815191								
17	0	0	0	-107815191								
18	0	0	0	-107815191								
19	0	0	0	-107815191								
20	0	0	0	-107815191								
											-9626000	#NUM!

Cost (R/m³)

-33.48

System Description: 3. Pine sawtimber System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle %/Yr	Cost/cycle Rands
1	Feller buncher	1260000	1	1260000	13000	305236	1	7800	160000	3	180000
2	Grapple skidder	104395	2	208791	13000	297623	8	3250	17100	11	136500
3	Processor	2072000	2	4144000	16000	301444	2	7800	190000	3	304000
4	Loader	661800	2	1323600	13000	277717	2	7800	137862	3	27324
5	6 X 4 truck	350000	12	4200000	580000	262548	120	32500	1300	0	188000
6	FEL	770000	2	1540000	13000	305236	8	3200	11875	2	85000
Total		6157458	20	13294917			141	64350	510167		7193281

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lc R/Year	shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Feller buncher	103.65	50.35	63017	5.2	2.0	221	2298	1	418981
2	Grapple skidder	68.74	61.75	62215	6.0	1.7	221	2188	2	873417
3	Processor	82.14	52.25	103811	7.0	1.8	221	2328	2	809673
4	Loader	37.47	60.80	33262	7.0	1.7	221	2630	2	583080
5	6 X 4 truck	1.82	0.97	18340	320.0	1.5	221	108080	12	3389154
6	FEL	69.10	42.75	38517	7.0	1.5	221	2321	2	596144
Total				268				248780		6560428

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Feller buncher	225420	2	0	0	30	285200	580092	
2 Grapple skidder	225420	4	0	0			901680	
3 Processor	1400	4	0	0			5600	
4 Loader	225420	4	0	0			901680	
5 6 X 4 truck	187850	24	0	0			4508400	
6 FEL	225420	4	0	0			901680	
7	0						0	
8	0						0	
9	0						0	
Total		1090830		0	0	30	265200	7805132

2: Cash outflows per year, based on Input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Processor	Ownership Cost Loader	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1260000	2087917	4144000	1323000	4200000	1540000	0	0	0	14554917
1							815600	6560428	9167080	16343108
2							710600	6560428	9167080	16438108
3							1385324	6560428	9167080	17112833
4							815600	6560428	9167080	16343108
5							710600	6560428	9167080	16438108
6							319200	6560428	9167080	16046708
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	6	1663200	306306
2	Grapple skidder	6	1240222	297627
3	Processor	6	2735040	301444
4	Loader	5	873180	277717
5	6 X 4 truck	6	2772000	262548
6	FEL	6	1016400	306306
7			0	0
8			0	0
9			0	0
Total			10300042	306306

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		2572970	2572970
2		2572970	2572970
3		2572970	2572970
4		2572970	2572970
5		2572970	2572970
6	10600042	2572970	13173013
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years 20

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUMI- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	14554917	0	-14554917	-14554917	0	0	-14554917	1.00	-14554917		-14554917	
1	16343108	2572970	-13770138	-28325055	-20417596	0	-13770138	0.96	-13240517	#REF!	-13240517	#NUM!
2	16438108	2572970	-13865138	-42190193	-17853613	0	-13865138	0.92	-12819099	#REF!	-12819099	#NUM!
3	17112833	2572970	-14539862	-56730055	-17198846	0	-14539862	0.89	-12925885	#REF!	-12925885	#NUM!
4	16343108	2572970	-13770138	-70500193	-13770138	0	-13770138	0.85	-11770772	#REF!	-11770772	#NUM!
5	16438108	2572970	-13865138	-84365331	-13865138	0	-13865138	0.82	-11396133	#REF!	-11396133	#NUM!
6	16046708	13173013	-2873896	-87239226	-2873896	0	-2873896	0.79	-2271123	#REF!	-2271123	#NUM!
7	0	0	0	-87239226	0	0	0					
8	0	0	0	-87239226	0	0	0					
9	0	0	0	-87239226	0	0	0					
10	0	0	0	-87239226	0	0	0					
11	0	0	0	-87239226	0	0	0					
12	0	0	0	-87239226	0	0	0					
13	0	0	0	-87239226	0	0	0					
14	0	0	0	-87239226	0	0	0					
15	0	0	0	-87239226	0	0	0					
16	0	0	0	-87239226	0	0	0					
17	0	0	0	-87239226	0	0	0					
18	0	0	0	-87239226	0	0	0					
19	0	0	0	-87239226	0	0	0					
20	0	0	0	-87239226	0	0	0					
											-78978446	#NUM!

4. System Description: Pine sawtimber, System 4

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vst. cost R	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/Tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Harvester	2072000	2	4144000	15000	302222	2	7800	15000	3	304000
2	Forwarder	262428	3	787284	15000	52486	24	15600	17100	5	419400
3	Loader	681800	2	1363600	12000	113633	2	7800	137850	3	275775
4	6 X 4 Truck	352000	12	4224000	84000	502000	120	32500	1300	0	156000
5	FEL	720000	2	1440000	12000	120000	8	5200	11875	2	96000
6											
7											
8				0							
9				0							
				0							
Total		6478128	19	14936885			156	68900	320167		4994068

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Int & lic R/Year	shft length m/hr	# of shifts	Workdays Days/Year	Total hrs Mhrs/Yr	# machines	Total cost R/Year	
1	Harvester	82.1	52.3	103617	7.0	1.9	221	2852	2	1033693	
2	Forwarder	80.6	42.6	131248	7.0	1.9	221	2853	3	876290	
3	Loader	37.5	60.9	33062	7.0	1.7	221	2630	2	583060	
4	6 X 4 Truck	1.9	0.8	18340	320.0	1.5	221	106280	12	3389154	
5	FEL	68.1	42.8	38517	7.0	1.5	221	2321	2	596144	
6											
7											
8											
9											
Total				199	221197					6576341	

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervisor R/Year	Total cost R/Year
1 Harvester	309400	4	0	0	0	265200	1602800
2 Forwarder	225420	6	44200	0	0	0	1352520
3 Loader	225420	4	0	0	0	0	901680
4 6 X 4 Truck	187850	24	0	0	0	0	4508400
5 FEL	225420	4	0	0	0	0	901680
6							0
7							0
8							0
9							0
Total			44200	0	0	265200	9167080

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost 6 X 4 Truck	Ownership Cost FEL	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	4144000	787385	1323000	4200000	1540000	0	0	0	0	19080885
1							478000	6578341	9167080	16224221
2							573800	6578341	9167080	16319221
3							1068524	6578341	9167080	16603945
4							478000	6578341	9167080	16224221
5							718200	6578341	9167080	16463621
6							3040000	6578341	9167080	16049421
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Resale value m ³ /Year	Price R/m ³
1	Harvester	5	1085700	302222	3
2	Forwarder	5	2598382	300034	
3	Loader	5	514813	277717	
4	6 X 4 Truck	6	3720667	262548	
5	FEL				
6					
7					
8					
9					
			7919562	302222	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		2538664	2538664
2		2538664	2538664
3		2538664	2538664
4		2538664	2538664
5		2538664	2538664
6	7919562	2538664	10458227
7		0	0
8		0	0
9		0	0
10		0	0
11		0	0
12		0	0
13		0	0
14		0	0
15		0	0
16		0	0
17		0	0
18		0	0
19		0	0
20		0	0

1.5: Project life span
Years

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	QUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	19080885	0	-19080885	-19080885	0	0	-19080885	1.00	-19080885		-19080885	
1	16224221	2538664	-13685557	-32766442	-21153099	0	-13685557	0.95	-13159189	#REF!	-13159189	#NUM!
2	16319221	2538664	-13780557	-46546999	-18261622	0	-13780557	0.92	-12740899	#REF!	-12740899	#NUM!
3	16603945	2538664	-14265281	-60812280	-17262658	0	-14265281	0.89	-12661783	#REF!	-12661783	#NUM!
4	16224221	2538664	-13685557	-74497837	-13685557	0	-13685557	0.85	-11696471	#REF!	-11696471	#NUM!
5	16463621	2538664	-13924957	-88422793	-13924957	0	-13924957	0.82	-11445299	#REF!	-11445299	#NUM!
6	16049421	10458227	-5591194	-94013688	-5591194	0	-5591194	0.79	-4418802	#REF!	-4418802	#NUM!
7	0	0	0	0	0	0	0					
8	0	0	0	0	0	0	0					
9	0	0	0	0	0	0	0					
10	0	0	0	0	0	0	0					
11	0	0	0	0	0	0	0					
12	0	0	0	0	0	0	0					
13	0	0	0	0	0	0	0					
14	0	0	0	0	0	0	0					
15	0	0	0	0	0	0	0					
16	0	0	0	0	0	0	0					
17	0	0	0	0	0	0	0					
18	0	0	0	0	0	0	0					
19	0	0	0	0	0	0	0					
20	0	0	0	0	0	0	0					
											-85226330	#NUM!

Cost (R/m³) 47.35

Expensive sawtimber

Machine name	Purchase price	Useful life (mhrs)	Resale value	Financial Inputs						Pine (1m ³)			Time worked					
				Fuel cons (lit/mhr)	R & M (R/mhr or R/km)	License (R/yr)	Insurance (R/yr)	L&I (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/km)	LF	(m ³ /shift)	m ³ /year	no of shifts	mhrs/shift	Days/yr	mhrs/yr
Chainsaw fell & delim	17500	825	875	2.3	24.1	0	3500	3500	N/A	0	N/A	2	69	15249	1.0	5	221	1105
Chainsaw crosscut	17500	825	875	2.3	24.1	0	3500	3500	N/A	0	N/A	-	129	28509	1.0	5	221	1105
112kW Cable skidder	5571570	7500	278579	20.8	225.0	96	1114314	1114410	64000	4	3510	5	128	28376	1.0	7	221	1547
130kW Grapple skidder	7456845	7500	335558	23.4	325.0	96	1491369	1491465	72000	4	3250	5	223	78711	1.6	6	221	2122
TJ1010 forwarder	10181545	7500	509077	11.3	175.0	96	2036309	2036405	72000	6	15600	N/A	N/A	2.0	7	221	3094	
Timbco feller buncher disc	9000000	7500	450000	45.5	288.2	96	1800000	1800096	800000	1	7800	N/A	N/A	2.0	6	221	2652	
Timbco feller buncher cAb	9000000	7500	450000	35.1	265.0	96	1800000	1800096	800000	1	7800	4	378	158722	1.9	5	221	2100
Cato excavator HD 820	4725000	7500	236250	12.7	320.0	96	945000	945096	580472	1	7800	3	202	75741	1.7	7	221	2630
Bell 220 A logger	1375000	7500	68750	10.4	100.0	96	275000	275096	13900	3	2340	3	164	36200	1.0	6	221	1328
Bell ADT timber truck	5650000	11250	282500	18.2	225.0	96	1130000	1130096	45000	6	4550	-	1	285	2.0	7	221	3094
6 X 4 truck	2500000	337500	125000	0.7	3.0	4800	500000	504800	5600	10	32500	-	36	11934	1.5	320	221	106080
6 X 4 truck with trailer	4900000	625000	245000	0.8	350.0	6000	980000	985000	5600	18	39000	-	30	6630	1.0	800	221	176800
Front end loader	5500000	7500	275000	0.9	225.0	96	1100000	1100096	50000	4	5200	-	252	83538	1.5	7	221	2321
Slinger steer truck	4780000	562500	237500	0.9	3.5	6000	950000	956000	6400	18	65000	-	96	31824	1.5	320	221	106080
Bigwood Waratah F/D/C	14800000	18000	740000	31.2	275.0	96	2960000	2960096	640000	1	7800	-	202	76632	1.7	7	221	2661
Bigwood Waratah Proc	14800000	15000	740000	31.2	275.0	96	2960000	2960096	640000	1	7800	-	240	79560	1.5	7	221	2321
Waratah 616 F/D	11750000	11250	587500	29.9	115.0	96	2350000	2350096	580000	1	7800	N/A	N/A	1.9	7	221	2939	
Waratah 616 F/D/C	11750000	11250	587500	29.9	115.0	96	2350000	2350096	580000	1	7800	N/A	N/A	2.0	7	221	3094	
Timberjack 1810 forwarder	18747345	15000	837367	27.3	225.0	96	3749469	3749565	72000	8	15600	-	132	51051	1.8	7	221	2707
Bell tractor/trailer	2550000	7500	127500	15.6	125.0	96	510000	510096	17500	8	3900	-	63	13923	1.0	7	221	1547
Interlink truck	5800000	750000	290000	0.8	3.9	6000	1160000	1166000	6400	18	65000	-	30	13280	2.0	7	221	3094
Prattice 410 and slasher	5816400	11250	290820	36.4	325.0	96	1163280	1163376	580000	1	19500	N/A	N/A	1.5	7	221	2321	
Timbco clamshank skidder	9000000	7500	450000	28.6	175.0	96	1800000	1800096	4254	6	13000	-	126	41789	1.5	7	221	2321
Peteron Pacific DDCL	33520915	7500	1676046	104.0	600.0	96	6704183	6704279	N/A	0	N/A	-	0	2.0	7	221	3094	

Labour cost input data: current figures

	R/day	Days/yr	Total/year
Supervisor	1000	221	221000
Chainsaw operator	600	221	132600
Harvester operator	300	221	66300
Machine operator	1360	221	300560
Truck driver 6 X 4	1105	221	244205
Truck driver EC1	1300	221	287300
Tallyman	700	221	154700
Chockerman	700	221	154700
Labourer	480	221	106080
Diesel price	13.00		
Petrol Price	15.20		

Scenario Inputs

	Expensive
Diesel price	4.00
Petrol Price	4.00
Oil as a % of fuel	0.05
Supervisor	5.00
Chainsaw operator	5.00
Harvester operator	1.50
Machine operator	8.00
Truck driver 6 X 4	6.50
Truck driver EC1	6.50
Tallyman	7.00
Chockerman	7.00
Labourer	6.00
Purchase price	5.00
Useful life (mhrs)	0.75
Resale value	0.05
Fuel cons (lit/mhr)	1.30
R & M (R/mhr)	5.00
License (R/yr)	4.00
Insurance (R/yr)	0.20
Tyre/track cost per tyre	4.00
Tyre/track life (hrs/km)	1.30
Pine 1m3 (m ³ /shift)	0.60
Pine 0.3m3 (m ³ /shift)	0.60
Eucalyptus (m ³ /shift)	0.60
mhrs/shift or km/shift	1.00
Tax rate	0.60
Hurdle rate	0.13

System Description: 1. Pine sawtimber System 1

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/yr	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre Rands	Tyre cycle YEAR	Cost/cycle Rands
1	Chainsaw	17900	11	192900	825	167739	0	0	0	0	0
2	Cable skidder	5871870	5	2787850	7500	141882	20	3510	84000	2	1280000
3	Chainsaw	17900	6	109000	825	171054	0	0	0	0	0
4	3 wheeler	1379000	5	6895000	7500	180999	13	2340	13600	2	170000
5	6 X 4 truck	2500000	13	32500000	337500	195142	130	23900	5600	0	728000
6	FEL	4500000	3	11000000	7500	167076	8	5200	50000	2	400000
7											
8											
9											
Total		14981570	31	78337850			171	43550	133200		22710800

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R/M R/mhr	hrs & ltr R/Yr	shift length mhr/shift	# of shifts	Workdays R/year	Total hrs Mhr/yr	# machines	Total cost R/Yr
1	Chainsaw	31.8	24.1	3500	5.0	1.0	221	1105	11	719071
2	Cable skidder	283.8	225.0	1114410	7.0	1.0	221	1547	5	9508548
3	Chainsaw	37.3	24.1	3900	5.0	1.0	221	1105	6	428058
4	3 wheeler	142.0	100.0	27926	6.0	1.0	221	1326	5	2879675
5	6 X 4 truck	8.9	3.0	104800	320.0	1.5	221	106080	13	2235052
6	FEL	12.1	229.0	1100098	7.0	1.5	221	2321	3	3300418
7										
8										
9										
Total			601	2987802						36870020

1.4: Labour cost								
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads R/year	Supervision R/year	Total cost R/year	
1 Chainsaw	132800	11	0	0	0	221000	1679600	
2 Cable skidder	300560	5	154700	12			3359200	
3 Chainsaw	132800	6	154700	12			2652000	
4 3 wheeler	300560	5	0	0			1502800	
5 6 X 4 truck	244205	26	0	0			6349330	
6 FEL	300560	4					1202240	
7	0						0	
8	0						0	
9	0						0	
Total		1411085		309400	24	0	221000	16745170

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Cable skidd	Ownership Cost Chainsaw	Ownership Cost 3 wheeler	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	192900	27857850	105000	6875000	32500000	11000000				78530350
1	192900		105000				2184000	39870820	16745170	59097490
2	192900		105000				4034000	39870820	11043370	55248500
3	192900		105000				2184000	39870820	11043370	53395690
4	192900		105000				2754000	39870820	11043370	53965690
5	192900		105000				3464000	39870820	11043370	54675690
6							1456000	39870820	11043370	52370190
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ²
1	Chainsaw	1	9625	167739
2	Cable skidder	5	1322893	141882
3	Chainsaw	1	5250	171054
4	3 wheeler	6	412500	180999
5	6 X 4 truck	3	1625000	155142
6	FEL	3	550000	167076
7				0
8				0
9				180999

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	0	0
1	14875	0	14875
2	14875	0	14875
3	14875	0	14875
4	14875	0	14875
5	14875	0	14875
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

1.5: Project life span	
Years	0

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	78530350	0	-78530350	-78530350	0	0	-78530350	1.000	-78530350	#REF!	-78530350	#NUM!
1	59097490	14875	-59082615	-137612965	-98251940	0	-59082615	0.885	-52285500	#REF!	-52285500	#NUM!
2	55248500	14875	-55233625	-192846590	-78732170	0	-55233625	0.783	-43253830	#REF!	-43253830	#NUM!
3	53395690	14875	-53380815	-246227405	-69048305	0	-53380815	0.693	-36995563	#REF!	-36995563	#NUM!
4	53965690	14875	-53950815	-300178220	-6350816	0	-53950815	0.613	-33089045	#REF!	-33089045	#NUM!
5	54675690	14875	-54660815	-354839035	-54660815	0	-54660815	0.543	-29667701	#REF!	-29667701	#NUM!
6	52370190	0	-52370190	-407209225	-52370190	0	-52370190	0.480	-25154373	#REF!	-25154373	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-298676381	#NUM!

2. Pine sawtimber: System 2

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks					
Item	Machina Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mhrs	Annual vol. cul m	Number of Tyres/tracks	Type life Mhrs	Cost/tyre Rands	Type cycle YR/FT	Cost/cycle Rands	
1	Feller buncher	800000	1	800000	7500	158723	1	7800	800000	4	800000	
2	Chainsaw	17500	3	52500	825	85527	0	N/A	0	N/A	0	
3	Grapple skidder	7495845	2	14991690	7500	157423	8	3250	72000	2	576000	
4	Loader	472500	2	945000	7500	151483	2	7800	56072	3	115394	
5	Slinger steer	4780000	8	38240000	62500	159130	80	65000	8400	1	576000	
6	Chainsaw	17500	4	70000	825	85527	0	N/A	0	N/A	0	
7	Bell logger	137500	2	275000	7800	72400	3	2340	13800	2	88000	
8	FEL	550000	2	1100000	7500	167078	8	5200	80000	2	400000	
Total												

1.3: Operating cost											
Item	Machina Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lc R/Year	shd length m/mhr	# of shifts	Workdays Days/Year	Total hrs Mhrs/yr	# machines	Total cost R/Year	
1	Feller buncher	479.1	285.0	1800096	5.0	1.9	221	2100	1	3382365	
2	Chainsaw	37.3	24.1	3500	5.0	1.0	221	1105	3	214029	
3	Grapple skidder	317.7	325.0	1491485	8.0	1.8	221	2122	2	5710123	
4	Loader	173.2	350.0	945095	7.0	1.7	221	2650	2	4484270	
5	Slinger steer	12.1	3.5	85500	320.0	1.5	221	106280	5	13036525	
6	Chainsaw	37.3	24.1	3500	5.0	1.0	221	1105	3	214029	
7	Bell logger	142.0	100.0	275096	6.0	1.0	221	1328	2	1191870	
8	FEL	12.1	325.0	1100096	7.0	1.5	221	2321	2	3300418	
9									0	0	
Total											

1.4: Labour cost							
Machina Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overseers R/Year	Supervision R/Year	Total cost R/Year
1 Feller buncher	300560	2	0	0	30	442000	781458
2 Chainsaw	132600	4	66300	12			1326000
3 Grapple skidder	300560	4	0	0			1202240
4 Loader	300560	4	0	0			1202240
5 Slinger steer	287300	10	0	0			2873000
6 Chainsaw	132600	4	154700	12			2388800
7 Bell logger	300560	2					601120
8 FEL	300560	4					1202240
9							0
Total							2055300

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Chainsaw	Ownership Cost Grapple skidder	Ownership Cost Loader	Ownership Cost Slinger steer	Ownership Cost Chainsaw	Ownership Cost Bell logger	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	900000	52500	14913690	9450000	23750000	52500	2750000	5500000	0	0	0	65468690
1		52500				52500			1152000	31513635	11575096	44345731
2		52500				52500			2196000	31513635	11575096	45389731
3		52500				52500			2888944	31513635	11575096	46082675
4		52500		9450000		52500			2420000	31513635	11575096	50563731
5		52500				52500			1152000	31513635	11575096	44345731
6									576000	31513635	11575096	43664731
7												0
8												0
9												0
10												0
11												0
12												0
13												0
14												0
15												0
16												0
17												0
18												0
19												0
20												0

2. CASH INFLOWS

Item	Machina Description	Machine life Years	Rests Rands	Volume m ³ /year	Price R/m ²
1	Feller buncher	4	450000	158723	
2	Chainsaw	1	2625	85527	
3	Grapple skidder	4	335560	157423	
4	Loader	3	472500	151482	
5	Slinger steer	5	1187500	159120	
6	Chainsaw	1	2625	85527	
8	Bell logger	6	137500	72400	
	FEL	3	550000	167078	
		3	3138310	167076	

1.5: Project life span
 Years: 6

YEAR	Rests value R	Annual income R	TOTAL INFLOWS R
0	0	1403438	1403438
1	5250	1403438	1408688
2	5250	1403438	1408688
3	5250	1403438	1408688
4	5250	1403438	1408688
5	5250	1403438	1408688
8	1330250	1403438	2733688
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

Tax rate

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	DMR FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	65468690	1403438	-64065252	-64065252	0	0	-64065252	1.000	-64065252		-64065252	
1	44345731	1408688	-42937042	-10702294	-73895197	0	-42937042	0.885	-37997383	#REF!	-37997383	#REF!
2	45389731	1408688	-43981042	-109893336	-82558999	0	-43981042	0.783	-34443607	#REF!	-34443607	#REF!
3	46082675	1408688	-44673886	-109897223	-37057224	0	-44673886	0.693	-30951314	#REF!	-30951314	#REF!
4	50563731	1408688	-49157042	-248112865	-53655042	0	-49157042	0.613	-22907642	#REF!	-22907642	#REF!
5	44345731	1408688	-42937042	-282249408	-42937042	0	-42937042	0.543	-23304506	#REF!	-23304506	#REF!
6	43664731	2733688	-40931042	-333180450	-40931042	0	-40931042	0.480	-19659938	#REF!	-19659938	#REF!
7												
8												
9												
10												
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System Description: 3. Pine sawtimber System 3

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs	Annual vol. cub m	Number of Tyres/tracks	Type life Mths/yr	Cost/tyre Rands	Type cycle YRS/E	Cost/cycle Rands
1	Feller buncher	800000	1	800000	7500	158722	1	7800	80000	4	800000
2	Grapple skidder	7458845	2	14917690	7500	157423	8	3250	78000	2	576000
3	Processor	1480000	2	2960000	15000	158120	2	7800	840000	3	1280000
4	Loader	4725000	2	9450000	7500	151482	2	7800	560472	3	1169944
5	6 X 4 truck	2900000	13	37700000	337500	155142	130	32900	5600	0	728000
6	FEL	950000	3	1100000	7500	167076	8	5200	80000	2	400000
Total											
		43981845	21	97463690			151	64350	2148072		334358872

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lic R/year	shill length m/hrs	# of shifts	Workdays Days/year	Total hrs Mhr/yr	# machines	Total cost R/year
1	Feller buncher	478.1	265.0	1800096	5.0	1.8	221	2100	1	3362365
2	Grapple skidder	317.7	325.0	1491465	6.0	1.6	221	2122	2	5710120
3	Processor	425.8	275.0	2960096	7.0	1.5	221	2321	2	9172976
4	Loader	173.2	330.0	945096	7.0	1.7	221	2630	2	4484279
5	6 X 4 truck	8.8	3.0	904800	320.0	1.5	221	105090	13	22935052
6	FEL	12.1	225.0	1100096	7.0	1.5	221	2321	2	3300418
7		0	0	0	0	0	0	0	0	0
8		0	0	0	0	0	0	0	0	0
9		0	0	0	0	0	0	0	0	0
Total										
			1413	7001553						48965211

1.4: Labour cost							
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads R/year	Supervision R/year	Total cost R/year
1 Feller buncher	300560	2	0	0	30	221000	781450
2 Grapple skidder	300560	4	0	0	0	0	1202240
3 Processor	300	4	0	0	0	0	1200
4 Loader	300560	4	0	0	0	0	1202240
5 6 X 4 truck	244205	26	0	0	0	0	6349330
6 FEL	300560	4	0	0	0	0	1202240
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
Total							
		1446745	0	0	30	221000	10738708

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Processor	Ownership Cost Loader	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	800000	14913690	2960000	945000	3250000	1100000	0	0	0	106463690
1							2184000	48965211	11043370	62192581
2							3180000	48965211	11043370	63168581
3							4624944	48965211	11043370	64633525
4							3960000	48965211	11043370	63968581
5							2184000	48965211	11043370	62192581
6							2184000	48965211	11043370	62192581
7							0	0	0	0
8							0	0	0	0
9							0	0	0	0
10							0	0	0	0
11							0	0	0	0
12							0	0	0	0
13							0	0	0	0
14							0	0	0	0
15							0	0	0	0
16							0	0	0	0
17							0	0	0	0
18							0	0	0	0
19							0	0	0	0
20							0	0	0	0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	4	1800000	158722
2	Grapple skidder	4	1342232	157423
3	Processor	6	2960000	158120
4	Loader	3	945000	151482
5	6 X 4 truck	3	3250000	155142
6	FEL	3	1100000	167076
7			0	0
8			0	0
9			0	0
Total				11387232

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	0	0
1	0	1403438	1403438
2	0	1403438	1403438
3	0	1403438	1403438
4	0	1403438	1403438
5	0	1403438	1403438
6	4760000	1403438	6163438
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

1.5: Project life span
Year:

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	106463690	0	-106463690	-106463690	0	0	-106463690	1.000	-106463690		-106463690	
1	62192581	1403438	-60789142	-167252832	-109520987	0	-60789142	0.885	-53795701	#REF!	-53795701	#NUM!
2	63168581	1403438	-61765142	-229017974	-81004248	0	-61765142	0.783	-48371166	#REF!	-48371166	#NUM!
3	64633525	1403438	-63230086	-292248061	-62722824	0	-63230086	0.693	-43821621	#REF!	-43821621	#NUM!
4	63968581	1403438	-62565142	-354813203	-52595142	0	-62565142	0.613	-38372273	#REF!	-38372273	#NUM!
5	62192581	1403438	-60789142	-415602345	-60789142	0	-60789142	0.543	-32939311	#REF!	-32939311	#NUM!
6	62192581	6163438	-56029142	-471631487	-56029142	0	-56029142	0.480	-26911835	#REF!	-26911835	#NUM!
Total											-350730298	#NUM!

4. System Description: Pine sawmiller, System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Total price Rands	Machine life Mths/kms	Annual vol cub m	Number of Tyres/tracks	Tyre life Mths/km	Cost/tyre Rands	Tyre cycle YRS/RS	Cost/cycle Rands
1	Harvester	1480000	2	2960000	15000	153264	2	7800	640000	3	1280000
2	Forwarder	18747345	3	56242035	15000	153153	24	15800	72000	8	1728000
3	Loader	4725000	2	9450000	7500	151482	2	7500	580472	3	1780416
4	6 X 4 Truck	350000	13	4550000	37500	155142	120	32000	3600	6	216000
5	FEL	550000	2	1100000	7500	167076	8	5200	50000	2	100000
6											
7											
8											
9											
Total		46272345	20	109192035			166	65900	1348072		223779992

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhv	R&M R/mhv	Ins & lc R/Year	shft length mhrs	# of shifts	Workdays Days/Year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Harvester	425.8	273.0	2960096	7.0	1.7	221	2661	2	9650051
2	Forwarder	372.6	225.0	3749985	7.0	1.8	221	2707	3	10735078
3	Loader	173.2	320.0	548098	7.0	1.7	221	2630	2	4484276
4	6 X 4 Truck	8.9	3.0	50480	320.0	1.5	221	106280	13	22935052
5	FEL	12.1	225.0	1100096	7.0	1.5	221	2321	2	3300418
6										
7										
8										
9										
Total			1048	6299557						51104879

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Harvester	66300	4	0	0	0	221000	486200	
2 Forwarder	300560	6	154700	0	0	0	1803360	
3 Loader	300560	4	0	0	0	0	1202240	
4 6 X 4 Truck	244205	26	0	0	0	0	6349330	
5 FEL	300560	4	0	0	0	0	1202240	
6							0	
7							0	
8							0	
9							0	
Total		1212185		154700	0	0	221000	11043370

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost 6 X 4 Truck	Ownership Cost FEL	Ownership Cost Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	2960000	56242035	9450000	4550000	11000000	0	0	0	138792035
1						2184000	51104879	11043370	84332249
2						2584000	51104879	11043370	84732249
3						4624944	51104879	11043370	66773193
4						2584000	51104879	11043370	84732249
5						2184000	51104879	11043370	84332249
6						1456000	51104879	11043370	63604249
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value in 7 year	Price R/m ³
1	Harvester	6	1175000	153264	8
2	Forwarder	6	2812102	153153	
3	Loader	3	557157	151482	
4	6 X 4 Truck	3	4362254	155142	
5	FEL	3	1018155	167076	
6					
7					
8					
9					
			9924968	167076	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		1403438	1403438
2		1403438	1403438
3		1403438	1403438
4		1403438	1403438
5		1403438	1403438
6	3987102	1403438	5390540
7		0	0
8		0	0
9		0	0
10		0	0
11		0	0
12		0	0
13		0	0
14		0	0
15		0	0
16		0	0
17		0	0
18		0	0
19		0	0
20		0	0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	QUM- FLOW R	TAXABLE INCOME R	TAX R	NET- FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	138792035	0	-138792035	-138792035	0	0	-138792035	1.000	-138792035		-138792035	
1	84332249	1403438	-82928811	-201720946	-117524629	0	-82928811	0.868	-56689213	#REF!	-56689213	#NUM!
2	84732249	1403438	-8328811	-266049657	-96084222	0	-8328811	0.753	-49585748	#REF!	-49585748	#NUM!
3	66773193	1403438	-65369755	-330419412	-87208162	0	-65369755	0.683	-45304519	#REF!	-45304519	#NUM!
4	84732249	1403438	-8328811	-393748223	-63328811	0	-8328811	0.613	-38840746	#REF!	-38840746	#NUM!
5	84332249	1403438	-82928811	-456677034	-62928811	0	-82928811	0.543	-34155237	#REF!	-34155237	#NUM!
6	63604249	5390540	-58213709	-514890744	-58213709	0	-58213709	0.480	-27961123	#REF!	-27961123	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-390338623	#NUM!
											-425.21	

Machine name	Financial inputs										Pine (1m ³)			Time worked				
	Purchase price	Useful life (mhrs)	Resale value	Fuel cons (l/mhr)	R & M (R/mhr or R/km)	License (R/yr)	Insurance (R/yr)	L&I (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/km)	LF	(m ³ /shft)	m ³ /year	no of shifts	mhrs/shft	Days/yr	mhrs/yr
Chainsaw fell & delimb	14000	880	880	2.3	19.2	0	2800	2800	N/A	0	N/A	2	81	17791	1.0	5	221	1105
Chainsaw crosscut	14800	880	880	2.3	19.2	0	2800	2800	N/A	0	N/A	-	151	33261	1.0	5	221	1105
112kW Cable skidder	4457256	8000	312008	20.8	180.0	48	891451	891499	48000	4	2025	5	150	33106	1.0	7	221	1547
130kW Grapple skidder	5965476	8000	375825	23.4	260.0	48	1193065	1193143	54000	4	1875	5	260	103309	1.8	6	221	2387
TJ1010 forwarder	8145236	8000	570167	11.3	140.0	48	1629047	1629095	54000	6	9000		N/A	N/A	2.0	7	221	3094
Timbco feller buncher disc	7200000	8000	504000	45.5	214.5	48	1440000	1440048	600000	1	4500	4	441	199795	2.1	5	221	2265
Timbco feller buncher c&b	7200000	8000	504000	35.1	212.0	48	1440000	1440048	600000	1	4500	4	441	199795	2.1	5	221	2265
Cato excavator HD B20	3780000	8000	264800	12.7	256.0	48	756000	756048	435354	1	4500	3	235	77969	1.5	7	221	2321
Bell 220 A logger	1100000	8000	77000	10.4	80.0	48	220000	220048	10200	3	1350	3	191	42233	1.0	6	221	1326
Bell ADT timber truck	4520000	12000	316400	18.2	180.0	48	804000	804048	34500	6	2625		1	309	2.0	7	221	3094
6 X 4 truck	2000000	36000	140000	0.7	2.4	2400	400000	402400	4200	10	18750		42	13923	1.5	320	221	106080
6 X 4 truck with trailer	3920000	56000	274400	0.8	280.0	3000	784000	787000	4200	18	22500		35	11603	1.5	800	221	265200
Front end loader	4400000	8000	308000	23.4	180.0	48	880000	880048	37500	4	3000		294	97451	1.5	7	221	2321
Stinger steer truck	3800000	60000	266000	0.9	2.8	3000	760000	763000	4800	18	37500		112	37128	1.5	320	221	106080
Bigwood Waratah F/DIC	11840000	15000	828800	31.2	220.0	48	2368000	2368048	480000	1	4500		235	101359	2.0	7	221	3017
Bigwood Waratah Proc	11840000	15000	828800	31.2	220.0	48	2368000	2368048	480000	1	4500		280	99008	1.6	7	221	2475
Waratah 616 F/D	9400000	12000	658000	29.9	92.0	48	1880000	1880048	435000	1	4500		N/A	N/A	2.0	7	221	3094
Waratah 616 F/DIC	9400000	12000	658000	29.9	92.0	48	1880000	1880048	435000	1	4500		N/A	N/A	2.0	7	221	3094
Timberjack 1810 forwarder	14997876	15000	1049851	27.3	180.0	48	2999575	2999623	54000	7	9000		154	96699	2.9	7	221	4486
Bell tractor/trailer	2040000	8000	142800	15.6	100.0	48	408000	408048	13125	8	2250		74	16244	1.0	7	221	1547
Interlink truck	4640000	80000	324800	0.8	3.1	3000	928000	931000	4800	18	37500		35	15470	2.0	7	221	3094
Prentice 410 and slasher	4653120	12000	325718	36.4	268.0	48	930624	930672	435000	1	11250		N/A	N/A	1.5	7	221	2321
Timbco clamshell skidder	7200000	8000	504000	28.6	140.0	48	1440000	1440048	3198	6	7500		147	48731	1.5	7	221	2321
Peterson Pacific DDCL	28816732	8000	1877171	104.0	480.0	48	8363346	8363394	N/A	0	N/A		0	0	2.0	7	221	3094

Labour cost input data: current figures

	R/day	Days/yr	Total/yr
Supervisor	140	221	30940
Chainsaw operator	84	221	18564
Harvester operator	300	221	66300
Machine operator	255	221	56355
Truck driver 6 X 4	255	221	56355
Truck driver EC1	300	221	66300
Tallyman	70	221	15470
Chockerman	70	221	15470
Labourer	40	221	8840
Diesel price	3.25		
Petrol Price	3.80		

Scenario inputs

	Labour Int
Diesel price	1.00
Petrol Price	1.00
Oil as a % of fuel	0.95
Supervisor	0.70
Chainsaw operator	0.70
Harvester operator	1.50
Machine operator	1.50
Truck driver 6 X 4	1.50
Truck driver EC1	1.50
Tallyman	0.70
Chockerman	0.70
Labourer	0.50
Purchase price	4.00
Useful life (mhrs)	0.80
Resale value	0.07
Fuel cons (l/mhr)	1.30
R & M (R/mhr)	4.00
License (R/yr)	2.00
Insurance (R/yr)	0.20
Tyre/track cost per tyre	3.00
Tyre/track life (hrs/km)	0.75
Pine 1m3 (m ³ /shft)	0.70
Pine 0.3m3 (m ³ /shft)	0.70
Eucalyptus (m ³ /shft)	0.70
mhrs/shft or km/shft	1.00
Days/yr	1.00
Tax rate	0.20
Hurdle rate	0.11

System Description:

1. Pine sawtimber System 1

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mhrs/kms	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mhrs/km	Cost/tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Chainsaw	14000	11	154000	880	185890	0	0	0	0	0
2	Cable skidder	4457256	6	26743536	8000	188635	24	2025	48000	1	1152000
3	Chainsaw	14000	6	84000	880	199565	0	0	0	0	0
4	3 wheeler	1100000	10	11000000	8000	422331	25	1350	10200	1	295000
5	6 X 4 truck	2000000	15	30000000	360000	208845	150	18750	4300	0	62000
6	FEL	4400000	2	8800000	8000	194922	8	3090	37800	1	300000
7											
8											
9											
Total		11985256	35	76627536			207	25125	99900		20679000

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RM R/mhr	Ins & lic R/year	shill length mhrs/km	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/year
1	Chainsaw	9.3	19.2	2800	6.0	1.0	221	1105	11	378149
2	Cable skidder	71.0	180.0	851499	7.0	1.0	221	1547	6	7678592
3	Chainsaw	9.3	19.2	2800	6.0	1.0	221	1105	8	206263
4	3 wheeler	35.9	80.0	220048	6.0	1.0	221	1325	15	3731977
5	6 X 4 truck	2.3	2.4	422400	320.0	1.5	221	106080	15	13384361
6	FEL	79.9	180.0	880048	7.0	1.5	221	2321	2	2966071
7										
8										
9										
Total			481	2396795						28345312

1.4: Labour cost							
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overhead Percent	Supervision R/year	Total cost R/year
1 Chainsaw	18564	11	0	0	0	30940	235144
2 Cable skidder	56355	6	15470	12	0	0	523770
3 Chainsaw	18564	6	15470	12	0	0	297024
4 3 wheeler	56355	15	0	0	0	0	845325
5 6 X 4 truck	56355	30	0	0	0	0	1690650
6 FEL	56355	4	0	0	0	0	224200
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
Total	262548		30940	24	0	30940	3617333

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Cable skidder	Ownership Cost Chainsaw	Ownership Cost 3 wheeler	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	154000	26743536	84000	11000000	30000000	8800000	0	0	0	76781636
1	154000		84000				5487000	28345312	3617333	37887645
2	154000		84000				4035000	28345312	2775760	35394072
3	154000		84000				5487000	28345312	2775760	36846072
4	154000		84000				4035000	28345312	2775760	35394072
5	154000		84000				5487000	28345312	2775760	36846072
6							4035000	28345312	2775760	35156072
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value %/Year	Price R/m ³
1	Chainsaw	1	10780		195696
2	Cable skidder	5	1872048		198635
3	Chainsaw	1	5880		199563
4	3 wheeler	6	924090		422331
5	6 X 4 truck	3	2100000		208845
6	FEL	3	616000		194922
7					0
8					0
9					0
					422331

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1	16660		16660
2	16660		16660
3	16660		16660
4	16660		16660
5	16660		16660
6	2812708		2812708
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span

Years	6
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Tax rate 0
burdle rate 0.11

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	76781636	0	-76781636	-76781636	0	0	-76781636	1.000	-76781636		-76781636	
1	37887645	16660	-37870985	-114652611	-76184753	0	-37870985	0.901	-34118005	#REF!	-34118005	#NUM!
2	35394072	16660	-35377412	-150029923	-58365673	0	-35377412	0.812	-26713101	#REF!	-26713101	#NUM!
3	36846072	16660	-36829412	-186859335	-52154920	0	-36829412	0.731	-26929349	#REF!	-26929349	#NUM!
4	35394072	16660	-35377412	-222236757	-35377412	0	-35377412	0.659	-23304197	#REF!	-23304197	#NUM!
5	36846072	16660	-36829412	-259066171	-36829412	0	-36829412	0.593	-21856464	#REF!	-21856464	#NUM!
6	35156072	2812708	-32343365	-291409536	-32343365	0	-32343365	0.535	-17292084	#REF!	-17292084	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-228984736	#NUM!

2. Pine sawtimber: System 2

1: CASH OUTFLOWS: Input Data
No of systems 1

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol cub m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Feller buncher	720000	1	720000	8000	199795	1	4500	800000	2	600000
2	Chainsaw	14000	4	56000	880	133042	0	N/A	0	N/A	0
3	Grapple skidder	595476	2	1190952	8000	208617	8	1875	54000	1	432000
4	Loader	378000	3	1134000	8000	233906	3	4500	435354	2	1306962
5	Slinger steer	380000	6	2280000	60000	222788	108	37800	4800	0	518400
6	Chainsaw	14000	4	56000	880	133042	0	N/A	0	N/A	0
7	Belt logger	1100000	4	4400000	8000	148832	10	1340	10200	1	102000
8	FEL	4400000	2	8800000	8000	194922	8	3000	37800	1	300000
Total		26273476	21	59326952			138	52725	1141854	0	15787562

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & ls R/Year	shft length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Feller buncher	119.8	212.0	1440045	5.0	2.1	221	2285	1	2191610
2	Chainsaw	9.3	18.2	2800	5.0	1.0	221	1105	4	137509
3	Grapple skidder	79.4	280.0	1183143	8.0	1.8	221	2387	2	4006589
4	Loader	43.3	258.0	798048	7.0	1.8	221	2321	3	4351706
5	Slinger steer	3.0	2.8	783000	320.0	1.5	221	106080	8	8280181
6	Chainsaw	9.3	18.2	2800	5.0	1.0	221	1105	4	137509
7	Belt logger	41.1	80.0	230048	8.0	1.0	221	1326	4	1524507
8	FEL	79.9	180.0	880048	7.0	1.8	221	2321	2	2896071
9									0	0
Total			1029	3815087						23595782

1.4: Labour cost							
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads P/cent	Supervision R/year	Total cost R/year
1 Feller buncher	56355	2	0	0	30	61800	146523
2 Chainsaw	18564	4	15470	12			258896
3 Grapple skidder	56355	4	0	0			225420
4 Loader	56355	6	0	0			338130
5 Slinger steer	66300	12	0	0			795600
6 Chainsaw	18564	4	15470	12			258896
7 Belt logger	56355	4					225420
8 FEL	56355	4					225420
9							0
Total	385203		30940	24	30	61880	2476305

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Chainsaw	Ownership Cost Grapple skidder	Ownership Cost Loader	Ownership Cost Slinger steer	Ownership Cost Chainsaw	Ownership Cost Belt logger	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0												82182952
1	720000	56000	11930952	1134000	2280000	56000	4400000	4400000	2389200	23595782	2476305	28573287
2		56000				56000			4295282	23595782	2476305	30479349
3		56000				56000			1870800	23595782	2476305	28054887
4		56000				56000			4295282	23595782	2476305	30479349
5		56000				56000			2389200	23595782	2476305	28573287
6						56000			1438800	23595782	2476305	27510887
7									0	0	0	0
8									0	0	0	0
9									0	0	0	0
10									0	0	0	0
11									0	0	0	0
12									0	0	0	0
13									0	0	0	0
14									0	0	0	0
15									0	0	0	0
16									0	0	0	0
17									0	0	0	0
18									0	0	0	0
19									0	0	0	0
20									0	0	0	0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale Rands	Volume m ³ /year	Price R/m ³
1	Feller buncher	4	504000	199795	8
2	Chainsaw	1	3920	133042	
3	Grapple skidder	3	375827	208617	
4	Loader	3	793800	233906	
5	Slinger steer	6	1599000	222788	
6	Chainsaw	1	3920	133042	
8	Belt logger	6	308020	168832	
	FEL	3	816000	194922	
		3	4201487	233906	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	1964814	1964814
1	2	1964814	1964815
2	2	1964814	1964815
3	2	1964814	1964815
4	2	1964814	1964815
5	2	1964814	1964815
6	2415040	1964814	4380654
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span	
Years	
	6

Tax rate 0
Hurta rate 0.11

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	82182952	1964814	-80218138	-80218138	0	0	-80218138	1.000	-80218138		-80218138	
1	28573287	1964815	-2660471	-82878609	-6271947	0	-2660471	0.801	-23971596	#REF!	-23971596	#REF!
2	30479349	1964815	-28514533	-115411143	-6312619	0	-28514533	0.812	-23143035	#REF!	-23143035	#REF!
3	28054887	1964815	-26090071	-141431214	-3795482	0	-26090071	0.731	-19078835	#REF!	-19078835	#REF!
4	30479349	1964815	-28514533	-169945746	-28514533	0	-28514533	0.659	-18783406	#REF!	-18783406	#REF!
5	28573287	1964815	-2660471	-196594219	-2660471	0	-2660471	0.593	-16790833	#REF!	-16790833	#REF!
6	27510887	4380654	-23130233	-219684452	-23130233	0	-23130233	0.535	-12366367	#REF!	-12366367	#REF!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

System Description: 3. Pine sawtimber System 3

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine	Unit price	Number of	Tot. price	Machine life	Annual vol	Number of	Tyre life	Cost/tyre	Tyre cycle	Cost/cycle
	Description	Rands	Machines	Rands	Mths/years	cu m	Tyres/tracks	Mths/tyr	Rands	years	Rands
1	Feller buncher	720000	1	720000	8000	18795	1	4500	800000	2	800000
2	Grapple skidder	866476	2	1732952	8000	20617	8	1875	54000	1	432000
3	Processor	1184000	2	2368000	15000	18816	2	4500	480000	2	860000
4	Loader	378000	3	1134000	8000	23306	3	4500	43504	2	130608
5	6 X 4 truck	200000	15	3000000	36000	20845	150	18750	4200	0	830000
6	FEL	440000	2	880000	8000	26233	8	3000	37800	1	300000
Total											

1.3: Operating cost											
Item	Machine	Fuel & oil	RAM	Ins & lc	shft length	# of shifts	Workdays	Total hrs	# machines	Total cost	
	Description	R/mhr	R/mhr	R/Yagr	mhrs		Days/year	Mhrs/yr		R/Yagr	
1	Feller buncher	118.8	212.0	1440048	5.0	2.1	221	2265	1	2191610	
2	Grapple skid	79.4	250.0	1183143	6.0	1.8	221	2387	2	4006588	
3	Processor	106.5	220.0	2388048	7.0	1.6	221	2475	2	6352253	
4	Loader	43.3	256.0	786048	7.0	1.8	221	2321	3	4361706	
5	6 X 4 truck	2.2	2.4	402400	320.0	1.8	221	106080	15	13384381	
6	FEL	79.9	180.0	880048	7.0	1.5	221	2321	2	2866071	
Total											

1.4: Labour cost							
Machine	Operator	Operator	Assistants	Assistants	Overheads	Supervision	Total cost
Description	R/Year	Number	R/year	Number	Permanent	R/year	R/year
1 Feller buncher	56355	2	0	0	30	30940	146523
2 Grapple skid	56355	4	0	0	0	0	226420
3 Processor	300	4	0	0	0	0	1200
4 Loader	56355	8	0	0	0	0	338130
5 6 X 4 truck	56355	30	0	0	0	0	1690650
6 FEL	56355	4	0	0	0	0	225420
7	0						0
8	0						0
9	0						0
Total							2627343

2: Cash outflows per year, based on input data

Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
	Feller buncher	Grapple skidder	Processor	Loader	6 X 4 truck	FEL	R	R	R
0	720000	11930952	23680000	11340000	30000000	8600000	0	0	92950952
1						4512000	33252500	2775760	40540350
2						7078062	33252500	2775760	43106412
3						4512000	33252500	2775760	40540350
4						7078062	33252500	2775760	43106412
5						4512000	33252500	2775760	40540350
6						3150000	33252500	2775760	39178350
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine	Machine life	Resale value	Price
	Description	Years	m ³ /year	R/m ³
1	Feller buncher	4	2016000	199795
2	Grapple skid	3	1503300	206617
3	Processor	6	3315200	198016
4	Loader	3	1587600	233906
5	6 X 4 truck	3	4200000	208845
6	FEL	3	1232000	292383
7				0
8				0
9				0
Total				262383

YEAR	Resale value	Annual Income	TOTAL INFLOWS
	R	R	R
0			0
1		2456017	2456017
2		2456017	2456017
3		2456017	2456017
4		2456017	2456017
5		2456017	2456017
6	5331200	2456017	7787217
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span	
Years	
	6

YEAR	OUT FLOWS	IN- FLOWS	NET FLOW	CUM. FLOW	TAXABLE INCOME	TAX	NET FLOW	NPV FACTOR	NPV after tax	IRR after tax	NPV before tax	IRR before tax
	R	R	R	R	R	R	R		R	%	R	%
0	82950952	0	-82950952	-82950952	0	0	-82950952	1.000	-82950952		-82950952	
1	40540350	2456017	-38084333	-131035285	-80959609	0	-38984333	0.901	-34310210	#REF!	-34310210	#NUM!
2	43106412	2456017	-40650395	-171685679	-65375680	0	-40650395	0.812	-3282772	#REF!	-3282772	#NUM!
3	40540350	2456017	-38084333	-209770012	-55234523	0	-38084333	0.731	-27846936	#REF!	-27846936	#NUM!
4	43106412	2456017	-40650395	-250420407	-40850395	0	-40850395	0.659	-26777674	#REF!	-26777674	#NUM!
5	40540350	2456017	-38084333	-288504740	-38084333	0	-38084333	0.593	-22601198	#REF!	-22601198	#NUM!
6	39178350	7787217	-31391133	-319895872	-31391133	0	-31391133	0.535	-16782981	#REF!	-16782981	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total												

4. System Description: Pine a softwood, System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price R/yr	Number of Machines	Tot. price R/yr	Machine life Mths/yr	Annual vol. cum m	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre R/yr	Tyre cycle years	Cost/cycle R/yr
1	Harvester	1184000	2	2368000	15000	202719	2	4500	48000	11	880000
2	Forwarder	1489787	2	2979574	15000	197287	18	8000	94000	2	864000
3	Loader	3780000	3	11340000	8000	233908	3	4500	436344	2	1308062
4	6 X 4 Truck	2000000	15	30000000	360000	208845	150	18750	4300	0	630000
5	FEL	4400000	2	8800000	8000	194922	8	3000	37800	1	8097866
6											
7											
8											
9											
Total		37017876	22	80135752			179	39750	1011054		

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R/M	hrs & lc R/Year	shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year	
1	Harvester	106.5	220.0	2368046	7.0	2.0	221	3017	2	8705787	
2	Forwarder	83.2	180.0	2899523	7.0	2.9	221	4486	2	12675320	
3	Loader	43.3	258.0	158048	7.0	1.8	221	2321	3	4351706	
4	6 X 4 Truck	2.2	2.4	402490	320.0	1.5	221	106080	15	13384361	
5	FEL	79.8	180.0	880048	7.0	1.5	221	2321	2	2966071	
6											
7											
8											
9											
Total			838	8038116						4083245	

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Harvester	66300	4	0	0	0	30940	296140
2 Forwarder	56355	4	15470	0	0	0	225420
3 Loader	56355	6	0	0	0	0	338130
4 6 X 4 Truck	56355	30	0	0	0	0	1690650
5 FEL	56355	4	0	0	0	0	225420
6							0
7							0
8							0
9							0
Total	291720		15470	0	0	30940	2775760

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost 6 X 4 Truck	Ownership Cost FEL	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	23680000	29995752	11340000	30000000	8800000	0	0	0	0	103815752
1							3780000	40083245	2775760	46639005
2							7210062	40083245	2775760	50069067
3							4740000	40083245	2775760	47599005
4							5850062	40083245	2775760	48690667
5							4080000	40083245	2775760	46939005
6							4110000	40083245	2775760	46969005
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value R/yr	Price R/m ³
1	Harvester	5	1318000	202719
2	Forwarder	3	2099703	197387
3	Loader	3	936024	233906
4	6 X 4 Truck	3	5637375	208845
5	FEL			
6				
7				
8				
9				
			888101	233906

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		1964814	1964814
2		1964814	1964814
3		1964814	1964814
4		1964814	1964814
5		1964814	1964814
6	1318000	1964814	3280614
7		0	0
8		0	0
9		0	0
10		0	0
11		0	0
12		0	0
13		0	0
14		0	0
15		0	0
16		0	0
17		0	0
18		0	0
19		0	0
20		0	0

1.5: Project life span
Years

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET- FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	103815752	0	-103815752	-103815752	0	0	-103815752	1.000	-103815752		-103815752	
1	46639005	1964814	-44674191	-148489943	-84742067	0	-44674191	0.901	-40247019	#REF!	-40247019	#NUM!
2	50069067	1964814	-48104253	-196594196	-72144978	0	-48104253	0.812	-38042491	#REF!	-38042491	#NUM!
3	47599005	1964814	-45634191	-242228386	-61661341	0	-45634191	0.731	-33367327	#REF!	-33367327	#NUM!
4	48090067	1964814	-46342253	-289072639	-46842253	0	-46342253	0.659	-30857780	#REF!	-30857780	#NUM!
5	46939005	1964814	-44974191	-334046830	-44974191	0	-44974191	0.593	-26689693	#REF!	-26689693	#NUM!
6	46969005	3280614	-43688191	-377735021	-43688191	0	-43688191	0.535	-23357491	#REF!	-23357491	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-297377633	#NUM!

Mechanised saw timber	Financial Inputs											Pine (1m ³)		Time worked					
	Machine name	Purchase price	Useful life (mhrs)	Resale value	Fuel cons (l/mhr)	R & M (R/mhr or R/km)	License (R/yr)	Insurance (R/yr)	LAI (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/km)	LF	(m ³ /shift)	m ³ /year	no of shifts	mhrs/shift	Days/yr	mhrs/yr
Chainsaw fell & delimb	2800	1265	700	1.5	5.3	0	280	280	N/A	0	N/A	2	121	26886	1.0	5	221	1105	
Chainsaw crosscut	2800	1265	700	1.5	5.3	0	280	280	N/A	0	N/A	-	226	49891	1.0	5	221	1105	
112kW Cable skidder	891451	11500	222863	13.1	49.5	19	89145	89164	17600	4	2970	5	225	49659	1.0	7	221	1547	
130kW Grapple skidder	1193095	11500	268446	14.8	71.5	19	119310	119329	19800	4	2790	5	390	146354	1.7	6	221	2254	
TJ1010 forwarder	1629047	11500	407262	7.1	38.5	19	162905	162924	19800	6	13200		N/A	N/A	2.0	7	221	3094	
Timbco feller buncher disc	1440000	11500	360000	28.7	59.0	19	144000	144019	220000	1	8900		N/A	N/A	2.0	6	221	2652	
Timbco feller buncher c&b	1440000	11500	360000	22.1	58.3	19	144000	144019	220000	1	8600	4	662	292383	2.0	5	221	2210	
Calc excavator HD 820	756000	11500	189000	8.0	70.4	19	75600	75619	156630	1	6600	3	353	105258	1.4	7	221	2088	
Bell 220 A logger	220000	11500	55000	6.6	22.0	19	22000	22019	3740	3	1980	3	287	63350	1.0	6	221	1326	
Bell ADT timber truck	904000	17250	228000	11.5	49.5	19	90400	90419	12650	6	3850		1	464	2.0	7	221	3094	
6 X 4 truck	400000	517500	100000	0.4	0.7	980	40000	40980	1540	10	27500		63	20885	1.5	320	221	10980	
6 X 4 truck with trailer	784000	809000	199000	0.5	77.0	1200	78400	79600	1540	18	33000		53	11603	1.0	800	221	17680	
Front end loader	880000	11500	220000	14.8	49.5	19	88000	88019	13750	4	4400		441	148192	1.5	7	221	2321	
Singer steer truck	780000	862500	190000	0.7	0.8	1200	78000	77200	1780	18	55000		186	55692	1.5	320	221	10980	
Bigwood Waratah F/D/C	2368000	15000	592000	19.7	60.5	10	236800	236819	176000	1	6600		353	148141	1.9	7	221	2939	
Bigwood Waratah Proc	2368000	15000	592000	19.7	60.5	10	236800	236819	176000	1	6600		420	148512	1.6	7	221	2475	
Waratah 616 F/D	1880000	17250	470000	18.9	25.3	19	188000	188019	159500	1	6600		N/A	N/A	2.0	7	221	3094	
Waratah 616 F/D/C	1880000	17250	470000	18.9	25.3	19	188000	188019	159500	1	6600		N/A	N/A	2.0	7	221	3094	
Timberjack 1810 forwarder	2995675	15000	749894	17.2	49.5	19	299568	299977	19800	8	13200		231	89549	2.0	7	221	3017	
Bell tractor/trailer	408000	11500	102000	9.8	27.5	19	40800	40819	4813	8	3300		110	24365	1.0	7	221	1547	
Interlink truck	928000	1150000	232000	0.5	0.8	1200	92800	94000	1780	18	55000		53	23205	2.0	7	221	3094	
Prentice 410 and slasher	930624	17250	232856	23.0	73.7	19	93062	93082	159990	1	16900		N/A	N/A	1.5	7	221	2321	
Timbco clamshell skidder	1440000	11500	360000	18.0	38.5	19	144000	144019	1173	6	11000		221	73096	1.5	7	221	2321	
Peterson Pacific DDCL	5363346	11500	1340837	65.6	132.0	19	536335	536354	N/A	0	N/A			0	2.0	7	221	3094	

Labour cost input data: current figures

	R/day	Days/yr	Totallyear
Supervisor	1000	221	221000
Chainsaw operator	600	221	132600
Harvester operator	2000	221	442000
Machine operator	1360	221	300560
Truck driver 6 X 4	1020	221	225420
Truck driver EC1	1200	221	265200
Tallyman	650	221	143650
Chockerman	650	221	143650
Labourer	480	221	106080
Diesel price	5.53		
Petrol Price	6.46		

Scenario Inputs

	Mechanised
Diesel price	1.70
Petrol Price	1.70
Oil as a % of fuel	0.05
Supervisor	5.00
Chainsaw operator	5.00
Harvester operator	10.00
Machine operator	6.00
Truck driver 6 X 4	6.00
Truck driver EC1	6.00
Tallyman	6.50
Chockerman	6.50
Labourer	6.00
Purchase price	0.80
Useful life (mhrs)	1.15
Resale value	0.25
Fuel cons (l/mhr)	0.82
R & M (R/mhr)	1.10
License (R/yr)	0.80
Insurance (R/yr)	0.10
Tyre/track cost per tyre	1.10
Tyre/track life (hrs/km)	1.10
Pine 1m3 (m ³ /shift)	1.05
Pine 0.3m3 (m ³ /shift)	1.05
Eucalyptus (m ³ /shift)	1.05
mhrs/shift or km/shift	1.00
Days/yr	1.00
Tax rate	0.20
Hurdle rate	0.05

System Description:

1. Pine sawtimber: System 1

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs	Annual vol. cut m ³	Number of Tyres/tracks	Type life Mths/hrs	Cost/tyre Rands	Type cycle years	Cost/cycle Rands
1	Chainsaw	2900	11	32000	1261	293543	0	0	0	0	0
2	Cable skidder	89451	6	534707	11500	297952	24	2970	17800	2	422400
3	Chainsaw	2800	6	16800	1261	299345	0	0	0	0	0
4	3 wheeler	220000	9	1980000	11500	570147	23	1860	3740	1	84150
5	6 X 4 truck	400000	14	5600000	517000	292383	140	27000	1540	0	215600
6	FEL	860000	2	1720000	11500	292383	8	4400	13750	2	110000
7											
8											
9											
Total		2397051	37	14705507			195	36950	36630		7124535

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/lt	RAM R/lt	hrs & sec R/Year	shift length mhrs/dm	# of shifts	Workdays Days/Year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Chainsaw	10.0	5.3	290	5.0	1.0	221	1105	11	189084
2	Cable skidder	76.1	49.5	89194	7.0	1.0	221	1547	6	1700920
3	Chainsaw	10.0	5.3	280	5.0	1.0	221	1105	6	103137
4	3 wheeler	38.1	22.0	22018	6.0	1.0	221	1326	9	914883
5	6 X 4 truck	2.4	0.7	40960	320.0	1.5	221	106080	14	5085966
6	FEL	85.6	49.5	88018	7.0	1.5	221	2321	2	803160
7										
8										
9										
Total				132	240443					8797181

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1	Chainsaw	132900	11	0	0	0	221000	1679600
2	Cable skidder	300560	6	143650	12	0	0	3527100
3	Chainsaw	132900	6	143650	12	0	0	2519400
4	3 wheeler	300560	11	0	0	0	0	3308160
5	6 X 4 truck	225420	28	0	0	0	0	6311760
6	FEL	300560	4	0	0	0	0	1202240
7		0						0
8		0						0
9		0						0
Total		1392300		287300	24	0	221000	18546320

2: Cash outflows per year, based on Input data

Year	Ownership Cost	Ownership Cost Cable skidder	Ownership Cost Chainsaw	Ownership Cost 3 wheeler	Ownership Cost 6 X 4 truck	Ownership Cost FEL	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0										
1	30800	5348707	16800	1980000	5600000	1760000	862400	8797181	18546320	14736307
2	30800		16800				1478850	8797181	13109720	23433451
3	30800						946550	8797181	13109720	22884251
4	30800		16800				1394800	8797181	13109720	23349301
5	30800						946550	8797181	13109720	22884251
6							862400	8797181	13109720	22769301
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value n ² /Year	Price R/m ²
1	Chainsaw	1	7700	293543	0
2	Cable skidder	7	1337177	297952	
3	Chainsaw	1	4200	299345	
4	3 wheeler	6	594000	570147	
5	6 X 4 truck	5	1400000	292383	
6	FEL	5	440000	292383	
7				0	
8				0	
9				0	
				570147	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1	7700	0	7700
2	7700	0	7700
3	11900	0	11900
4	7700	0	7700
5	7700	0	7700
6	3783077	0	3783077
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	14736307	0	-14736307	-14736307	0	0	-14736307	1.000	-14736307		-14736307	
1	25236701	7700	-25229001	-49965308	-35581795	0	-25229001	0.952	-26884763	#REF!	-26884763	#NUM!
2	23434451	7700	-23426751	-73392059	-7337403	0	-23426751	0.907	-21247847	#REF!	-21247847	#NUM!
3	22884251	11900	-22872351	-96264410	-29913452	0	-22872351	0.864	-19757907	#REF!	-19757907	#NUM!
4	23349301	7700	-23341601	-119606011	-23341601	0	-23341601	0.823	-19203193	#REF!	-19203193	#NUM!
5	22884251	7700	-22876551	-135481562	-22876551	0	-22876551	0.784	-17924376	#REF!	-17924376	#NUM!
6	22769301	3783077	-18986224	-154467786	-18986224	0	-18986224	0.746	-14167813	#REF!	-14167813	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-133922296	#NUM!

2. Pine sawtimber: System 2

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life yrs	Annual vol. cu m	Number of Tyres/tracks	Tyre life Mtrs	Cost/hrs Rands	Tyre cycle years	Cost/cycle Rands
1	Feller buncher	1440000	1	1440000	11500	282383	1	8800	220000	3	220000
2	Chainsaw	2800	4	11200	1285	199563	0	N/A	0	N/A	0
3	Grapple skidder	1183095	2	2366190	11500	282708	8	2780	19800	1	158400
4	Loader	786000	3	2358000	11500	315774	3	8600	19800	3	475800
5	Slinger steer	760000	6	4560000	862900	334152	106	55000	1780	1	190080
6	Chainsaw	2800	4	11200	1285	199563	0	N/A	0	N/A	0
7	Bell logger	220000	4	880000	11600	282383	10	1980	3740	1	37400
8	FEL	800000	2	1600000	11500	282383	8	4400	13780	2	110000
Total											

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	RM R/mhr	MS & LC R/year	shill length m/hr	# of shifts	Workdays R/day	Total hrs Mhrs/yr	# machines	Total cost R/year	
1	Feller buncher	128.4	88.3	144019	5.0	2.0	221	2210	1	587114	
2	Chainsaw	10.0	5.3	280	5.0	1.0	221	1105	4	88758	
3	Grapple skidder	88.2	71.5	118329	6.0	1.7	221	2254	2	845004	
4	Loader	48.4	70.4	75619	7.0	1.4	221	2088	3	958829	
5	Slinger steer	4.3	0.6	77200	330.0	1.5	221	106080	6	3715190	
6	Chainsaw	10.0	5.3	280	5.0	1.0	221	1105	4	88758	
7	Bell logger	44.3	22.0	22019	8.0	1.0	221	1328	4	440774	
8	FEL	88.8	48.5	88019	7.8	1.5	221	2321	2	803198	
9										0	
Total											

1.4: Labour cost							
Machine Description	Operator	Operator Number	Assistants	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year
1 Feller buncher		300560	2	0	30	442000	781456
2 Chainsaw		132600	4	442000	12		833400
3 Grapple skidder		300560	4	0	0		1202240
4 Loader		300560	6	0	0		1803360
5 Slinger steer		265200	12	0	0		3182400
6 Chainsaw		132600	4	143650	12		2254200
7 Bell logger		300560	4				1202240
8 FEL		300560	4				1202240
9							0
Total							

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Chainsaw	Ownership Cost Grapple skidder	Ownership Cost Loader	Ownership Cost Slinger steer	Ownership Cost Chainsaw	Ownership Cost Bell logger	Tyre Cost FEL	Operating Cost R	Labour Cost R	Total Outflow R
0	1440000	11200	2366190	2280000	4560000	11200	880000	800000	0	0	12436800
1		11200				11200		417561	757187	17462536	25458884
2		11200				11200		527560	757187	17462536	28588830
3		11200				11200		1274849	757187	17462536	26316872
4		11200				11200		685960	757187	17462536	25728033
5		11200				11200		575960	757187	17462536	29618033
6								190080	757187	17462536	25209803
7											0
8											0
9											0
10											0
11											0
12											0
13											0
14											0
15											0
16											0
17											0
18											0
19											0
20											0

2. CASH INFLOWS

Item	Machine Description	Machine life years	Resale Rands	Volume m ³ /year	Price R/m ³
1	Feller buncher	5	360000	282383	
2	Chainsaw	1	2800	199563	
3	Grapple skidder	5	288448	282708	
4	Loader	6	567000	315774	
5	Slinger steer	8	1140000	334152	
6	Chainsaw	1	2800	199563	
8	Bell logger	5	220000	253399	
9	FEL	5	440000	282383	
Total					
		5	3001048	334152	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	2806877	2806877
1	2	2806877	2806879
2	2	2806877	2806879
3	2	2806877	2806879
4	2	2806877	2806879
5	2	2806877	2806879
6	3001048	2806877	5807925
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years

YEAR	OUT FLOWS R	INFLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	12436590	2806877	-9629714	-9629714	0	0	-9629714	1.000	-9629714		-9629714	
1	25459684	2806879	-22652805	-32282519	2806879	0	-22652805	0.952	-21574100	#REF!	-21574100	#REF!
2	25589583	2806879	-22762804	-55045323	2806879	0	-22762804	0.907	-20646534	#REF!	-20646534	#REF!
3	26316872	2806879	-23510093	-78555416	2806879	0	-23510093	0.864	-20308903	#REF!	-20308903	#REF!
4	25728033	2806879	-2291204	-101478620	2806879	0	-2291204	0.823	-18857331	#REF!	-18857331	#REF!
5	25618083	2806879	-22811204	-124287824	2806879	0	-22811204	0.784	-17873175	#REF!	-17873175	#REF!
6	25209803	5807925	-19401878	-143689701	19401878	0	-19401878	0.746	-14477980	#REF!	-14477980	#REF!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total												
-123367737 #NUM!												

System Description:

3. Pine sawtimber: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2 Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Total price Rands	Machine life Mths/Anns	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Anns	Cost/tyre Rands	Tyre cycle YRS/Anns	Cost/cycle Rands
1	Feller buncher	1440000	1	1440000	11500	292383	1	6000	220000	3	220000
2	Grapple skidder	1193095	2	2386190	11500	292708	8	2750	18800	1	18800
3	Processor	2388000	2	4776000	15000	297024	2	8800	176000	3	352000
4	Loader	756000	3	2268000	11500	315774	3	8800	158400	3	475200
5	6 X 4 truck	400000	14	5600000	817000	292383	140	27500	1340	0	218800
6	FEL	880000	2	1760000	11500	439375	8	4400	13200	2	110000
Total											
		7037095	23	16750190			162	54450	590720	9598608	

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mtr	RAM R/mtr	line & lc R/mtr	enfl length m/mtr	# of shifts	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/year	
1	Feller buncher	128.4	58.3	144019	5.0	2.0	221	2210	1	556714	
2	Grapple skidder	85.2	71.5	118329	8.0	1.7	221	2254	2	945004	
3	Processor	114.2	80.5	238119	7.0	1.6	221	2475	2	1338318	
4	Loader	45.4	70.4	78818	7.0	1.4	221	2088	3	958829	
5	6 X 4 truck	2.4	0.7	40980	320.0	1.5	221	106060	14	5085996	
6	FEL	85.8	49.5	88019	7.0	1.5	221	2321	2	803160	
7		0	0								
8		0	0								
9		0	0								
Total											
			311	562746						9698021	

1.4: Labour cost								
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year	
1 Feller buncher	300560	2	0	0		30	221000	
2 Grapple skidder	300560	4	0	0			1202240	
3 Processor	2000	4	0	0			8000	
4 Loader	300560	6	0	0			1803360	
5 6 X 4 truck	225420	28	0	0			6311760	
6 FEL	300560	4					1202240	
7	0						0	
8	0						0	
9	0						0	
Total								
		1429660		0	0	30	221000	1139056

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Processor	Ownership Cost Loader	Ownership Cost 6 X 4 truck	Tyre Cost FEL	Operating Cost r	Labour Cost r	Total Outflow r
0	1440000	2386190	4736000	2268000	5600000	1760000	0		15190190
1						805200	9688021	13109720	23602941
2						915200	9688021	13109720	23712941
3						1856089	9688021	13109720	24653830
4						915200	9688021	13109720	23712941
5						805200	9688021	13109720	23602941
6						431200	9688021	13109720	23226841
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	5	1440000	292383
2	Grapple skidder	5	1073786	292708
3	Processor	6	2388000	297024
4	Loader	6	1134000	315774
5	6 X 4 truck	5	2600000	292383
6	FEL	5	880000	438575
7				0
8				0
9				0
			969796	438575

YEAR	Resale value r	Annual Income r	TOTAL INFLOWS r
0			0
1		3684026	3684026
2		3684026	3684026
3		3684026	3684026
4		3684026	3684026
5		3684026	3684026
6	969796	3684026	13379811
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	CUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	15190190	0	-15190190	-15190190	0	0	-15190190	1.000	-15190190		-15190190	
1	23602941	3684026	-19918915	-38109105	-28264010	0	-19918915	0.952	-18970395	#REF!	-18970395	#NUM!
2	23712941	3684026	-20028915	-58138021	-25053872	0	-20028915	0.907	-18166816	#REF!	-18166816	#NUM!
3	24653830	3684026	-20969804	-79107825	-24319843	0	-20969804	0.864	-18114506	#REF!	-18114506	#NUM!
4	23712941	3684026	-20028915	-99136740	-20028915	0	-20028915	0.823	-16477838	#REF!	-16477838	#NUM!
5	23602941	3684026	-19918915	-119055655	-19918915	0	-19918915	0.784	-15006991	#REF!	-15006991	#NUM!
6	23226841	13379811	-9846129	-128904785	-9846129	0	-9846129	0.746	-7349572	#REF!	-7349572	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

4. System Description: Pine sawmiller System 4

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub. m	Number of Tyres/tracks	Tyre life Mths/Yrs	Costs/tyre Rands	Tyre cycle YRS/E	Costs/cycle Rands
1	Harvester	2368000	2	4736000	18000	296281	2	8500	176000		352000
2	Forwarder	299675	3	899025	18000	299648	24	13200	18900		478200
3	Loader	756000	3	2268000	11800	315774	3	8600	19930		47889
4	6 X 4 Truck	40000	14	560000	17500	292365	140	27500	1540		215600
5	FEL	88000	2	176000	11800	292365	8	4400	13750		110000
6											
7											
8											
9											
Total		7403575	22	18626726			177	58300	370720		69617405

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RM R/mhr	Ins & lic R/Year	Shift length mhrs	# of shifts	Workdays Days/Year	Total hrs Mhrs/Yr	# machines	Total cost R/Year
1	Harvester	114.3	60.5	236819	7.0	1.9	221	2939	2	1500445
2	Forwarder	89.9	49.5	29977	7.0	2.0	221	3017	3	2251970
3	Loader	46.4	70.4	75618	7.0	1.4	221	2088	3	968829
4	6 X 4 Truck	2.4	0.7	40960	350.0	1.5	221	106080	14	5085996
5	FEL	88.6	49.5	88019	7.0	1.5	221	2321	2	803160
6										
7										
8										
9										
Total			231	804575						10600401

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Harvester	442000	4	0	0	0	221000	1989000
2 Forwarder	300550	6	143650	0	0		1803360
3 Loader	300550	6	0	0	0		1803360
4 6 X 4 Truck	225420	28	0	0	0		6311760
5 FEL	300560	4					1202240
6							0
7							0
8							0
9							0
Total		1569100		143650	0	221000	13109720

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost 6 X 4 Truck	Ownership Cost FEL	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0										23362726
1	4736000	899726	2268000	5600000	1760000	0	648800	10600401	13109720	24356921
2							1108800	10600401	13109720	24818921
3							1125688	10600401	13109720	24835810
4							1684000	10600401	13109720	25294121
5							648800	10600401	13109720	24356921
6							431200	10600401	13109720	24141321
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine Life Years	Rands	Resale value n ³ /year	Price R/m ³
1	Harvester	5	940000	296281	8
2	Forwarder	5	2249681	299648	
3	Loader	5	668588	315774	
4	6 X 4 Truck	5	3758250	292383	
5	FEL				
6					
7					
8					
9					
			7816520	315774	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		2652499	2652499
2		2652499	2652499
3		2652499	2652499
4		2652499	2652499
5		2652499	2652499
6	7616520	2652499	10269018
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span Years

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	23362726	0	-23362726	-23362726	0	0	-23362726	1.000	-23362726		-23362726	
1	24356921	2652499	-21704422	-45067148	-31017785	0	-21704422	0.952	-20670878	#REF!	-20670878	#NUM!
2	24818921	2652499	-22166422	-67233570	-27754440	0	-22166422	0.907	-20105598	#REF!	-20105598	#NUM!
3	24835810	2652499	-22183312	-89416882	-25908657	0	-22183312	0.864	-19162779	#REF!	-19162779	#NUM!
4	25294121	2652499	-22641622	-112058504	-22641622	0	-22641622	0.823	-18627319	#REF!	-18627319	#NUM!
5	24356921	2652499	-21704422	-133762927	-21704422	0	-21704422	0.784	-17005983	#REF!	-17005983	#NUM!
6	24141321	10269018	-13872303	-147635229	-13872303	0	-13872303	0.746	-10351726	#REF!	-10351726	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Annexure 14

Financial evaluation of the pine pulpwood value chain

Current pine pulp

Machine name	Purchase price	Useful life (mths)	Resale value	Financial inputs										Pine (R,3m)					Time worked	
				Fuel cons (litre/hr)	R & M (R/mhr or R/hr)	Licence (R/yr)	Insurance (R/yr)	LM (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/m)	LF	(m ³ /hr)	m ³ /year	no of shifts	m ³ /shift	Days/yr	m ³ /yr		
Chainsaw fell & debark	3500	1100	700	1.80	4.81	0	175	175	N/A	0	N/A	2	40	8840	1.0	5	221	1105		
Chainsaw crosscut	3500	1100	700	1.80	4.81	0	175	175	N/A	0	N/A	-	100	22100	1.0	5	221	1105		
112kW Cable skidder	1114314	10000	228663	16.00	45.00	24	55716	65740	16000	4	2700	5	N/A	N/A	0.0	7	221	0		
132kW Grapple skidder	1481389	10000	296274	16.00	65.00	24	74966	74582	18000	4	2500	5	300	81420	1.2	7	230	1800		
L210HD Forwarder	2030209	15000	407262	8.71	35.00	24	101815	101830	18000	6	12000	5	128	56750	2.0	7	221	3094		
Timber loader buncher disc	1800000	10000	360000	35.00	53.83	24	90000	90004	200000	1	8000	2	368	162431	2.0	7	221	3094		
Timber loader buncher cabs	1800000	10000	360000	27.00	53.00	24	80000	90004	200000	1	8000	4	N/A	N/A	0.0	7	221	0		
Cable excavator HD 820	945000	10000	189000	9.76	64.00	24	47290	47274	145118	1	8000	3	200	88400	2.0	7	221	3094		
Bell 220 A digger	275000	10000	55000	8.00	20.00	24	13750	13774	3400	3	1800	3	150	33150	1.0	6	221	1326		
Bell ADT timber truck	1130000	15000	226000	14.00	45.00	24	56500	56524	11500	6	3500	0	0	0	0.0	7	221	0		
6 X 4 truck	500000	45000	100000	0.50	0.60	1200	25000	26200	1400	10	25000	N/A	N/A	0.0	330	221	0			
6 X 4 truck with trailer	880000	100000	186000	0.62	0.70	1500	46000	50900	1400	18	50000	45	19690	2.0	500	221	221000			
Front end loader	1100000	10000	220000	16.00	45.00	24	55000	55024	12500	4	4000	420	0	0	0.0	7	221	0		
Skidder clear truck	950000	75000	190000	82.00	0.70	1500	47500	49000	1600	18	50000	100	0	0	0.0	7	221	0		
Bigwood Warratah F/D/C	2960000	18000	592000	0.24	55.00	24	148000	148024	160000	1	6000	N/A	N/A	0.0	7	221	0			
Bigwood Warratah Proc	2960000	18000	592000	34.00	55.00	24	148000	148024	160000	1	6000	N/A	N/A	0.0	7	221	0			
Warratah 616 F/D	2350000	15000	470000	18.00	23.00	24	117500	117524	145000	1	6000	150	66300	2.0	7	221	3084			
Warratah 616 F/D/C	2350000	15000	470000	18.00	23.00	24	117500	117524	145000	1	6000	120	55692	2.1	7	221	3249			
Timberjack 1810 forwarder	3749498	18000	749894	21.00	45.00	24	187473	187487	18000	8	12000	N/A	N/A	2.0	7	221	3094			
Bell tractor/trailer	510000	10000	102000	12.00	25.00	24	25500	25524	4375	8	3000	90	19890	1.0	7	221	1547			
Interlink truck	1160000	100000	232000	0.65	0.77	1500	90000	90600	1600	18	50000	48	19890	2.0	500	221	221000			
Prattline 410 wind stacker	1161000	15000	232200	28.00	87.00	24	58194	58188	145000	1	15000	140	48410	1.5	7	221	2321			
Timber chiselback skidder	1800000	10000	360000	22.00	35.00	24	80000	90004	1066	8	10000	85	0	0.0	7	221	0			
Peterson Pacific DDCL	8704183	10000	1349837	80.00	120.00	24	335209	335233	N/A	0	N/A	490	162438	1.5	7	221	2381			
Chip Truck	1500000	70000	300000	0.68	0.77	1500	75000	76500	3611	18	50000	0	45	19690	2.0	500	221	221000		

Labour cost input data: current figures

	Rate/day	Days/yr	Total/yr
Supervisor	200	221	44200
Chainsaw operator	120	221	26520
Harvester operator	200	221	44200
Machine operator	170	221	37570
Truck driver 6 X 4	170	221	37570
Truck driver EC1	200	221	44200
Tallyman	100	221	22100
Chockerman	100	221	22100
Labourer	80	221	17680
Diesel price	3.25		
Petrol Price	3.80		

Labour productivity figures

	Time/day	Time/yr
Manual stacking pine pulpwood	11	2431
Manual loading pine pulpwood	12	2652
Debar/stack Eucalyptus pulpwood	8	1218
Load Eucalyptus pulpwood	16	3536

Scenario inputs	Current
Diesel price	1.00
Petrol Price	1.00
Oil as a % of fuel	0.05
Supervisor	1.00
Chainsaw operator	1.00
Harvester operator	1.00
Machine operator	1.00
Truck driver 6 X 4	1.00
Truck driver EC1	1.00
Tallyman	1.00
Chockerman	1.00
Labourer	1.00
Purchase price	1.00
Useful life (mths)	1.00
Resale value	0.20
Fuel cons (litre/hr)	1.00
R & M (R/mhr)	1.00
Licence (R/yr)	1.00
Insurance (R/yr)	0.05
Tyre/track cost per tyre	1.00
Tyre/track life (hrs/m)	1.00
Pine 1m3 (m ³ /hr)	1.00
Pine 0.3m3 (m ³ /hr)	1.00
Eucalyptus (m ³ /hr)	1.00
Manual stacking pine pulpwood	1.00
Manual loading pine pulpwood	1.00
Debar/stack Eucalyptus pulpwood	1.00
Load Eucalyptus pulpwood	1.00
m ³ /shift or km/shift	1.00
Days/yr	1.00
Tax rate	0.20
Trade rate	0.05

System Description: 1. Pine sawwood: System 1

1: CASH OUTFLOWS: Input Data											
1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Years	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mhrs/tyr	Cost/tyr Rands	Tyre cycle Years	Cost/cycle Rands
1	Chainsaw	3500	19	66500	1100	167800	0	0	0	0	0
2	Tract/Trail	510000	9	4590000	10000	179010	72	3000	4375	2	316000
3	Loader	845000	2	1690000	10000	178800	2	8000	14518	2	28036
4	Interlink	1160000	8	9280000	1000000	159120	144	80000	7600	0	230400
5											
6											
7											
8											
9											
Total		2618500	19	15780000			218	59000	151093		3293274

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R/M	Ins & lic R/Year	shift length mhrs/yr	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year	
1	Chainsaw	8.64	4.81	175	5.0	1.0	221	1105	19	247917	
2	Tract/Trail	40.95	25.00	2524	7.0	1.0	221	1547	9	1147938	
3	Loader	33.31	64.00	4174	7.0	2.0	221	3094	2	856578	
4	Interlink	2.22	0.77	9500	500.0	2.0	221	221000	8	5759005	
5											
6											
7											
8											
9											
Total			95	132296						7851537	

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Chainsaw	26520	19	17680	76	0	176800	2024360
2 Tract/Trail	37570	9	17680	77			1600650
3 Loader	37570	4	0	0			150280
4 Interlink	44200	16	0	0			707200
5							
6							
7							
8							
9							
Total		145860	35360	153	0	176800	4572490

2: Cash outflows per year, based on input data										
Year	Ownership Cost Chainsaw	Ownership Cost Tract/Trail	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	66500	4590000	1690000	9280000	0	0	0	0	0	15826500
1	66500						921600	7851537	4572490	13412127
2	66500						1526836	7851537	4572490	14017363
3	66500						921600	7851537	4572490	13412127
4	66500		1690000				1526836	7851537	4572490	15907363
5	66500						921600	7851537	4572490	13412127
6	66500						921600	7851537	4572490	13412127
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS									
Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
1	Chainsaw	1	13300	167960	0	0	0	0	0
2	Tract/Trail	6	918000	179010		1	13300	0	13300
3	Loader	3	378000	176800		2	13300	0	13300
4	Interlink	5	1856000	159120		3	13300	0	13300
5						4	391300	0	391300
6						5	13300	0	13300
7						6	3165300	0	3165300
8						7	0	0	0
9						8	0	0	0
10						9	0	0	0
11						10	0	0	0
12						11	0	0	0
13						12	0	0	0
14						13	0	0	0
15						14	0	0	0
16						15	0	0	0
17						16	0	0	0
18						17	0	0	0
19						18	0	0	0
20						19	0	0	0
Total			3165300	179010		20	0	0	0

1.5: Project life span
Years: 6

3. Net cash flow													
YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CLM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %	
0	15826500	0	-15826500	-15826500	0	0	-15826500	1	-15826500		-15826500		
1	13412127	13300	-13398827	-29226327	-12798827	0	-13398827	0.852	-12760788	#REF!	-12760788	#NUM!	
2	14017363	13300	-14004063	-43220360	-18732063	0	-14004063	0.807	-12702098	#REF!	-12702098	#NUM!	
3	13412127	13300	-13398827	-66826217	-16590827	0	-13398827	0.864	-11574411	#REF!	-11574411	#NUM!	
4	15907363	391300	-15516063	-72144281	-15516063	0	-15516063	0.823	-12765104	#REF!	-12765104	#NUM!	
5	13412127	13300	-13398827	-85543108	-13398827	0	-13398827	0.784	-10498332	#REF!	-10498332	#NUM!	
6	13412127	3165300	-10246827	-95789935	-10246827	0	-10246827	0.746	-7466340	#REF!	-7466340	#NUM!	
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
											-8373572	#NUM!	

Current pine pulp

2. Pine sawwood: System 2

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks				Cost/cycle Rands
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Years	Annual vol Cub.m	Number of Tyres/tracks	Tyre life Miles	Cost/tyre Rands	
1	Chainsaw	2500	19	47500	1100	18795	0	0	0	0
2	Forwarder	203830	3	610892	15000	170250	12	13000	18000	4
3	Loader	545000	2	1090000	10000	178000	2	6000	145118	2
4	Rigid drawbar	960000	8	7680000	1000000	199120	144	50000	1400	0
5										
Total										
		3954809	13	15838927			164	68000	164518	26309653

1.3: Operating cost

Item	Machine Description	Fuel & oil R/mtr	R&M R/mtr	Inv & Lic R/Year	shift length mtr/hr	# of shifts	Workdays	Total hrs Mhr/yr	# machines
1	Chainsaw	62.1	83.0	475	7.0	1.0	221	1547	19
2	Forwarder	39.9	35.0	101830	7.0	2.0	221	3094	3
3	Loader	33.3	64.0	47274	7.0	2.0	221	3094	2
4	Rigid drawbar	2.1	0.7	50500	500.0	2.0	221	221000	8
5									
6									
7									
8									
9									
Total									
		153	199013						

1.4: Labour cost

Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Chainsaw	37570	19	17650	76	0	17650	2057510
2 Forwarder	37570	6	0	0	0	0	225420
3 Loader	37570	4	0	0	0	0	150280
4 Rigid drawbar	44200	16	0	0	0	0	707200
5	0						
6	0						
7	0						
8	0						
9	0						
Total							
		156910	17650	76	0	17650	3140410

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	66500	6108927	1890000	7840000	0	0	0	0	0	15905427
1	66500						806400	11265547	3140410	15278857
2	66500						1096636	11265547	3140410	16589093
3	66500						806400	11265547	3140410	15278857
4	66500		1890000				1420836	11265547	3140410	17783093
5	66500						806400	11265547	3140410	15278857
6							604800	11265547	3140410	15010757
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Volume m³/year	Price R/m³
1	Chainsaw	1	13300		167960
2	Forwarder	5	1221785		170250
3	Loader	3	378000		178900
4	Rigid drawbar	5	0		159120
5					
6					
7					
8					
9					
1.5: Project life span					
Years <input type="text" value="5"/>					

YEAR	Revals value R	Annual Income R	TOTAL INFLOWS R
0	0	0	0
1	13300	0	13300
2	13300	0	13300
3	13300	0	13300
4	391300	0	391300
5	13300	0	13300
6	1613085	0	1613085
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

3. Net cashflow

YEAR	Tax rate Norda rate	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET- FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	0	15905427	0	-15905427	-15905427	0	0	-15905427	1	-15905427	-15905427	#NUM!
1	0.05	15278857	13300	-15265557	-31170984	-23185020	0	-15265557	0.952	-14538626	-14538626	#NUM!
2	0.05	15589093	13300	-15565793	-46726777	-20307471	0	-15565793	0.907	-14109563	-14109563	#NUM!
3	0.05	15278857	13300	-15265557	-61992333	-18433342	0	-15265557	0.864	-13186962	-13186962	#NUM!
4	0.05	17783093	391300	-17391793	-79384126	-17391793	0	-17391793	0.823	-14308271	-14308271	#NUM!
5	0.05	15278857	13300	-15265557	-94649683	-15265557	0	-15265557	0.784	-11960963	-11960963	#NUM!
6	0.05	15010757	1613085	-13397671	-108047355	-13397671	0	-13397671	0.746	-9997549	-9997549	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

-92.16

Current price pub

System Description: 3. Pine pulpwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs	Annual vol sub m	Number of Tyres/tracks	Type life Mths/Ann	Cost/tyre Rands	Type cycle YRS/yr	Cost/cycle Rands
1	Feller buncher	1800000	1	1800000	10000	182435	1	8000	200000	2	200000
2	Grapple skidder	1491369	2	2982738	10000	182840	0	2500	18000	1	144000
3	Del/slasher	1163280	4	4653120	15000	185640	4	15000	145000	6	860000
4	Rigid/drawb	980000	8	7840000	1000000	159120	144	80000	1400	0	201600
5											
6											
Total		5434649	14	15475858			157	73500	364400		57210800

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lic R/Year	Stk length m/hrs	# of stks	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/Year
1	Feller buncher	119.4	53.0	90034	7.0	2.0	221	3094	1	623546
2	Grapple skidder	61.1	65.0	74582	7.0	1.2	230	1900	2	1256629
3	Del/slasher	95.6	67.0	58198	7.0	1.5	221	2321	4	1741541
4	Rigid/drawb	2.1	0.7	80500	500.0	2.0	221	221000	8	5382246
5										
6										
7										
8										
9										
Total			186	183280						9003962

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Feller buncher	37570	2	0	0	0	88400	75140
2 Grapple skidder	37570	4	0	0	0	0	150280
3 Del/slasher	37570	8	0	0	0	0	225420
4 Rigid/drawb	44200	16	0	0	0	0	707200
5							0
6							0
7							0
8							0
9							0
Total		156910	0	0	0	88400	1158040

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Del/slasher	Ownership Cost Rigid/drawb	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1800000	2982738	4653120	7840000	0	0	0	0	17275858
1						806400	9003962	1158040	10968402
2						1150400	9003962	1158040	11312402
3						950400	9003962	1158040	11112402
4						1006400	9003962	1158040	11168402
5						950400	9003962	1158040	11112402
6						604800	9003962	1158040	10766902
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	3	0	182435
2	Grapple skidder	5	596548	182840
3	Del/slasher	6	0	185640
4	Rigid/drawb	5	0	159120
5				0
6				0
7				0
8				0
9				0
			596548	185640

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		501228	501228
1		501228	501228
2		501228	501228
3		501228	501228
4		501228	501228
5		501228	501228
6	3291369	501228	3792597
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	17275858	501228	-16774630	-16774630	0	0	-16774630	1	-16774630		-16774630	
1	10968402	501228	-10467174	-27241804	-18205103	0	-10467174	0.952	-9968737	#REF!	-9968737	#NUM!
2	11312402	501228	-10811174	-38052978	-16433801	0	-10811174	0.907	-9805053	#REF!	-9805053	#NUM!
3	11112402	501228	-10611174	-48664152	-13706346	0	-10611174	0.864	-9163311	#REF!	-9163311	#NUM!
4	11168402	501228	-10667174	-59331326	-10667174	0	-10667174	0.823	-8775910	#REF!	-8775910	#NUM!
5	11112402	501228	-10611174	-69942499	-10611174	0	-10611174	0.784	-8314132	#REF!	-8314132	#NUM!
6	10766902	3792597	-6974205	-76916703	-6974205	0	-6974205	0.746	-5204259	#REF!	-5204259	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-59010052	#NUM!

Current price pulp

4. System Description: Pine pulpwood, System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot price Rands	Machine life Mths/hrs	Annual vol. cub m	Number of Tyres/tracks	Type life Mths/km	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands
1	Feller buncher	1800000	1	1800000	10000	162435	1	6000	200000	2	200000
2	Grapple skidder	1491369	2	2982738	10000	162840	8	2500	16000	1	144000
3	Peterson DDCL	8704183	1	8704183	10000	162435	0	N/A	N/A	0	0
4	Chip truck trailer	1500000	8	13500000	700000	178010	182	50000	3611	0	584882
5											
6											
7											
8											
9											
Total		11495552	12	23186921			171	58500	221611		37895481

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/Year	RAM R/Year	Ins & lic R/Year	min length m/hrs	# of shifts	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/Year
1	Feller buncher	82.1	53.0	90024	7.0	2.0	221	3094	1	538079
2	Grapple skidder	61.1	65.0	74592	7.0	1.2	230	1900	2	314157
3	Peterson DD	85.6	87.0	58188	7.0	1.5	221	2321	1	435385
4	Chip truck trail	2.3	0.8	76500	500.0	2.0	221	221000	8	6835505
5										
6										
7										
8										
9										
Total			186	209280						8124126

1.4: Labour cost								
Machine Description	Operator Number	Operator R/Year	Assistants Number	Assistants R/Year	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Feller buncher	44200	2	0	0	0	44200	132600	
2 Grapple skidder	37570	4	0	22100	0	0	150280	
3 Peterson DD	37570	2	0	22100	0	0	163540	
4 Chip truck trail	44200	18	0	0	0	0	795600	
5							0	
6							0	
7							0	
8							0	
9							0	
Total		163540		44200	4	0	44200	1242020

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trail	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	1800000	2982738	8704183	13500000	0	0	0	0	24886921
1						2483928	8124126	1242020	11850074
2						2683928	8124126	1242020	12050074
3						2483928	8124126	1242020	11850074
4						2683928	8124126	1242020	12050074
5						2483928	8124126	1242020	11850074
6						1754946	8124126	1242020	11121092
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Resale value m ³ /Year	Price R/m ³
1	Feller buncher	3	0	162435	20
2	Grapple skidder	5	596548	162840	
3	Peterson DD	4	1340837	162435	
4	Chip truck trail	3	0	179010	
5					
6					
7					
8					
9					
			1937384	179010	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		3580200	3580200
1		3580200	3580200
2		3580200	3580200
3		3580200	3580200
4		3580200	3580200
5		3580200	3580200
6	373206	3580200	7312406
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.3: Project life span
Years: 6

YEAR	OUT FLOWS R	INFLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	24886921	3580200	-21406721	-21406721	0	0	-21406721	1	-21406721		-21406721	
1	11850074	3580200	-8269874	-29676595	-19663335	0	-8269874	0.952	-7876071	#REF!	-7876071	#NUM!
2	12050074	3580200	-8469874	-38146470	-15425961	0	-8469874	0.907	-7682426	#REF!	-7682426	#NUM!
3	11850074	3580200	-8269874	-46416344	-12907059	0	-8269874	0.864	-7143828	#REF!	-7143828	#NUM!
4	12050074	3580200	-8469874	-54886219	-8469874	0	-8469874	0.823	-6968187	#REF!	-6968187	#NUM!
5	11850074	3580200	-8269874	-63156093	-8269874	0	-8269874	0.784	-6479663	#REF!	-6479663	#NUM!
6	11121092	7312406	-3808687	-66964780	-3808687	0	-3808687	0.746	-2842101	#REF!	-2842101	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-60388997	#NUM!

5. System Description: Pine sawwood System 2

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machining life Mths/Years	Annual vol. cub. m	Number of Tyres/tracks	Tyre life Mths/Years	Cost/tyre Rands	Tyre cycle years	Cost/cycle Rands
1	Harvester	234000	3	702000	15000	167078	3	6000	14000	2	43500
2	Forwarder	203638	3	610917	18000	170256	18	12000	18000	4	324000
3	Loader	94500	2	189000	10000	178800	2	8000	145118	2	290236
4	Rigid/drawbar	98000	8	784000	100000	158120	144	80000	1400	0	201600
5											
6											
7											
8											
9											
Total		6311309	13	15838927			167	74000	309518		51889400

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mtr	RMM R/mtr	Ins & lic R/Year	shift length m/hr	# of shifts	Workdays Days/year	Total hrs Mths/Yr	# machines	Total cost R/Year
1	Harvester	81.4	23.0	117534	7.0	2.1	221	3249	3	1175386
2	Forwarder	30.9	35.0	101839	7.0	2.0	221	3094	3	917272
3	Loader	33.3	64.0	47274	7.0	2.0	221	3094	2	696578
4	Rigid/drawbar	2.1	0.7	50500	500.0	2.0	221	221000	8	5382246
5										
6										
7										
8										
9										
Total		128	123	199613				230437		8171582

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year
1 Harvester	44200	6	0	0	0	44200	309400
2 Forwarder	37570	6	0	0	0		225420
3 Loader	37570	4	0	0	0		150280
4 Rigid/drawbar	37570	16	0	0	0		601120
5							0
6							0
7							0
8							0
9							0
Total		156910		0	0	44200	1286220

2: Cash outflows per year, based on input data									
Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost 0	Tyre Cost 0	Operating Cost R	Labour Cost R	Total Outflow R
0	7050000	6108927	1890000	7840000	0	0	0	0	22888927
1							806400	8171582	10264202
2							1531636	8171582	10989438
3							806400	8171582	10264202
4			1890000				1855636	8171582	13203438
5							806400	8171582	10264202
6							604800	8171582	10062602
7							8171582	1286220	9467902
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value R	Price R/m ³
1	Harvester	5	1410000	167076
2	Forwarder	5	1221785	170256
3	Loader	3	378000	176800
4	Rigid/drawbar	5	0	159120
5				
6				
7				
8				
9				
			3009785	176800

1.3: Project life span
Years 0

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		530400	530400
1		530400	530400
2		530400	530400
3		530400	530400
4	378000	530400	908400
5		530400	530400
6	3009785	530400	3540185
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	22888927	0	-22888927	-22888927	0	0	-22888927	1	-22888927		-22888927	
1	10264202	530400	-9733802	-32622729	-17653265	0	-9733802	0.952	-9270287	#REF!	-9270287	#NUM!
2	10989438	530400	-10459038	-43081767	-15210716	0	-10459038	0.907	-9486656	#REF!	-9486656	#NUM!
3	10264202	530400	-9733802	-52815568	-12001597	0	-9733802	0.864	-9408424	#REF!	-9408424	#NUM!
4	13203438	908400	-12295038	-65110606	-12295038	0	-12295038	0.823	-10115158	#REF!	-10115158	#NUM!
5	10264202	530400	-9733802	-74844408	-9733802	0	-9733802	0.784	-7629588	#REF!	-7629588	#NUM!
6	10062602	3540185	-6522416	-81366824	-6522416	0	-6522416	0.746	-4867128	#REF!	-4867128	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20											-72663286	#NUM!

Low cost pine pulp

Low cost pine pulpwood

	Financial inputs										Pine (0,3m³)			Time worked				
	Purchase price	Useful life (mths)	Resale value	Fuel cons (l/mhr)	R & M (R/mhr or R/km)	License (R/yr)	Insurance (R/yr)	LAI (Total)	Tyre/track cost per yr	# of tyres	Tyre/track life (hrs/km)	LP	m³/ha/yr	m³/year	no of shifts	mhrs/shift km/shift	Days/yr	mhrs/yr km/yr
Chainsaw fell & delim	2450	1430	809	1.4	4.6	0	123	123	N/A	0	N/A	2	44	9724	1.0	5	221	1105
Chainsaw control	2450	1430	809	1.4	4.6	0	123	123	N/A	0	N/A	2	110	26310	1.0	5	221	1105
113kW Cable skidder	780000	13000	257407	12.0	42.4	17	39001	39018	15000	4	3510	5	N/A	N/A	1.0	7	221	1547
130kW Grapple skidder	1042858	13000	344508	13.5	61.8	17	52188	52215	17100	4	3250	5	330	113860	1.5	7	220	2413
TJ1010 Excavator	1425418	15000	470387	8.4	33.3	17	71271	71389	17100	6	15600	5	141	65549	2.1	7	221	3248
Timberc feller buncher disc	1290000	13000	415800	26.3	50.9	17	63000	63017	190000	1	7800	2	404	201013	2.3	7	221	3481
Timberc feller buncher ckb	1260000	13000	415800	20.3	50.4	17	63000	63017	190000	1	7800	4	N/A	N/A	0.0	7	221	0
Cato excavator HD R20	661500	13000	216295	7.3	60.8	17	33075	33082	137862	1	7800	3	220	87240	2.0	7	221	3094
Bell 220 A loader	192500	13000	63525	6.0	18.0	17	8625	8642	3230	3	2340		185	36488	1.0	6	221	1326
Bell ADT timber truck	781000	19500	261030	10.5	42.8	17	39550	39567	10925	6	4550		0	2.0	0	7	221	3094
8 X 4 truck	350000	585000	115500	0.4	0.6	840	17500	18540	1330	10	32500		N/A	N/A	1.0	320	221	70730
8 X 4 truck with trailer	680000	2000000	226500	0.5	0.7	1050	34300	35390	1390	18	135000		90	21879	2.0	800	221	221030
Front end loader	770000	13000	254100	13.5	43.8	17	38550	38517	11875	4	6200		462	262094	2.0	7	221	3094
Skidder steel truck	665000	879000	219450	46.5	0.7	1050	33250	34300	1530	16	65000		110	48620	2.0	7	221	3094
Bigwood Warrabah F/D/C	2072000	23400	663760	0.2	52.3	17	103600	103617	150000	1	7800		N/A	N/A	0.0	7	221	0
Bigwood Warrabah Proc	2072000	23400	663760	18.0	52.3	17	103600	103617	150000	1	7800		N/A	N/A	0.0	7	221	0
Warrabah 616 F/D	1645000	19500	542850	17.3	17.1	17	82250	82267	137780	1	7800		185	0	0.0	7	221	0
Warrabah 616 F/D/C	1645000	19500	542850	17.3	17.1	17	82250	82267	137780	1	7800		132	59510	1.8	7	221	2785
Timberjack 1810 forwarder	2624628	23400	868127	15.8	42.8	17	131211	131248	17100	8	15500		N/A	N/A	0.0	7	221	0
Bell tractor/loader	352000	13000	117810	8.0	23.8	17	17850	17867	4156	5	3000		99	20785	1.0	7	221	1470
Interlink truck	812000	1300000	267860	0.5	0.7	1050	40600	41650	1330	18	65000		50	30788	1.9	900	221	209690
Practica 410 and slasher	814296	19500	268718	21.0	83.7	17	40715	40732	137790	1	19600		154	51051	1.5	7	221	2321
Timberc clamshell skidder	1260000	13000	415800	16.5	30.3	17	63000	63017	1013	6	13000		94	0	0.0	7	221	0
Palerson Pacific DDC	4892928	13000	1548666	80.0	114.0	17	234546	234563	N/A	0	N/A		538	202502	1.7	7	221	2630
Chip Truck	1050000	810000	348500	0.5	0.7	1050	62500	63550	3430	18	65000		50	21879	2.0	500	221	221000

Labour cost input data: current figures

	R/day	Days/yr	Total/yr
Supervisor	1200	221	265200
Chainsaw operator	240	221	53040
Harvester operator	1400	221	308400
Machine operator	1020	221	225420
Truck driver 8 X 4	850	221	187850
Truck driver EC1	1000	221	221000
Tallyman	290	221	64090
Checkman	200	221	44200
Labourer	216	221	47736
Diesel price	5		
Petrol Price	6		

Labour productivity figures

	T/mhr	T/year
Manual stacking: pine pulpwood	11	2455
Manual loading: pine pulpwood	12	2679
Debar/stack: Eucalyptus pulpwood	6	0
Load Eucalyptus pulpwood	16	0

Scenario inputs

	Low cost
Diesel price	1.50
Petrol Price	1.50
Oil as a % of fuel	0.05
Supervisor	6.00
Chainsaw operator	2.00
Harvester operator	7.00
Machine operator	6.00
Truck driver 8 X 4	5.00
Truck driver EC1	2.00
Tallyman	2.00
Checkman	2.00
Labourer	2.70
Purchase price	0.70
Useful life (mths)	1.30
Resale value	0.33
Fuel cons (l/mhr)	0.75
R & M (R/mhr)	0.95
License (R/yr)	0.70
Insurance (R/yr)	0.05
Tyre/track cost per yr	0.85
Tyre/track life (hrs/km)	1.30
Pine 1m3 (m³/ha/yr)	1.10
Pine 0.3m3 (m³/ha/yr)	1.10
Eucalyptus (m³/ha/yr)	1.10
Manual stacking: pine pulpwood	1.01
Manual loading: pine pulpwood	1.01
Debar/stack: Eucalyptus pulpwood	
Load Eucalyptus pulpwood	
mhrs/shift or km/shift	1.00
Days/yr	1.00
Tax rate	20.00
Handle rate	0.04

System Description:

1. Pine sawwood: System 1

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cuh.m	Number of Tyres/tracks	Type Mts	Cost/tyre Rands	Type cycle YRS	Cost/cycle Rands
1	Chainsaw	2450	21	51450	1430	204204	0	0	0	0	0
2	Tract/Trail	397000	10	3970000	13000	207851	80	3900	4188	3	332800
3	Loader	681900	3	1945500	13000	291720	3	7800	137662	3	413586
4	Interlink	812000	10	8120000	1300000	207851	180	89000	1330	0	238400
5											
6											
7											
8											
9											
Total		1832950	23	13674500			263	76700	143348		37700016

1.3: Operating cost

Item	Machine Description	Fuel & oil R/mhr	R/M R/mhr	In & to R/Year	Inv length m/hr	# of shifts	Workdays Days/Year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Chainsaw	7.7	4.6	123	5.0	1.0	221	1105	21	287170
2	Tract/Trail	48.5	23.8	17867	7.0	1.0	221	1470	10	1211009
3	Loader	37.8	60.8	33082	7.0	2.0	221	3094	3	1014821
4	Interlink	2.5	0.7	41650	800.0	1.8	221	209960	10	7239718
5										
6										
7										
8										
9										
Total				90				92609		9752518

1.4: Labour cost

Machine Description	Operator	Operator	Assistants	Assistants	Overheads	Supervision	Total cost R/Year
1 Chainsaw	53040	21	47736	83	0	1060800	6144763
2 Tract/Trail	187850	10	47736	78			5682766
3 Loader	225420	8	0	0			1352520
4 Interlink	221000	30	0	0			4420000
5							
6							
7							
8							
9							
Total	687310		95472	161	0	1060800	17500049

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Tract/Trail	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	51450	3570000	1964500	8120000	0	0	0	0	0	13729500
1	51450						718200	9752518	17500049	28022217
2	51450						718200	9752518	17500049	28022217
3	51450						1464286	9752518	17500049	28768303
4	51450						718200	9752518	17500049	28022217
5	51450						718200	9752518	17500049	28022217
6							478800	9752518	17500049	27731367
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
1	Chainsaw	1	16979	204204	0	0	0	0
2	Tract/Trail	9	1178100	207851	0	16979	0	16979
3	Loader	4	654855	291720	1	16979	0	16979
4	Interlink	6	2679600	207851	2	16979	0	16979
5					3	16979	0	16979
6					4	16979	0	16979
7					5	16979	0	16979
8					6	164964	0	164964
9					7	0	0	0
10					8	0	0	0
11					9	0	0	0
12					10	0	0	0
13					11	0	0	0
14					12	0	0	0
15					13	0	0	0
16					14	0	0	0
17					15	0	0	0
18					16	0	0	0
19					17	0	0	0
20					18	0	0	0
					19	0	0	0
					20	0	0	0

1.5: Project life span

Years: 6

3. Net cash flow

YEAR	OUT FLOWS R	In- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	13729500	0	-13729500	-13729500	0	0	-13729500	1.000	-13729500		-13729500	
1	28022217	16979	-28005238	-41731189	-34842498	0	-28005238	0.982	-26928114	#REF!	-26928114	#N/UM
2	28022217	16979	-28005238	-69736427	-32107586	0	-28005238	0.925	-25692417	#REF!	-25692417	#N/UM
3	28768303	16979	-28751325	-98487751	-31468355	0	-28751325	0.889	-25559823	#REF!	-25559823	#N/UM
4	28022217	16979	-28005238	-126492989	-28005238	0	-28005238	0.855	-23838965	#REF!	-23838965	#N/UM
5	28022217	16979	-28005238	-154498226	-28005238	0	-28005238	0.822	-23018264	#REF!	-23018264	#N/UM
6	27731367	164964	-25881403	-180379631	-25881403	0	-25881403	0.790	-20454449	#REF!	-20454449	#N/UM
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Tax rate: 20.00%

-159519012 #N/UM! -132.93

2. Pine rulewood: System 2

1: CASH OUTFLOWS: Input Data												
1.1 Ownership Costs							1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle YRS#	Cost/cycle Rands	
1	Chainsaw	2450	21	51450	1430	204204	0	0	0	0	0	
2	Forwarder	142818	3	427824	13000	196648	18	18200	17100	5	307800	
3	Loader	681500	3	2044500	13000	194400	3	7800	137800	3	278240	
4	Rigid drawbar	686000	10	6860000	2000000	218790	180	135000	1330	1	239400	
5												
6												
7												
8												
9												
Total		2775366	15	12459249			200	158400	156292		31256420	

1.3: Operating cost												
Item	Machine Description	Fuel & oil R/mhr	RM R/mhr	Ins & lic R/Year	shft length m/hr	# of shifts	Workdays Days/year	Total hrs Mhr/yr	# machines			
1	Chainsaw	104.6	95.4	125	7.0	1.0	221	1547	21			
2	Forwarder	35.1	33.1	71288	7.0	2.1	221	3249	3			
3	Loader	37.8	60.8	33052	7.0	2.0	221	3094	3			
4	Rigid drawbar	2.4	0.7	35390	500.0	2.0	221	221000	10			
5												
6												
7												
8												
9												
Total			145	139729								

1.4: Labour cost									
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year		
1 Chainsaw	225420	21	47736	83	0	1060800	8703843		
2 Forwarder	225420	6	0	0		1352520			
3 Loader	225420	4	0	0		901680			
4 Rigid drawbar	221000	20	0	0		4420000			
5	0								
6	0								
7	0								
8	0								
9	0								
Total	897280		47736	83	0	1060800	15378143		

2: Cash outflows per year, based on Input data										
Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	51450	4278249	1323000	6860000	0	0	0	0	0	12510699
1	51450						478800	13802490	15378143	29710883
2	51450						478800	13802490	15378143	29710883
3	51450						754524	13802490	15378143	29869607
4	51450						478800	13802490	15378143	29710883
5	51450						788600	13802490	15378143	30018683
6							239400	13802490	15378143	29420033
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS										
Item	Machine Description	Machine life Years	Volume m ³ /year	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R		
1	Chainsaw	1	16979	204204	0	0	0	0		
2	Forwarder	5	1411162	196848	1	16979	0	16979		
3	Loader	4	436590	194480	2	16979	0	16979		
4	Rigid drawbar	9	2253900	218790	3	16979	0	16979		
5					4	16979	0	16979		
6					5	16979	0	16979		
7					6	16979	0	16979		
8					7	16979	0	16979		
9					8	16979	0	16979		
10					9	16979	0	16979		
11					10	16979	0	16979		
12					11	16979	0	16979		
13					12	16979	0	16979		
14					13	16979	0	16979		
15					14	16979	0	16979		
16					15	16979	0	16979		
17					16	16979	0	16979		
18					17	16979	0	16979		
19					18	16979	0	16979		
20					19	16979	0	16979		
20					20	16979	0	16979		

3. Net cashflow											
Tax rate	20	0.04									
YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	12510699	0	-12510699	-12510699	0	0	-12510699	1	-12510699	-12510699	
1	29710883	16979	-29693905	-42204804	-35823529	0	-29693905	0.982	-28551831	-28551831	#NUM!
2	29710883	16979	-29693905	-71898709	-33431679	0	-29693905	0.925	-27453684	-27453684	#NUM!
3	29986607	16979	-29969629	-101868137	-32461479	0	-29969629	0.889	-26642891	-26642891	#NUM!
4	29710883	16979	-29693905	-131562042	-29693905	0	-29693905	0.855	-25382474	-25382474	#NUM!
5	30018683	16979	-30001705	-161563747	-30001705	0	-30001705	0.822	-24659214	-24659214	#NUM!
6	29420033	1864731	-27555303	-189119048	-27555303	0	-27555303	0.790	-21777356	-21777356	#NUM!
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
Total										-166978150	#NUM!

System Description:

3_Pine pulpmill: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Items	Machine Description	Unit price	Number of	Total price	Machine life	Annual vol	Number of Tyres/tracks	Tyre life	Cost/tyre	Tyre cycle	Cost/cycle
		Rands		Rands	Mhrs/hrs	hrs/m		Rands	YEARS	Rands	
1	Feller buncher	1260000	1	1260000	13000	201013	1	7800	180000	2	180000
2	Grapple skidder	104358	2	208717	13000	22700	8	3250	17100	1	136800
3	Del/flasher	814296	4	3257184	19500	204204	4	19500	137730	8	551000
4	Rigid/drawb	669000	10	6690000	200000	216760	190	136000	1330	1	239000
5											
6											
Total							193	185550	346180		66812740

1.3: Operating cost											
Items	Machine Description	Fuel & oil	R&M	Ina & sc	stall length	# of shifts	Workdays	Total hrs	# machines	Total cost	
		R/ymr	R/mtr	R/year	mbts	Percent	Days/year	Mhrs/yr	R/year		
1	Feller buncher	135.6	50.4	83017	7.0	2.3	221	3481	1	710288	
2	Grapple skidder	68.4	61.8	92215	7.0	1.9	230	2415	2	1475497	
3	Del/flasher	108.6	63.7	40739	7.0	1.9	221	2321	4	1780693	
4	Rigid/drawb	2.4	0.7	36350	800.0	2.0	221	221000	10	7209340	
5											
6											
7											
8											
9											
Total										11155618	

1.4: Labour cost								
Machine Description	Operator	Operator	Assistants	Assistants	Overheads	Supervision	Total cost	
	R/year	Number	R/year	Number	Percent	R/year	R/year	
1 Feller buncher	225420	2	0	0	0	530400	450840	
2 Grapple skidder	225420	4	0	0	0		901680	
3 Del/flasher	225420	8	0	0	0		1803360	
4 Rigid/drawb	221000	20	0	0	0		4420000	
5							0	
6							0	
7							0	
8							0	
9							0	
Total							897260	7575880

2: Cash outflows per year, based on input data

Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
	Feller buncher	Grapple skidd	Del/flasher	Rigid/drawb						
0	1260000	208717	3257184	6690000	0	0	0	0		13465101
1							615600	11155818	7575880	19347298
2							668800	11155818	7575880	19400498
3							615600	11155818	7575880	19347298
4							668800	11155818	7575880	19400498
5							615600	11155818	7575880	19347298
6							478800	11155818	7575880	19210488
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³
1	Feller buncher	4	415800		201013
2	Grapple skidder	5	669012		22700
3	Del/flasher	8	2735040		204204
4	Rigid/drawb	9	2263800		216790
5					0
6					0
7					0
8					0
9					0
			610383	22700	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		614790	614790
1		614790	614790
2		614790	614790
3		614790	614790
4		614790	614790
5		614790	614790
6	342452	614790	4038842
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years:

YEAR	Tax rate	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	20	13465101	614790	-12850311	-12850311	0	0	-12850311	1	-12850311		-12850311	
1	0.04	19347298	614790	-18732508	-31582819	-24833599	-10000000	-18732508	0.962	-18012027	11.4%	-18012027	11.4%
2		19400498	614790	-18785708	-50368527	-22447238	-9000000	-18785708	0.925	-17388443	11.2%	-17388443	11.2%
3		19347298	614790	-18732508	-69101036	-21173629	-9000000	-18732508	0.889	-16653132	11.0%	-16653132	11.0%
4		19400498	614790	-18785708	-87886744	-18785708	-9000000	-18785708	0.855	-16058102	10.8%	-16058102	10.8%
5		19347298	614790	-18732508	-106619253	-18732508	-9000000	-18732508	0.822	-15396756	10.6%	-15396756	10.6%
6		19210498	4038842	-15171656	-121790909	-15171656	-9000000	-15171656	0.790	-11990380	10.4%	-11990380	10.4%
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
												-108329152	10.3%

Low cost pine pulp

4. System Description: Pine eucalypt, System 4

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs	Annual vol cub m	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre Rands	Tyre cycle YRS/yr	Cost/cycle Rands
1	Feller buncher	1260000	1	1260000	13000	201013	1	7800	160000	2	190000
2	Grapple skidd	1043996	2	2087992	13000	227700	8	3250	17100	1	136800
3	Peterson DDCL	4692978	1	4692978	13000	202502	0	N/A	N/A	0	0
4	Chip truck trailer	1050000	11	11550000	8100000	240669	198	85000	3430	0	678229
5											
6											
7											
8											
9											
Total		8046886	14	18330845			207	78050	210530		4357803

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mtr	RAM R/mtr	Inv & lc R/Year	shift length mths	# of shifts	Workdays Days/year	Total hrs Mtr/yr	# machines	Total cost R/Year
1	Feller buncher	104.8	50.4	83017	7.0	2.3	221	3481	1	602399
2	Grapple skidd	89.4	61.8	52215	7.0	1.5	230	2415	2	368874
3	Peterson DD	108.5	83.7	40732	7.0	1.5	221	2321	1	440173
4	Chip truck trail	2.8	0.7	53950	800.0	2.0	221	221000	11	8772185
5										
6										
7										
8										
9										
Total				176						10183632

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Feller buncher	225420	2	0	0	0	265200	716040
2 Grapple skidd	225420	4	44200	0			901680
3 Peterson DD	225420	2	44200	4			627640
4 Chip truck trail	221000	22	0	0			4862000
5							0
6							0
7							0
8							0
9							0
Total	897260		88400	4	0	265200	7107360

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidd	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trail	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1260000	2087917	4692928	11550000	0	0	0	0	0	19590845
1							1495258	10183632	7107360	18786250
2							1548458	10183632	7107360	18839450
3							1495258	10183632	7107360	18786250
4							1548458	10183632	7107360	18839450
5							1495258	10183632	7107360	18786250
6							679229	10183632	7107360	17970221
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	4	415800	201013
2	Grapple skidd	5	689012	227700
3	Peterson DD	6	1548666	202502
4	Chip truck trail	4	3811500	240669
5				
6				
7				
8				
9				
			6464978	240669

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			4813380
1			4813380
2			4813380
3			4813380
4			4813380
5			4813380
6	2653478		4813380
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CLM: FLOW R	TAXABLE INCOME R	TAX R	-NET- FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	19590845	4813380	-14777465	-14777465	0	0	-14777465	1	-14777465		-14777465	
1	18786250	4813380	-13972870	-28730334	-23138292	0	-13972870	0.962	-13439452	#REF!	-13439452	#NUM!
2	18839450	4813380	-14026070	-42779004	-19525323	0	-14026070	0.926	-12967880	#REF!	-12967880	#NUM!
3	18786250	4813380	-13972870	-56748274	-17639039	0	-13972870	0.889	-12421830	#REF!	-12421830	#NUM!
4	18839450	4813380	-14026070	-70775344	-14026070	0	-14026070	0.855	-11989543	#REF!	-11989543	#NUM!
5	18786250	4813380	-13972870	-84748213	-13972870	0	-13972870	0.822	-11484680	#REF!	-11484680	#NUM!
6	17970221	7466959	-10503362	-95251575	-10503362	0	-10503362	0.790	-8300959	#REF!	-8300959	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-85377820	#NUM!

5. System Description: Pine sawwood, System 3

1: CASH FLOWS: Input Data

1.1: Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Years	Annual vol. cu m	Number of Tyres/tracks	Tyre life Mths/Years	Cost/Tyre Rands	Tyre cycle YRS/5E	Cost/cycle Rands
1	Harvester	1649000	4	6596000	18500	210038	4	7800	137790	3	561000
2	Forwarder	1425416	3	4276249	15000	196548	18	15000	17100	5	307800
3	Loader	661500	2	1323000	13000	194480	2	7800	137862	3	275724
4	Rigid/drawbar	688000	10	6880000	2000000	218790	180	135000	1330	1	239400
5											
6											
7											
8											
9											
Total		4417916	15	12459249			204	166200	294042		6994580

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	log & lc R/Year	shft length mhrs	# of shifts	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/Year
1	Harvester	89.1	17.1	82267	7.0	1.8	221	2785	4	1512118
2	Forwarder	35.1	33.3	71288	7.0	2.1	221	3249	3	879930
3	Loader	37.8	60.0	33092	7.0	2.0	221	3094	2	676414
4	Rigid/drawbar	2.4	0.7	36350	800.0	2.0	221	221000	10	7209340
5										
6										
7										
8										
9										
Total		164	112	139729				290127		10277799

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhaul Percent	Supervision R/Year	Total cost R/Year
1 Harvester	309400	8	0	0	0	265200	2740400
2 Forwarder	225420	6	0	0	0		1352520
3 Loader	225420	4	0	0	0		901680
4 Rigid/drawbar	187850	20	0	0	0		3757000
5							0
6							0
7							0
8							0
9							0
Total	948090		0	0	0	265200	8751600

2: Cash outflows per year, based on input data

Year	Harvester Ownership Cost	Forwarder Ownership Cost	Loader Ownership Cost	Rigid/drawbar Ownership Cost	Tyre Ownership Cost	Operating Cost	Labour Cost	Total Outflow
0	6580000	4276249	1323000	6880000	0	0	0	19039249
1					478800	10277799	8751600	19508199
2					478800	10277799	8751600	19508199
3					754524	10277799	8751600	19783924
4					1029800	10277799	8751600	20059199
5					1062324	10277799	8751600	20091724
6					239400	10277799	8751600	19268799
7						10277799	8751600	19029399
8								0
9								0
10								0
11								0
12								0
13								0
14								0
15								0
16								0
17								0
18								0
19								0
20								0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /Year	Price R/m ³
1	Harvester	7	2171400	210038	3
2	Forwarder	5	1411162	196648	
3	Loader	4	436590	194480	
4	Rigid/drawbar	9	2263800	218790	
5					
6					
7					
8					
9					
			8282952	218790	

1.5: Project life span
Years

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		656370	656370
2		656370	656370
3		656370	656370
4		656370	656370
5		656370	656370
6	4019152	656370	4675522
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	19039249	0	-19039249	-19039249	0	0	-19039249	1	-19039249		-19039249	
1	19508199	656370	-18851829	-37891079	-25081454	0	-18851829	0.962	-18126759	#REF!	-18126759	#NUM!
2	19508199	656370	-18851829	-56742908	-22568904	0	-18851829	0.926	-17429576	#REF!	-17429576	#NUM!
3	19783924	656370	-19127554	-75870461	-21619403	0	-19127554	0.889	-17004325	#REF!	-17004325	#NUM!
4	20059199	656370	-19402829	-95273290	-19402829	0	-19402829	0.855	-16585620	#REF!	-16585620	#NUM!
5	20091724	656370	-19435354	-114708644	-19435354	0	-19435354	0.822	-15974444	#REF!	-15974444	#NUM!
6	19268799	4675522	-14593277	-129301921	-14593277	0	-14593277	0.790	-11533279	#REF!	-11533279	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-115693252	#NUM!

Expansive pine pulp

Expansive pine pulpwood

Machine name	Purchase price	Useful life (mths)	Resale value	Financial inputs							Pine (0,3m³)			Time worked				
				Fuel cons (l/mhr)	R & M (R/mhr or R/ha)	License (R/yr)	Insurance (R/yr)	L&I (Total)	Tyrefrack cost per tyre	# of tyres	Tyrefrack life (hr/ha)	LF	(m³/ha/yr)	m³/yr	no of shifts	mhrs/shift	Days/yr	mhrs/yr
Chainsaw fall & skidder	17500	825	875	2.3	24.1	0	3500	3500	N/A	0	N/A	2	24	5394	1.0	5	221	1105
Chainsaw crosscut	17500	825	875	2.3	24.1	0	3500	3500	N/A	0	N/A	1	60	13260	1.0	5	221	1105
1120W Cable skidder	5571570	7500	278879	20.8	225.0	96	1114314	1114410	64000	4	3510	5	N/A	N/A	1.0	7	221	1547
1300W Grapple skidder	7456645	7500	372842	23.4	325.0	96	1491389	1491485	72000	4	3250	5	180	55890	1.4	7	230	2174
TJ1010 forwarder	10181545	15000	508077	11.3	175.0	96	2036308	2036405	80000	6	15900	5	77	34052	2.0	7	221	3094
Timbco feller buncher disc	8000000	7500	450000	45.5	268.2	96	1800000	1800096	800000	1	7800	2	221	102334	2.1	7	221	3249
Timbco feller buncher cab	9000000	7500	450000	35.1	265.0	96	1800000	1800096	800000	1	7800	4	N/A	N/A	0.0	7	221	0
Cato excavator HD 820	4725000	7500	236250	12.7	320.0	96	945000	945096	580472	1	7800	3	120	53040	2.0	7	221	3094
Bel 220 A logger	1375000	7500	68750	10.4	100.0	96	275000	275096	13600	3	2340	80	19890	1.0	6	221	1326	
Bel ADJ timber truck	2620000	11250	262000	18.2	225.0	96	1130000	1130096	49000	6	4590	8	0	0	2.0	7	221	3094
6 X 4 truck	2920000	32750	175000	0.7	3.0	4800	500000	500000	5000	10	33000	N/A	N/A	0.0	330	221	0	
6 X 4 truck with trailer	4900000	500000	245000	0.8	0.7	6000	980000	980000	5000	18	65000	27	11834	2.0	500	221	221000	
Fendt end loader	6500000	7500	275000	23.4	225.0	96	1100000	1100096	50000	4	5200	252	0	0.0	7	221	0	
Stinger steer truck	4750000	36250	237500	80.6	3.5	6000	950000	950000	6400	18	65000	80	0	0.0	7	221	0	
Bigwood Waratah F/D/C	14800000	13500	740000	0.3	275.0	96	2960000	2960096	640000	1	7800	N/A	N/A	0.0	7	221	0	
Bigwood Waratah Proc	14800000	13500	740000	31.2	275.0	96	2960000	2960096	640000	1	7800	N/A	N/A	0.0	7	221	0	
Waratah 618 F/D	11750000	11250	587500	23.4	115.0	96	2350000	2350096	580000	1	7800	90	38780	2.0	7	221	3094	
Waratah 618 F/D/C	11750000	11250	587500	23.4	115.0	96	2350000	2350096	580000	1	7800	72	31824	2.0	7	221	3094	
Timbco 1810 forwarder	18747345	13500	637367	27.3	225.0	96	3749469	3749565	72000	8	15600	N/A	N/A	0.0	7	221	0	
Bel tractor/trailer	2550000	7500	127500	15.6	125.0	96	510000	510096	17500	8	3900	54	11834	1.0	7	221	1547	
Interlink truck	5800000	75000	290000	0.8	3.9	6000	1160000	1160000	6400	18	65000	27	11834	2.0	500	221	221000	
Plantica 410 and skidder	5918400	11250	290820	36.4	335.0	96	1183280	1183376	580000	1	19500	84	33415	1.8	7	221	2785	
Timbco chainsaw skidder	8000000	7500	450000	28.6	175.0	96	1800000	1800096	4264	6	13000	51	0	0.0	7	221	0	
Palsons Pacific DDCL	33522915	7500	1676046	104.0	600.0	96	6704183	6704279	N/A	0	N/A	0	294	110456	1.7	7	221	2630
Chip Truck	7500000	575000	375000	0.8	3.9	6000	1800000	1800000	14444	18	69000	0	27	11834	2.0	500	221	221000

Labour cost input data: current figures

	R/day	Days/yr	Total/yr
Supervisor	1000	221	221000
Chainsaw operator	600	221	132600
Harvester operator	300	221	66300
Machine operator	1360	221	300560
Truck driver 6 X 4	1105	221	244205
Truck driver EC1	1300	221	287300
Tallyman	700	221	154700
Chockman	700	221	154700
Labourer	480	221	106080
Diesel price	13		
Patrol Price	15		

Labour productivity figures

	T/day	T/yr
Manual stacking pine pulpwood	11	1450
Manual loading pine pulpwood	12	1591
Debar/stack Eucalyptus pulpwood	6	0
Load Eucalyptus pulpwood	16	0

Scenario inputs

	Expense
Diesel price	4.00
Patrol Price	4.00
Oil as a % of fuel	0.05
Supervisor	5.00
Chainsaw operator	5.00
Harvester operator	1.50
Machine operator	8.00
Truck driver 6 X 4	6.50
Truck driver EC1	6.80
Tallyman	7.00
Chockman	7.00
Labourer	6.00
Purchase price	5.00
Useful life (mths)	0.75
Resale value	0.05
Fuel cons (l/mhr)	1.30
R & M (R/mhr)	5.00
License (R/yr)	4.00
Insurance (R/yr)	0.20
Tyrefrack cost per tyre	4.00
Tyrefrack life (hr/ha)	1.20
Pine 1m3 (m³/ha/yr)	0.60
Pine 0.3m3 (m³/ha/yr)	0.60
Eucalyptus (m³/ha/yr)	0.60
Manual stacking pine pulpwood	0.60
Manual loading pine pulpwood	0.60
Debar/stack Eucalyptus pulpwood	
Load Eucalyptus pulpwood	
mhrs/shift or hrs/ha/yr	1.00
Days/yr	1.00
Tax rate	20.00
Burdle rate	0.13

2. Pine pulpwood: System 2

1: CASH OUTFLOWS: Input Data												
1.1 Ownership Costs							1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle YEAR	Cost/cycle Rands	
1	Chainsaw	17500	20	350000	825	106080	0	0	0	0	0	
2	Forwarder	10181545	3	30544635	15000	102155	18	15800	72000	5	1286000	
3	Loader	4728000	2	9456000	7900	106880	7	7800	580472	3	1189544	
4	Rigid drawbar	4900000	8	41000000	8000000	107406	162	69000	9600	0	907200	
5												
6												
7												
8												
9												
Total		19824045	14	84094635			182	88400	658072		119789104	

1.3: Operating cost												
Item	Machine Description	Fuel & oil R/mth	RLM R/mth	Ine & lic R/Year	shft length mths	# of shifts	Workdays Days/year	Total hrs Mths/yr	Total hrs	# machines		
1	Chainsaw	478.1	265.0	3500	7.0	1.0	221	1547	20			
2	Forwarder	169.7	176.0	2038405	7.0	2.0	221	3094	3			
3	Loader	173.2	320.0	945098	7.0	2.0	221	3094	2			
4	Rigid drawbar	11.0	0.7	888000	800.0	2.0	221	221000	8			
5												
6												
7												
8												
9												
Total		781	3967501									

1.4: Labour cost									
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overseer R/Year	Overseer Number	Supervision R/Year	Total cost R/Year	
1 Chainsaw	300560	20	106080	73	0	884000	13726109		
2 Forwarder	300560	3	0	0	0	801680			
3 Loader	300560	4	0	0	0	1202240			
4 Rigid drawbar	287300	18	0	0	0	5171400			
5	0								
6	0								
7	0								
8	0								
9	0								
Total		1189980		106080	73	0	884000	21001429	

2: Cash outflows per year, based on input data											
Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R	
0	350000	30544635	9450000	41100000	0	0	0	0	0	84444635	
1	380000						2721600	69409415	21001429	93482444	
2	350000		9450000				2721600	69409415	21001429	102832444	
3	350000						3882544	69409415	21001429	94643388	
4	380000		9450000				2721600	69409415	21001429	102832444	
5	380000						5178544	69409415	21001429	95830388	
6							1814400	69409415	21001429	92225244	
7										0	
8										0	
9										0	
10										0	
11										0	
12										0	
13										0	
14										0	
15										0	
16										0	
17										0	
18										0	
19										0	
20										0	

2. CASH INFLOWS				
Item	Machine Description	Machine life Years	Volume m ³ /year	Price R/m ³
1	Chainsaw	1	17500	106080
2	Forwarder	5	1527232	102155
3	Loader	2	472500	106880
4	Rigid drawbar	23	0	107406
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

3. Net cashflow												
YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %	
0	84444635	0	-84444635	-84444635	0	0	-84444635	1	-84444635	-84444635	#NUM!	
1	93482444	17500	-93464944	-17790879	135512262	0	-84463722	0.885	-82712340	-82712340	#NUM!	
2	102832444	490000	-102442444	-28035023	-127670635	0	-102442444	0.783	-80227460	-80227460	#NUM!	
3	94643388	17500	-94625888	-37497712	-111444815	0	-94625888	0.683	-65580487	-65580487	#NUM!	
4	102832444	490000	-102442444	-177420358	-102442444	0	-102442444	0.613	-62829870	-62829870	#NUM!	
5	95939388	17500	-95921888	-57334244	-85821888	0	-85821888	0.543	-52062558	-52062558	#NUM!	
6	92225244	2017232	-90208012	-663550256	-80208012	0	-80208012	0.480	-43328580	-43328580	#NUM!	
7	0	0	0									
8	0	0	0									
9	0	0	0									
10	0	0	0									
11	0	0	0									
12	0	0	0									
13	0	0	0									
14	0	0	0									
15	0	0	0									
16	0	0	0									
17	0	0	0									
18	0	0	0									
19	0	0	0									
20	0	0	0									
										-471185930	#NUM!	

System Description:

3. Pine pulpwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Total price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Feller buncher	800000	1	800000	7500	102334	1	7800	800000	2	800000
2	Grapple skidder	746848	2	1493696	7500	111780	8	3250	72000	1	576000
3	Del/flasher	5819400	3	17458200	11250	100246	3	19500	580000	7	1740000
4	Rigid/drawb	4900000	9	44100000	5000000	107406	167	65000	5600	0	907200
5											
6											
7											
8											
9											
Total		27173245	14	78462890			174	95550	1457800		233629400

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & tc R/Year	shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Feller buncher	621.1	265.0	1800096	7.0	2.1	221	3249	1	4878688
2	Grapple skidder	317.7	325.0	1491485	7.0	1.4	230	2174	2	8666251
3	Del/flasher	496.9	335.0	1163376	7.0	1.8	221	2785	3	10438320
4	Rigid/drawb	11.0	0.7	886000	500.0	2.0	221	221000	9	32149079
5										
6										
7										
8										
9										
Total			828	3040841						56932338

1.4: Labour cost								
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year	Total cost R
1 Feller buncher	300590	2	0	0	0	442000	601120	601120
2 Grapple skidder	300560	4	0	0	0	0	1202240	1202240
3 Del/flasher	300560	6	0	0	0	0	1803360	1803360
4 Rigid/drawb	287300	18	0	0	0	0	5171400	5171400
5							0	0
6							0	0
7							0	0
8							0	0
9							0	0
Total	1188980	0	0	0	0	442000	8778120	8778120

2: Cash outflows per year, based on Input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Del/flasher	Ownership Cost Rigid/drawb	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	900000	1491360	17449200	44100000	0	0	0	0	0	85462890
1							2721600	55832338	8778120	67432058
2							4087600	55932338	8778120	68080058
3	900000	1491360					3297600	55832338	8778120	91921748
4							2721600	55932338	8778120	67432058
5							4087600	55932338	8778120	68080058
6							1614400	55932338	8778120	66524858
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /Year	Price R/m ³
1	Feller buncher	2	450000	102334	3
2	Grapple skidder	3	745685	111780	
3	Del/flasher	4	0	100246	
4	Rigid/drawb	23	0	107406	
5				0	
6				0	
7				0	
8				0	
9				0	
			1195685	111780	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		301806	301806
1		301806	301806
2		301806	301806
3	6	301806	301812
4	1195685	301806	1497491
5		301806	301806
6	1195685	301806	1497491
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	INF FLOWS R	NET FLOW R	QUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	85462890	301806	-85161084	-85161084	0	0	-85161084	1	-85161084		-85161084	
1	67432058	301806	-67130252	-15281336	-105381897	0	-67130252	0.985	-59407302	#REF!	-59407302	#NUM!
2	68080058	301806	-68506252	-220787398	-91445119	0	-68506252	0.783	-53650444	#REF!	-53650444	#NUM!
3	91921748	301812	-91619936	-312417524	-106912514	0	-91619936	0.683	-63497212	#REF!	-63497212	#NUM!
4	67432058	1497491	-65957467	-378352091	-95934567	0	-65934567	0.613	-40438905	#REF!	-40438905	#NUM!
5	68080058	301806	-68506252	-44868343	-9508232	0	-68506252	0.543	-37182449	#REF!	-37182449	#NUM!
6	66524858	1497491	-65027367	-511885710	-65027367	0	-65027367	0.480	-31233849	#REF!	-31233849	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-370571245	#NUM!

4. System Description: Pine pulpwood, System 4

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/Tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Feller buncher	900000	1	900000	7500	102334	1	7800	800000	2	800000
2	Grapple skidder	745685	2	1491369	7500	111780	8	3280	72000	1	576000
3	Peterson DDCL	3352015	1	3352015	7500	110496	0	N/A	N/A	0	0
4	Chip truck trailer	790000	10	7900000	625000	119340	180	63000	14444	0	2599920
5											
6											
7											
8											
9											
Total		5747780	13	123434605			189	78050	886444		187537918

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R/M R/mhr	Ins & lic R/Year	Ins & lic mths	# of shifts	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/Year
1	Feller buncher	478.1	285.0	1500096	7.0	2.1	221	3249	1	4217502
2	Grapple skidder	317.7	225.0	1481485	7.0	1.4	230	2174	2	2888417
3	Peterson DD	498.9	335.0	1183375	7.0	1.8	221	2785	1	3479773
4	Chip truck trailer	12.1	3.9	1509000	500.0	2.0	221	221000	10	50235686
5										
6										
7										
8										
9										
Total			929	4180841						60821379

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Feller buncher	66300	2	0	0	0	221000	353600	
2 Grapple skidder	300560	4	154700	0	0	0	1202240	
3 Peterson DD	300560	2	154700	4	0	0	1219920	
4 Chip truck trailer	287300	20	0	0	0	0	5748000	
5							0	
6							0	
7							0	
8							0	
9							0	
Total		954720		308400	4	0	221000	8521780

2: Cash outflows per year, based on input data

Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	9000000	14913690	33520915	7500000	0	0	0	0	0	132434605
1							5198840	60821379	8521760	74542979
2							6575840	60821379	8521760	75918979
3	9000000	14913690	33520915				8375760	60821379	8521760	135153504
4							8597760	60821379	8521760	77942899
5							8375760	60821379	8521760	77718899
6							5198840	60821379	8521760	74542979
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /Year	Price R/m ³
1	Feller buncher	2	450000	102334	20
2	Grapple skidder	3	745685	111780	
3	Peterson DD	3	1676046	110456	
4	Chip truck trailer	2	0	119340	
5					
6					
7					
8					
9					
			2871730	119340	

1.5: Project life span
Years: 6

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		2386800	2386800
1		2386800	2386800
2		2386800	2386800
3	2871730	2386800	5258530
4	0	2386800	2386800
5		2386800	2386800
6	2871730	2386800	5258530
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

Tax rate 20
Hurdle rat 0.13

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	132434605	2386800	-130047805	-130047805	0	0	-130047805	1	-130047805		-130047805	
1	74542979	2386800	-72156179	-202203984	-133873481	0	-72156179	0.885	-63855025	#REF!	-63855025	#NUM!
2	75918979	2386800	-73532179	-275736162	-110562560	0	-73532179	0.783	-57886482	#REF!	-57886482	#NUM!
3	135153504	5258530	-129894973	-405631135	-154561894	0	-129894973	0.693	-90023732	#REF!	-90023732	#NUM!
4	77942899	2386800	-75556099	-481187234	-75556099	0	-75556099	0.613	-46339970	#REF!	-46339970	#NUM!
5	77718899	2386800	-75332099	-556519333	-75332099	0	-75332099	0.543	-40887245	#REF!	-40887245	#NUM!
6	74542979	5258530	-69284448	-625803782	-69284448	0	-69284448	0.480	-33278604	#REF!	-33278604	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-462018864	#NUM!

Expansive pine pulp

5. System Description: Pine pulpwood, System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/Tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Harvester	1175000	3	3525000	11250	95472	3	7800	580000	3	1740000
2	Forwarder	10181545	3	30544635	15000	102185	18	19000	72000	5	1290000
3	Loader	4775000	2	9550000	7500	106280	2	7800	580472	3	1180944
4	Rigid/drawbar	4900000	9	44100000	9000000	107498	162	85000	5600	0	807200
5											
6											
7											
8											
9											
Total		31558545	14	84094635			185	96200	1238072		228043320

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & Lic R/Year	Stall length m/hr	# of shifts	Workdays Days/year	Total hrs Mths/Yr	# machines	Total cost R/Year
1	Harvester	319.4	115.0	230000	7.0	2.0	221	3094	3	11082482
2	Forwarder	160.7	175.0	2036400	7.0	2.0	221	3094	3	9225359
3	Loader	173.2	320.0	945096	7.0	2.0	221	3094	2	4942050
4	Rigid/drawbar	111.0	0.7	980000	500.0	2.0	221	221000	9	32149079
5										
6										
7										
8										
9										
Total		664	611	3987501				230282		57398979

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year
1 Harvester	66300	6	0	0	0	221000	618800
2 Forwarder	300560	6	0	0	0	0	1803360
3 Loader	300560	4	0	0	0	0	1202240
4 Rigid/drawbar	244205	18	0	0	0	0	4395890
5							0
6							0
7							0
8							0
9							0
Total		911625	0	0	0	221000	8020090

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	3525000	30544635	9450000	44100000	0	0	0	0	0	119344635
1							2721600	57398979	8020090	68140669
2							5622544	57398979	8020090	80491613
3							2721600	57398979	8020090	68140669
4							2721600	57398979	8020090	77590969
5							6918544	57398979	8020090	72337613
6							1814400	57398979	8020090	67233469
7								57398979	8020090	65419069
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³
1	Harvester	4	176250	95472	3
2	Forwarder	5	254539	102155	
3	Loader	2	238250	105080	
4	Rigid/drawbar	23	0	107406	
5					
6					
7					
8					
9					
			687038	107406	

1.5: Project life span
Years: 20

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		322218	322218
2		322218	322220
3		322218	322218
4	236250	322218	558468
5		322218	322218
6	687038	322218	989257
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	119344635	0	-119344635	-119344635	0	0	-119344635	1	-119344635		-119344635	
1	68140669	322218	-67818451	-187163086	-10896788	0	-67818451	0.885	-60016328	#REF!	-60016328	#NUM!
2	80491613	322220	-80169392	-267332478	-106387783	0	-80169392	0.783	-62784394	#REF!	-62784394	#NUM!
3	68140669	322218	-67818451	-335150928	-84637378	0	-67818451	0.693	-47001588	#REF!	-47001588	#NUM!
4	77590969	558468	-77032201	-412183129	-77032201	0	-77032201	0.613	-47245291	#REF!	-47245291	#NUM!
5	72337613	322218	-72015395	-484198524	-72015395	0	-72015395	0.543	-39087071	#REF!	-39087071	#NUM!
6	67233469	989257	-66244212	-550442736	-66244212	0	-66244212	0.480	-31818322	#REF!	-31818322	#NUM!
7									0			
8									0			
9									0			
10									0			
11									0			
12									0			
13									0			
14									0			
15									0			
16									0			
17									0			
18									0			
19									0			
20									0			

Labour intensive pine pulpwood

Machine name	Purchase price	Useful life (years)	Resale value	Financial inputs					Pine (0,3m³)			Time worked						
				Fuel cost (R/hr)	R & M (R/hr or R/m)	License (R/yr)	Insurance (R/yr)	LAI (T/ha)	Tyre/truck cost per tyre	# of tyres	Tyre/truck life (trucks)	LF (m³/ha/yr)	m³/year	no of shifts	min/shifft	Days/yr	min/yr	
Chainaw fell & skid	14000	800	800	2.34	19.24	0	2800	2800	N/A	0	N/A	2	28	8188	1.0	5	221	1105
Chainaw crosscut	14000	800	800	2.34	19.24	0	2800	2800	N/A	0	N/A	-	70	15470	1.0	5	221	1105
1120W Cable skidder	4457256	8000	312008	20.80	180.00	48	891451	891459	48000	4	2025	9	N/A	N/A	1.0	7	221	1547
1300W Grapple skidder	5905476	8000	417583	23.40	200.00	48	1193095	1193143	54000	4	1875	5	210	48300	1.0	7	220	1610
TJ1010 forwarder	8145236	15000	870167	11.32	140.00	48	1629047	1629095	54000	6	8000	5	80	33768	1.7	7	221	2630
Timbco feller buncher disc	7200000	8000	504000	45.50	214.52	48	1440000	1440048	600000	1	4500	2	297	113705	2.0	7	221	3094
Timbco feller buncher cab	7300000	8000	504000	35.10	212.00	48	1440000	1440048	600000	1	4500	4	N/A	N/A	0.0	7	221	0
Cato excavator HD B20	3780000	8000	264607	12.89	258.00	48	756000	756048	435334	1	4500	3	140	61880	2.0	7	221	3094
Bal 520 A logger	1100000	8000	770000	10.40	80.00	48	235000	235048	130000	3	1350		105	23205	1.0	8	221	1326
Bal AOT timber truck	4500000	12000	316400	18.20	180.00	48	504000	504048	34800	6	2625		0	0.0	0.0	7	221	0
6 X 4 truck	2000000	360000	140000	0.88	2.40	3400	400000	400400	49000	10	18750		N/A	N/A	0.0	0	330	221
6 X 4 truck with trailer	3920000	700000	274400	0.81	0.70	3000	784000	787000	4900	18	37500		32	13623	2.0	500	221	221000
Front end loader	4400000	8000	308000	23.40	180.00	48	882000	882048	37500	4	3000		294	0	0.0	7	221	0
Steyer steer truck	3800000	600000	260000	80.80	2.80	3000	760000	763000	4800	18	37500		70	0	0.0	7	221	0
Bigwood Wanzah FDC	11840000	14400	828800	0.31	220.00	48	2368000	2368048	480000	1	4500		N/A	N/A	0.0	7	221	0
Bigwood Wanzah Proc	11840000	14400	828800	0.31	220.00	48	2368000	2368048	480000	1	4500		N/A	N/A	0.0	7	221	0
Wanzah 610 FDC	9400000	12000	656000	23.40	82.00	48	1892000	1892048	435000	1	4500		105	46410	2.0	7	221	3094
Wanzah 616 FDC	9400000	12000	656000	23.40	82.00	48	1892000	1892048	435000	1	4500		84	37128	2.0	7	221	3094
Timbcoack 1810 forwarder	14687876	14400	1048651	27.30	180.00	48	2988875	2988923	54000	8	8000		N/A	N/A	2.0	7	221	3094
Bal tractor/loader	2040000	8000	142800	15.80	100.00	48	408000	408048	13125	8	2250		63	13623	1.0	7	221	1947
Interlink truck	4640000	800000	324800	0.85	3.08	3000	928000	931000	4800	18	37500		32	13623	2.0	500	221	221000
Praxino 410 and stasher	4653120	12000	325718	38.40	288.00	48	930624	930872	435000	1	11250		85	34653	1.6	7	221	2475
Timbco clamshell skidder	7200000	8000	504000	28.80	140.00	48	1440000	1440048	3198	6	7500		80	0	0.0	7	221	0
Palermo Pacific DOCL	26916732	8000	1877171	104.00	490.00	48	5363348	5363394	N/A	0	N/A		343	113705	1.5	7	221	2321
Chip Truck	6000000	560000	420000	0.88	3.08	3000	1200000	1203000	10833	18	37500		32	10442	1.5	600	221	163795

Labour cost input data: current figures

Role	Days/yr	Total/yr
Supervisor	140	221
Chainaw operator	84	221
Harvester operator	300	221
Machine operator	255	221
Truck driver 6 X 4	255	221
Truck driver EC1	300	221
Tallyman	70	221
Chockerman	70	221
Labourer	40	221
Diesel price	8	
Petrol Price	10	

Labour productivity figures

	Time/day	Time/yr
Manual stacking pine pulpwood	11	2188
Manual loading pine pulpwood	12	2387
Debar/stack Eucalyptus pulpwood	6	0
Load Eucalyptus pulpwood	16	0

Benchmark inputs

	Lab Int
Diesel price	2.50
Petrol Price	2.50
Oil as % of fuel	0.05
Supervisor	0.70
Chainaw operator	0.70
Harvester operator	1.50
Machine operator	1.50
Truck driver 6 X 4	1.50
Truck driver EC1	1.50
Tallyman	0.70
Chockerman	0.70
Labourer	0.50
Purchase price	4.00
Useful life (years)	0.85
Resale value	0.02
Fuel cost (R/hr)	1.30
R & M (R/hr)	4.00
License (R/yr)	2.00
Insurance (R/yr)	0.20
Tyre/truck cost per tyre	3.00
Tyre/truck life (trucks)	0.75
Pine Int (m³/ha)	0.70
Pine 0.3m³ (m³/ha)	0.70
Eucalyptus (m³/ha)	0.70
Manual stacking pine pulpwood	0.90
Manual loading pine pulpwood	0.90
Debar/stack Eucalyptus pulpwood	
Load Eucalyptus pulpwood	
min/shifft or km/shifft	1.00
Days/yr	1.00
Tax rate	20.00
Hurdle rate	0.11

System Description: 1. Pine pulpwood: System 1

1: CASH OUTFLOWS: Input Data											
1.1 Ownership Costs					1.2: Tyres/tracks						
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cu m	Number of Tyres/tracks	Type life Mths/Yrs	Cost/tyre Rands	Type cycle YRS	Cost/cycle Rands
1	Chainsaw	14000	17	238000	800	105196	0	0	0	0	0
2	Tract/Trail	204000	8	1632000	8000	111384	64	2250	13125	1	840000
3	Loader	376000	3	1134000	8000	185640	3	4500	43534	1	1306082
4	Interlink	464000	8	3712000	80000	111384	144	37600	4800	0	881200
5											
6											
7											
8											
9											
Total		10474000	19	64780000			211	44250	453279		85641869

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & sc R/year	Shift length mhrs/ym	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/year
1	Chainsaw	22.2	19.2	2900	5.0	1.0	221	1105	17	826614
2	Tract/Trail	133.1	100.0	408048	7.0	1.0	221	1547	8	6148075
3	Loader	106.2	256.0	756048	7.0	2.0	221	3094	3	5649061
4	Interlink	7.2	3.1	931000	500.0	2.0	221	221000	8	25638786
5										
6										
7										
8										
9										
Total			378	2085096						38263537

1.4: Labour cost								
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year	
1 Chainsaw	18564	17	8840	48	0	123760	864382	
2 Tract/Trail	56355	8	8840	47	0		863373	
3 Loader	56355	6	0	0	0		338130	
4 Interlink	66300	16	0	0	0		1060800	
5								
6								
7								
8								
9								
Total		197574		17680	95	0	123760	3126696

2: Cash outflows per year, based on input data										
Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow	
	Chainsaw	Tract/Trail	Loader	Interlink	0	0	R	R	R	
0	238000	1632000	1134000	3712000	0	0	0	0	65018000	
1	238000						4147200	38263537	3126686	45775422
2	238000						6293262	38263537	3126686	47921484
3	238000		1134000				6293262	38263537	3126686	59251484
4	238000						4147200	38263537	3126686	45775422
5	238000						6293262	38263537	3126686	47921484
6	238000						3456000	38263537	3126686	45084222
7									0	
8									0	
9									0	
10									0	
11									0	
12									0	
13									0	
14									0	
15									0	
16									0	
17									0	
18									0	
19									0	
20									0	

2. CASH INFLOWS									
Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
1	Chainsaw	1	16660	105196	0	0	0	0	0
2	Tract/Trail	5	1142400	111384		1	16660	0	16660
3	Loader	3	793800	185640		2	16660	0	16660
4	Interlink	4	0	111384		3	810460	0	810460
5						4	16660	0	16660
6						5	16660	0	16660
7						6	1952860	0	1952860
8						7	0	0	0
9						8	0	0	0
10						9	0	0	0
11						10	0	0	0
12						11	0	0	0
13						12	0	0	0
14						13	0	0	0
15						14	0	0	0
16						15	0	0	0
17						16	0	0	0
18						17	0	0	0
19						18	0	0	0
20						19	0	0	0
			1952860	185640		20	0	0	0

1.5: Project life span									
Years		0							

3. Net cash flow												
Tax rate	0.11											
YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	65018000	0	-65018000	-65018000	0	0	-65018000	1	-65018000		-65018000	
1	45775422	16660	-45758762	-110776782	-78148782	0	-45758762	0.901	-41224110	#REF!	-41224110	#NUM!
2	47921484	16660	-47804824	-158681596	-47398624	0	-47804824	0.812	-38806330	#REF!	-38806330	#NUM!
3	59251484	810460	-58441024	-217122611	-71407024	0	-58441024	0.731	-42738865	#REF!	-42738865	#NUM!
4	45775422	16660	-45758762	-262881373	-45758762	0	-45758762	0.659	-30142714	#REF!	-30142714	#NUM!
5	47921484	16660	-47904824	-310796197	-47904824	0	-47904824	0.593	-28429182	#REF!	-28429182	#NUM!
6	45084222	1952860	-43131362	-353927559	-43131362	0	-43131362	0.535	-23059788	#REF!	-23059788	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-269493306	#NUM!

2. Pine pulpwood: System 2

1: CASH OUTFLOWS: Input Data											
1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle YRS/tyr	Cost/cycle Rands
1	Chainsaw	14000	17	238000	880	105196	0	0	0	0	0
2	Forwarder	8145236	3	24435708	15000	101304	18	9000	54000	3	972000
3	Loader	3780000	2	7560000	8000	123760	2	4200	43824	1	870708
4	Rigid drawbar	3920000	8	31360000	700000	111384	144	37800	4200	0	604800
5											
6											
7											
8											
9											
Total		15859236	13	63356708			164	51000	493554		80942856

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RLM R/mhr	Ins & lic R/Year	shift length mths	# of shifts	Workdays Days/Year	Total hrs Mths/yr	Total hrs	# machines
1	Chainsaw	299.4	212.0	2900	7.0	1.0	221	1547		17
2	Forwarder	100.4	140.0	1629095	7.0	1.7	221	2630		3
3	Loader	108.2	256.0	756045	7.0	2.0	221	3094		2
4	Rigid drawbar	6.6	0.7	787000	900.0	2.0	221	221000		8
5										
6										
7										
8										
9										
Total			608	3172143						

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Chainsaw	56355	17	8540	48	0	123760	1383069
2 Forwarder	56355	6	0	0			338130
3 Loader	56355	4	0	0			225420
4 Rigid drawbar	66300	16	0	0			1060800
5	0						0
6	0						0
7	0						0
8							0
9							0
Total	235365		8540	48	0	123760	3007419

2: Cash outflows per year, based on input data										
Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	238000	24435708	7560000	31360000	0	0	0	0	0	63593708
1	238000						3628800	43739241	3007419	50613460
2	238000						4499508	43739241	3007419	51484168
3	238000		7560000				5471508	43739241	3007419	60016168
4	238000						3628800	43739241	3007419	50613460
5	238000						4499508	43739241	3007419	51484168
6							3024000	43739241	3007419	49770680
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS										
Item	Machine Description	Machine life Years	Rands	Volume m ³ /year	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R	
1	Chainsaw	1	16660	105196	0	0	0	0	0	
2	Forwarder	6	1710500	101304	0	1	16660	0	16660	
3	Loader	3	529200	123760	0	2	16660	0	16660	
4	Rigid drawbar	3	0	111384	0	3	545860	0	545860	
5						4	16660	0	16660	
6						5	16660	0	16660	
7						6	2256360	0	2256360	
8						7			0	
9						8			0	
10						9			0	
11						10			0	
12						11			0	
13						12			0	
14						13			0	
15						14			0	
16						15			0	
17						16			0	
18						17			0	
19						18			0	
20						19			0	
20						20			0	

3. Net cashflow											
YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	63593708	0	-63593708	-63593708	0	0	-63593708	1	-63593708	-63593708	#NUM!
1	50613460	16660	-50596800	-114190508	-82274654	0	-50596800	0.901	-45582703	-45582703	#NUM!
2	51484168	16660	-51467508	-165658016	-70474221	0	-51467508	0.812	-41772184	-41772184	#NUM!
3	60016168	545860	-59470308	-225128325	-72141450	0	-59470308	0.731	-43484177	-43484177	#NUM!
4	50613460	16660	-50596800	-275725125	-50596600	0	-50596600	0.659	-3329679	-3329679	#NUM!
5	51484168	16660	-51467508	-327192633	-51467508	0	-51467508	0.593	-30543461	-30543461	#NUM!
6	49770680	2256360	-47514301	-374706934	-47514301	0	-47514301	0.535	-25403085	-25403085	#NUM!
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
										-283708996	#NUM!

System Description: 3. Pine pulpwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price R/ende	Number of Machines	Tot. price R/ende	Machine life Mths/hrs	Annual vol. cub. m	Number of Tyres/tracks	Tyre life Mths/km	Cost/tyre R/ende	Tyre cycle YEAR	Cost/cycle R/ende
1	Feller buncher	720000	1	720000	8000	113705	1	4500	600000	1	600000
2	Grapple skidder	5965476	2	11930952	8000	86600	8	1875	54000	1	432000
3	Del/slasher	465120	3	1395360	12000	102958	3	11250	435000	5	1305000
4	Rigid/drawb	362000	8	3136000	700000	111384	144	37500	4200	0	604800
5											
6											
Total		21738596	13	67250312			156	55125	1093200		170539200

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lic R/Year	shft length m/hr	# of shifts	Workdays Days/year	Total hrs Mhr/yr	# machines	Total cost R/Year
1	Feller buncher	388.2	212.0	1440048	7.0	2.0	221	3094	1	3296980
2	Grapple skidder	198.6	260.0	1193143	7.0	1.0	220	1610	2	5794347
3	Del/slasher	310.5	268.0	830672	7.0	1.6	221	2475	3	7089004
4	Rigid/drawb	6.9	0.7	787000	500.0	2.0	221	221000	8	19690700
5										
6										
7										
8										
9										
Total			741	2910815						35870030

1.4: Labour cost							
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year
1 Feller buncher	56355	2	0	0	0	61880	112710
2 Grapple skidder	56355	2	0	0	0		112710
3 Del/slasher	56355	6	0	0	0		338130
4 Rigid/drawb	66300	16	0	0	0		1060800
5							0
6							0
7							0
8							0
9							0
Total		235365	0	0	0	61880	1624350

2: Cash outflows per year, based on Input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Del/slasher	Ownership Cost Rigid/drawb	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	720000	11930952	1395360	3136000	0	0	0	0	64450312
1						604800	35870030	1624350	38099180
2						1036800	35870030	1624350	38531180
3	720000					0	35870030	1624350	44694380
4						604800	35870030	1624350	38099180
5						604800	35870030	1624350	38099180
6						1036800	35870030	1624350	38531180
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³
1	Feller buncher	3	504000	113705	3
2	Grapple skidder	5	835167	96600	
3	Del/slasher	5	1491840	103958	
4	Rigid/drawb	3	0	111384	
5				0	
6				0	
7				0	
8				0	
9				0	
Total			2831007	113705	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		307002	307002
1		307002	307002
2		307002	307002
3	504000	307002	811002
4		307002	307002
5		307002	307002
6	2831007	307002	3138006
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 0

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CLM- FLOW R	TAXABLE INCOME R	TAX R	NET- FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	64450312	307002	-64143310	-64143310	0	0	-64143310	1	-64143310		-64143310	
1	38099180	307002	-37792178	-101835488	-66117334	0	-37792178	0.901	-34047007	#REF!	-34047007	#NUM!
2	38531180	307002	-38224178	-140169666	-65386272	0	-38224178	0.812	-31023660	#REF!	-31023660	#NUM!
3	44694380	811002	-43883378	-184043044	-65333440	0	-43883378	0.731	-32087148	#REF!	-32087148	#NUM!
4	38099180	307002	-37792178	-221835222	-37792178	0	-37792178	0.659	-24894878	#REF!	-24894878	#NUM!
5	38099180	307002	-37792178	-259627400	-37792178	0	-37792178	0.593	-22427818	#REF!	-22427818	#NUM!
6	38531180	3138009	-35393171	-295020571	-35383171	0	-35383171	0.535	-18922635	#REF!	-18922635	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-227546397	#NUM!

4. System Description: Pine millwood System 4

1: CASH FLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle YRS/yr	Cost/cycle Rands
1	Feller buncher	720000	1	720000	8000	113705	1	4500	600000	1	600000
2	Grapple skidder	5865476	2	11730952	8000	96600	8	1875	94000	1	432000
3	Peterson DDCL	26816732	1	26816732	8000	113705	0	N/A		0	0
4	Chip truck trailer	6000000	9	54000000	56000	93900	162	37500	10833	0	1759466
5											
6											
7											
8											
9											
Total		45982208	12	92747684			171	43875	664633		113696443

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lc R/Year	shft length mhrs	# of shifts	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/Year	
1	Feller buncher	299.4	212.0	1440048	7.0	2.0	221	3094	1	3022465	
2	Grapple skidder	198.6	290.0	1193143	7.0	1.0	220	1810	2	1931449	
3	Peterson DD	319.3	208.0	320272	7.0	1.8	221	2475	1	2362668	
4	Chip truck trail	7.8	3.1	1203000	600.0	1.5	221	165750	9	26671809	
5											
6											
7											
8											
9											
Total			743	3329616						33988391	

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Feller buncher	66300	2	0	0	0	30940	163540
2 Grapple skidder	56355	2	15470	4	0	0	112710
3 Peterson DD	56355	2	15470	4	0	0	174590
4 Chip truck trail	66300	18	0	0	0	0	1193400
5							0
6							0
7							0
8							0
9							0
Total		245310	30940	4	0	30940	1644240

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skid	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trailer	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	720000	11930952	26816732	5400000	0	0	0	0	0	89947684
1							9206730	33988391	1644240	44839361
2							11561676	33988391	1644240	47194307
3	720000		26816732				11561676	33988391	1644240	81211039
4							10529676	33988391	1644240	46162307
5							11561676	33988391	1644240	47194307
6							8774730	33988391	1644240	44407361
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value n th year	Price R/m ³
1	Feller buncher	3	504000	113705	20
2	Grapple skidder	5	835167	96600	
3	Peterson DD	3	1877171	113705	
4	Chip truck trailer	3	0	93960	
5					
6					
7					
8					
9					
			3216338	113705	

1.5: Project life span	
Years	5

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		2274090	2274090
1		2274090	2274090
2		2274090	2274090
3	2381171	2274090	4655261
4		2274090	2274090
5		2274090	2274090
6	11442647	2274090	13716737
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	89947684	2274090	-87673594	-87673594	0	0	-87673594	1	-87673594		-87673594	
1	44839361	2274090	-42565271	-140238865	-88839113	0	-42565271	0.901	-38347091	#REF!	-38347091	#NUM!
2	47194307	2274090	-44920217	-185159082	-72744522	0	-44920217	0.812	-36458256	#REF!	-36458256	#NUM!
3	81211039	4655261	-7655777	-261714859	-95105314	0	-7655777	0.731	-55976925	#REF!	-55976925	#NUM!
4	46162307	2274090	-43888217	-305603076	-43888217	0	-43888217	0.659	-28910528	#REF!	-28910528	#NUM!
5	47194307	2274090	-44920217	-350523292	-44920217	0	-44920217	0.593	-26657962	#REF!	-26657962	#NUM!
6	44407361	13716737	-30690623	-381213916	-30690623	0	-30690623	0.535	-16409461	#REF!	-16409461	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

-300432616 #NUM!

5. System Description: Pine sawwood, System 2

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/years	Annual vol. cu m	Number of Tyres/tracks	Tyre life Mths/years	Cost/tyre Rands	Tyre cycle year#	Cost/cycle Rands
1	Harvester	940000	3	2820000	12000	111384	3	4500	435000	1	1305000
2	Forwarder	814528	3	2443578	18000	101304	18	8000	54000	3	172000
3	Loader	376000	2	752000	8000	123760	2	4500	435354	1	870708
4	Rigid/drawbar	352000	8	3136000	70000	111384	144	37500	4200	0	604800
5											
6											
7											
8											
9											
Total		25245236	13	63355708			167	55500	928554		15506818

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/lt	Road R/lt	Ins & lic R/lt	shift length hrs	# of shifts	Workdays Days/year	Total hrs	# machines	Total cost R/Year
1	Harvester	199.6	92.0	189004	7.0	2.0	221	3094	3	8347055
2	Forwarder	100.4	140.0	429096	7.0	1.7	221	2630	3	6784359
3	Loader	108.3	258.0	756048	7.0	2.0	221	3094	2	3766041
4	Rigid/drawbar	6.9	0.7	787000	500.0	2.0	221	221000	8	19690700
5										
6										
7										
8										
9										
Total		415	489	3172143				22818		38588165

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year
1 Harvester	65300	6	0	0	0	30940	428740
2 Forwarder	56355	6	0	0	0	0	338130
3 Loader	56355	4	0	0	0	0	225420
4 Rigid/drawbar	56355	16	0	0	0	0	901680
5							0
6							0
7							0
8							0
9							0
Total		235365	0	0	0	30940	1893970

2: Cash outflows per year, based on Input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost 0	Tyre Cost 0	Operating Cost R	Labour Cost R	Total Outflow R	
0	2820000	2443578	758000	3136000	0	0	0	0	91555708	
1							3628800	38588165	1893970	44110935
2							5804508	38588165	1893970	46286643
3			758000				6778508	38588165	1893970	54818643
4							3628800	38588165	1893970	44110935
5							5804508	38588165	1893970	46286643
6							3024000	38588165	1893970	43506135
7								38588165	1893970	40482135
8									0	0
9									0	0
10									0	0
11									0	0
12									0	0
13									0	0
14									0	0
15									0	0
16									0	0
17									0	0
18									0	0
19									0	0
20									0	0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value R/m ³ /year	Price R/m ³
1	Harvester	4	0	111384	3
2	Forwarder	6	570167	101304	
3	Loader	3	264600	123760	
4	Rigid/drawbar	3	0	111384	
5					
6					
7					
8					
9					
			834767	123760	

1.5: Project life span	
Years	0
	0

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		371280	371280
2		371280	371280
3		371280	371280
4	834767	371280	1206047
5		371280	371280
6	264600	371280	636880
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

Tax rate 20
Hurdle rate 0.11

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CLM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	91555708	0	-91555708	-91555708	0	0	-91555708	1	-91555708		-91555708	
1	44110935	371280	-43739655	-13529393	-75417608	0	-43739655	0.901	-39405094	#REF!	-39405094	#NUM!
2	46286643	371280	-45915363	-181210766	-64922075	0	-45915363	0.812	-37205936	#REF!	-37205936	#NUM!
3	54818643	371280	-54447363	-235690088	-81118504	0	-54447363	0.731	-38811442	#REF!	-38811442	#NUM!
4	44110935	1206047	-42904888	-278562977	-42904888	0	-42904888	0.659	-28262778	#REF!	-28262778	#NUM!
5	46286643	371280	-45915363	-324478339	-45915363	0	-45915363	0.593	-27248533	#REF!	-27248533	#NUM!
6	43506135	635880	-42870255	-367348594	-42870255	0	-42870255	0.535	-22920189	#REF!	-22920189	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Mechanised	Machine name	Purchase price	Useful life (mhrs)	Resale value	Financial inputs										Time worked				
					Fuel cons (l/mhr)	R & M (R/mhr or /m)	License (R/yr)	Insurance (R/yr)	LAI (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/tyre)	LF	(m ³ /shft)	m ³ /year	no of shifts	mhrs/shft	Days/yr	mhrs/yr
	Chainsaw fell & delim	2800	1265	700	1.48	5.29	0	280	280	N/A	0	N/A	2	42	9282	1.0	5	221	1105
	Chainsaw crosscut	2800	1265	700	1.48	5.29	0	280	280	N/A	0	N/A	-	105	23205	1.0	5	221	1105
	112kW Cable skidder	881451	11500	222863	13.12	49.50	19	88145	88164	17600	4	2970	9	N/A	N/A	0.0	7	221	0
	130kW Grapple skidder	1189095	11500	285274	14.78	71.50	19	118910	119320	19800	4	2750	5	315	85491	1.2	7	230	1900
	TJ1010 forwaler	1629047	15000	407282	7.14	38.50	19	162905	162924	19800	6	13200	5	136	56811	1.9	7	221	2929
	Timber loader buncher disc	1440000	11900	390000	28.70	99.99	19	144000	144019	220000	1	6900	2	266	170857	2.0	7	221	3094
	Timber loader buncher cab	1440000	11900	360000	22.14	58.30	19	144000	144019	220000	1	6900	4	N/A	N/A	0.0	7	221	0
	Cable excavator HD 805	756000	11500	186000	8.00	70.40	19	75600	75619	156000	1	6600	3	210	92630	3.0	7	221	3094
	Bel 230 A loader	220000	11500	55000	6.56	22.00	19	220000	22019	3740	3	1980	150	34806	1.0	6	221	1326	
	Bel ADT timber truck	804000	17250	225000	11.48	49.50	19	804000	80418	12950	6	3850		0	0.0	7	221	0	
	6 X 4 truck	400000	517500	100000	0.41	0.85	860	40000	40960	1540	10	27500		N/A	N/A	0.0	330	221	0
	6 X 4 truck with trailer	784000	5000000	195000	0.51	0.70	1200	78400	78600	1540	18	55000	47	20885	2.0	500	221	221000	
	Frost and loader	880000	11500	220000	14.78	49.50	19	880000	88019	13750	4	4400	441	0	0.0	7	221	0	
	Skidder steer truck	760000	802500	190000	30.84	0.77	1200	76000	77200	1760	18	55000	105	0	0.0	7	221	0	
	Skidder Wamsh FDC	2368000	20700	82000	0.20	82.50	19	236800	236819	176000	1	6600		N/A	N/A	0.0	7	221	0
	Skidder Wamsh Prec	2368000	20700	82000	19.08	60.50	19	236800	236819	176000	1	6600		N/A	N/A	0.0	7	221	0
	Waratah 616 FD	1880000	17250	470000	14.78	25.30	19	1880000	188018	159500	1	8600	150	69515	2.0	7	221	3094	
	Waratah 616 FDC	1880000	17250	470000	14.78	25.30	19	1880000	188018	159500	1	8600	128	58477	2.1	7	221	3249	
	Timberjack 5810 forwaler	2999575	20700	748894	17.22	49.50	19	299958	299977	19800	8	13200		N/A	N/A	2.0	7	221	3094
	Bel tractor/trailer	400000	11500	105000	9.84	27.50	19	400000	40019	4813	8	3200	85	20888	1.0	7	221	1947	
	Interim truck	928000	1160000	232000	0.53	0.85	1200	92800	94000	1760	18	55000	47	20885	2.0	500	221	221000	
	Frontend 410 and skidder	928004	17250	232856	22.98	73.70	19	92800	93000	195000	1	16500	147	49731	1.5	7	221	2321	
	Timber cleanback skidder	1440000	11500	360000	18.04	38.50	19	144000	144019	1179	8	11000		88	0	7	221	0	
	Palerson Pacific DDL	5363546	11500	1340837	85.80	132.00	19	536355	536354	N/A	0	N/A		515	170687	1.5	7	221	2321
	Chip Truck	1200000	805000	300000	0.56	0.85	1200	1200000	1212000	3872	18	55000	0	47	20885	2.0	500	221	221000

Labour cost input data: current figures

	Today	Days/yr	Total/yr
Supervisor	1000	221	221000
Chainsaw operator	600	221	132600
Harvester operator	2000	221	442000
Machine operator	1360	221	300560
Truck driver 6 X 4	1020	221	225420
Truck driver EC1	1200	221	265200
Tallyman	650	221	143650
Chuckerman	650	221	143650
Labourer	480	221	106080
Diesel price	3		
Petrol Price	4		

Labour productivity figures

	Ttoday	T/year
Manual stacking pine pulpwood	11	1823
Manual loading pine pulpwood	12	1989
Delim/stack Eucalyptus pulpwood	8	0
Load Eucalyptus pulpwood	16	0

Scenario Inputs	Mech
Diesel price	1.70
Petrol Price	1.70
Oil as a % of fuel	0.05
Supervisor	5.50
Chainsaw operator	5.00
Harvester operator	10.00
Machine operator	8.00
Truck driver 6 X 4	6.00
Truck driver EC1	6.00
Tallyman	6.50
Chuckerman	6.50
Labourer	6.00
Purchase price	0.80
Useful life (mhrs)	1.15
Resale value	0.25
Fuel cons (l/mhr)	0.82
R & M (R/mhr)	1.10
License (R/yr)	0.80
Insurance (R/yr)	0.10
Tyre/track cost per tyre	1.10
Tyre/track life (hrs/tyre)	1.10
Pine 1m3 (m ³ /shft)	1.05
Pine 0.3m3 (m ³ /shft)	1.05
Eucalyptus (m ³ /shft)	1.05
Manual stacking pine pulpwood	0.75
Manual loading pine pulpwood	0.75
Delim/stack Eucalyptus pulpwood	
Load Eucalyptus pulpwood	
mhrs/shft or km/shft	1.00
Days/yr	1.00
Tax rate	20.00
Float rate	0.05

System Description: 1. Pine rulewood: System 1

1: CASH OUTFLOWS: Input Data											
1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. sub. m	Number of Tyres/tracks	Tyre life Mths/km	Cost/Tyre Rands	Tyre cycle YRS/E	Cost/cycle Rands
1	Chainsaw	2800	19	53200	1265	176358	0	0	0	0	0
2	Tract/Trail	408000	9	3672000	11500	187961	72	3300	4813	2	346500
3	Loader	758000	3	2295000	11500	278482	3	8900	19930	2	478897
4	Interlink	928000	8	7424000	1150000	167076	144	55000	1760	0	253440
5											
6											
7											
8											
9											
Total		2094800	20	13364000			219	64900	166202		36396304

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Ins & lic R/Year	Ins & lic mhr/km	# of shifts	Workdays Days/Year	Total hrs Mhrs/Yr	# machines	Total cost R/Year
1	Chainsaw	5.61	5.29	280	5.0	1.0	221	1105	19	234161
2	Tract/Trail	33.58	27.50	40819	7.0	1.0	221	1547	9	1217778
3	Loader	27.31	76.40	75819	7.0	2.0	221	3094	3	1133810
4	Interlink	1.82	0.85	94000	500.0	2.0	221	221000	8	5465245
5										
6										
7										
8										
9										
Total				104	210436					8050992

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Chainsaw	132600	17	105080	97	0	884000	1339029	
2 Tract/Trail	225420	9	105080	95			12053340	
3 Loader	300560	6	0	0			1803360	
4 Interlink	265200	16	0	0			4243200	
5								
6								
7								
8								
9								
Total		923780		212160	191	0	884000	31498929

2: Cash outflows per year, based on input data										
Year	Ownership Cost Chainsaw	Ownership Cost Tract/Trail	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow	
0	53200	3672000	2298000	7424000	0	0	0	0	13417200	
1	53200					1013760	8050992	31498929	40616881	
2	53200					1839149	8050992	31498929	41442271	
3	53200					1013760	8050992	31498929	40616881	
4	53200		2298000			1839149	8050992	31498929	43710271	
5	53200					1013760	8050992	31498929	40616881	
6	53200					1013760	8050992	31498929	40616881	
7	53200					1013760	8050992	31498929	40616881	
8									0	
9									0	
10									0	
11									0	
12									0	
13									0	
14									0	
15									0	
16									0	
17									0	
18									0	
19									0	
20									0	

2. CASH INFLOWS					
Item	Machine Description	Machine life Years	Resale value Rands	Resale value in ² /Year	Price R/m ²
1	Chainsaw	1	13300	176358	0
2	Tract/Trail	7	918000	187961	
3	Loader	4	567000	278460	
4	Interlink	5	1856000	167076	
5					
6					
7					
8					
9					
			3354300	278460	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1	13300	0	13300
2	13300	0	13300
3	13300	0	13300
4	560000	0	560000
5	13300	0	13300
6	3354300	0	3354300
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

3. Net cash flow												
YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	13417200	0	-13417200	-13417200	0	0	-13417200	1	-13417200		-13417200	
1	40616881	13300	-40603581	-54020781	-47285581	0	-40603581	0.952	-38670077	#REF!	-38670077	#N/UM
2	41442271	13300	-41428971	-95449752	-45438171	0	-41428971	0.907	-37577296	#REF!	-37577296	#N/UM
3	40616881	13300	-40603581	-136053334	-43276381	0	-40603581	0.864	-35074900	#REF!	-35074900	#N/UM
4	43710271	560000	-4312971	-179183304	-4312971	0	-4312971	0.823	-35483134	#REF!	-35483134	#N/UM
5	40616881	13300	-40603581	-219786886	-40603581	0	-40603581	0.784	-31813958	#REF!	-31813958	#N/UM
6	40616881	3354300	-37262581	-257049467	-37262581	0	-37262581	0.746	-27805912	#REF!	-27805912	#N/UM
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-219842450	#N/UM

Mechanised pine pulp

2. Pine pulpwood: System 2

1. CASH OUTFLOWS: Input Data											
1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life mths	Annual vol. cu. m	Number of Tyres/tracks	Tyre life mths	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands
1	Chainaw	2800	17	47600	1265	197794	0	0	0	0	0
2	Forwarder	1629047	3	4887142	15000	169833	18	13200	19800	4	356400
3	Loader	756000	2	1512000	11500	185640	2	6600	15920	2	319200
4	Rigid drawbar	784000	8	6272000	5000000	187076	144	55000	1540	0	221760
Total											

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Ins & lc R/year	shift length mths	# of shifts	Workdays Days/year	Total hrs Mths/yr	# machines		
1	Chainaw	75.6	58.3	280	7.0	1.0	221	1547	17		
2	Forwarder	25.3	36.5	162924	7.0	1.9	221	2939	3		
3	Loader	27.3	70.4	75619	7.0	2.0	221	3094	2		
4	Rigid drawbar	1.7	0.7	79600	500.0	2.0	221	221000	8		
Total											

1.4: Labour cost								
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost	
1 Chainaw	300560	17	106080	97	0	884000	15370349	
2 Forwarder	300560	3	0	0	0	0	1803360	
3 Loader	300560	2	0	0	0	0	1803360	
4 Rigid drawbar	265200	16	0	0	0	0	4243200	
Total								

2: Cash outflows per year, based on input data									
Year	Chainaw Ownership Cost	Forwarder Ownership Cost	Loader Ownership Cost	Rigid drawbar Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R	
0	47600	4887142	1512000	6272000	0	0	0	12718742	
1	47600				887040	10274300	23220269	34429209	
2	47600				1206300	10274300	23220269	34748469	
3	47600				887040	10274300	23220269	34429209	
4	47600		1512000		1562700	10274300	23220269	36816869	
5	47600				887040	10274300	23220269	34429209	
6					665280	10274300	23220269	34159849	
7								0	
8								0	
9								0	
10								0	
11								0	
12								0	
13								0	
14								0	
15								0	
16								0	
17								0	
18								0	
19								0	
20								0	

2. CASH INFLOWS						YEAR			
Item	Machine Description	Machine life Years	Volume m³/year	Price R/m³	Price R/m³	Resale value R	Annual Income R	TOTAL INFLOWS R	
1	Chainaw	1	1900	157794	0	0	0	0	
2	Forwarder	5	1221785	169833	0	11900	0	11900	
3	Loader	4	379000	185640	0	11900	0	11900	
4	Rigid drawbar	23	0	187076	0	389900	0	389900	
5					0	11800	0	11900	
6					0	1611685	0	1611685	
7					0			0	
8					0			0	
9					0			0	
10					0			0	
11					0			0	
12					0			0	
13					0			0	
14					0			0	
15					0			0	
16					0			0	
17					0			0	
18					0			0	
19					0			0	
20					0			0	

1.5: Project life span
Years: 0

3. Net cashflow											
Year	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	12718742	0	-12718742	-12718742	0	0	-12718742	1	-12718742	-12718742	#NUM!
1	34429209	11900	-34417309	-47136551	-40759690	0	-34417309	0.952	-32775389	-32775389	#NUM!
2	34748469	11900	-34736569	-81873120	-36537911	0	-34736569	0.907	-31507992	-31507992	#NUM!
3	34429209	11900	-34417309	-116290429	-36951537	0	-34417309	0.864	-29730966	-29730966	#NUM!
4	36816869	389900	-36226969	-152516997	-36226969	0	-36226969	0.823	-29804017	-29804017	#NUM!
5	34429209	11900	-34417309	-186934206	-34417309	0	-34417309	0.784	-26968622	-26968622	#NUM!
6	34159849	1611685	-32548164	-219482369	-32548164	0	-32548164	0.746	-24287941	-24287941	#NUM!
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Mechanised pine pulp

System Description: 3. Pine sawwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machines	Unit price	Number of	Tot. price	Machine life	Annual vol	Number of	Tyre life	Cost/tyre	Tyre cycle	Cost/cycle
	Description	Rands	Machines	Rands	Mths/years	cu m	Tyres/tracks	Mths/years	Rands	years	Rands
1	Feller buncher	144000	1	144000	11500	17057	1	900	20000	2	20000
2	Grapple skidder	119095	2	238190	11500	17092	8	2750	19000	11	158400
3	Del/slasher	93064	4	372456	17250	19492	4	16500	19500	7	63000
4	Rigid/drawb	784000	8	6272000	5000000	167076	144	55000	1540	0	221760
5											
6											
Total		4347719	14	12380686			157	80950	400840		62931800

1.3: Operating cost										
Item	Machines	Fuel & oil	RM	In & tic	shaft length	# of shifts	Workdays	Total hrs	Total cost	Total cost
	Description	R/ltre	R/mhr	R/Year	m/yr		Days/Year	M/Year	R/Year	R/Year
1	Feller buncher	87.9	38.3	144019	7.0	2.0	221	3094	1	627422
2	Grapple skidder	50.1	71.5	119329	7.0	1.2	230	1900	2	1401353
3	Del/slasher	78.4	73.7	93082	7.0	1.5	221	2321	4	1783664
4	Rigid/drawb	1.7	0.7	78600	500.0	2.0	221	221000	8	4941730
5										
6										
7										
8										
9										
Total			304	292010						8754208

1.4: Labour cost							
Machines	Operator	Operator	Assistants	Assistants	Overheads	Supervision	Total cost
Description	R/Year	Number	R/Year	Number	Percent	R/Year	R/Year
1 Feller buncher	300560	2	0	0	0	442000	601120
2 Grapple skidder	300560	4	0	0	0		1202240
3 Del/slasher	300560	8	0	0	0		1803360
4 Rigid/drawb	265200	16	0	0	0		4243200
5							0
6							0
7							0
8							0
9							0
Total		1166880	0	0	0	442000	7849920

2: Cash outflows per year, based on Input data										
Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
	Feller buncher	Grapple skidder	Del/slasher	Rigid/drawb			R	R	R	R
0					0	0	0	0	0	13520886
1	1440000	238190	372496	6272000			867040	8754208	7849920	17491168
2							1265440	8754208	7849920	17869568
3							1045440	8754208	7849920	17649568
4							1107040	8754208	7849920	17711168
5							1045440	8754208	7849920	17649568
6							665280	8754208	7849920	17269408
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machines	Machine life	Resale value	Price
Description	Years	Rands	R/Year	R/m ³
1 Feller buncher	4	0	170567	3
2 Grapple skidder	6	596548	170982	
3 Del/slasher	7	0	194922	
4 Rigid/drawb	23	0	167076	
5			0	
6			0	
7			0	
8			0	
9			0	
		596548	194922	

YEAR	Resale value	Annual Income	TOTAL INFLOWS
	R	R	R
0		526289	526289
1		526289	526289
2		526289	526289
3		526289	526289
4		526289	526289
5		526289	526289
6	2633095	526289	3159385
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS	IN- FLOWS	NET FLOW	CUM FLOW	TAXABLE INCOME	TAX	NET FLOW	NPV FACTOR	NPV after tax	IRR after tax %	NPV before tax	IRR before tax %
	R	R	R	R	R	R	R		R		R	
0	13520688	526289	-13294397	-13294397	0	0	-13294397	1	-13294397		-13294397	
1	17491168	526289	-16964879	-30259276	-21155222	0	-16964879	0.952	-16157027	#REF!	-16157027	#NUM!
2	17869568	526289	-17343279	-47602555	-31057485	0	-17343279	0.907	-15730865	#REF!	-15730865	#NUM!
3	17649568	526289	-17123279	-64725833	-19566416	0	-17123279	0.864	-14791732	#REF!	-14791732	#NUM!
4	17711168	526289	-17184879	-81910712	-17184879	0	-17184879	0.823	-14138042	#REF!	-14138042	#NUM!
5	17649568	526289	-17123279	-99033991	-17123279	0	-17123279	0.784	-13416537	#REF!	-13416537	#NUM!
6	17269408	3159385	-14110024	-113144016	-14110024	0	-14110024	0.746	-10529117	#REF!	-10529117	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-98057718	#NUM!

Mechanised pine pulp

4. System Description: Pine pulpwood System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/km	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands
1	Feller buncher	144000	1	144000	11500	170557	1	6500	220000	2	220000
2	Grapple skidd	1193095	2	2386190	11500	170592	8	2750	19800	1	198000
3	Peterson DDCL	5363346	1	5363346	11500	170557	0	N/A	N/A	0	0
4	Chip truck trailer	1200000	9	10800000	805000	187961	182	95000	3972	0	843480
5											
6											
7											
8											
9											
Total		9196442	12	18549537			171	64350	243772		41685029

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RMM R/mhr	Ins & lc R/Year	shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Feller buncher	75.6	58.3	144019	7.0	2.0	221	3094	1	558180
2	Grapple skidd	50.1	71.5	119329	7.0	1.2	230	1900	2	350348
3	Peterson DD	75.4	73.7	93082	7.0	1.8	221	2321	1	445916
4	Chip truck trail	1.9	0.8	121250	500.0	2.0	221	221000	9	6560172
5										
6										
7										
8										
9										
Total				204	333610					7914596

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overtime Percent	Supervision R/Year	Total cost R/Year	
1 Feller buncher	442000	2	0	0	0	221000	1105000	
2 Grapple skidd	300560	4	143650	0	0	0	1202240	
3 Peterson DD	300560	2	143650	4	0	0	1175720	
4 Chip truck trail	265200	18	0	0	0	0	4773600	
5							0	
6							0	
7							0	
8							0	
9							0	
Total		1308320		287300	4	0	221000	8256560

2: Cash outflows per year, based on input data

Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	1440000	2386190	5363346	10800000	0	0	0	0	0	19889537
1							2732321	7914596	8256560	18903477
2							2952321	7914596	8256560	19123477
3							2732321	7914596	8256560	18903477
4							2952321	7914596	8256560	19123477
5							2732321	7914596	8256560	18903477
6							1930441	7914596	8256560	18101596
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value in Year	Price R/m ³
1	Feller buncher	4	0	170557	20
2	Grapple skidd	6	506548	170982	
3	Peterson DD	5	1340837	170557	
4	Chip truck trail	4	0	187961	
5					
6					
7					
8					
9					
			1937364	187961	

1.5: Project life span	
Years	5

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		3759210	3759210
1		3759210	3759210
2		3759210	3759210
3		3759210	3759210
4		3759210	3759210
5		3759210	3759210
6	3253832	3759210	7013142
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

Tax rate 20
Hurdle rate 0.05

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	19889537	3759210	-16230327	-16230327	0	0	-16230327	1	-16230327		-16230327	
1	18903477	3759210	-15144267	-31374593	-24419035	0	-15144267	0.952	-14423111	#REF!	-14423111	#NUM!
2	19123477	3759210	-15364267	-46738860	-2028128	0	-15364267	0.907	-13835843	#REF!	-13835843	#NUM!
3	18903477	3759210	-15144267	-61883127	-18654174	0	-15144267	0.864	-13082187	#REF!	-13082187	#NUM!
4	19123477	3759210	-15364267	-77247393	-15364267	0	-15364267	0.823	-12640220	#REF!	-12640220	#NUM!
5	18903477	3759210	-15144267	-92391660	-15144267	0	-15144267	0.784	-11865929	#REF!	-11865929	#NUM!
6	18101596	7013142	-11088455	-103480115	-11088455	0	-11088455	0.746	-8274376	#REF!	-8274376	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-90451993	#NUM!

5. System Description: Pine pulpwood System 5

1: CASH FLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Months	Annual vol. cub. m	Number of Tyres/tracks	Tyre life Months	Cost/tyre Rands	Tyre cycle years	Cost/cycle Rands
1	Harvester	160000	3	480000	17250	175430	3	6900	19950	2	47950
2	Forwarder	1629047	3	4887142	18000	189633	18	13300	19800	4	356400
3	Loader	796000	2	1592000	11500	189540	2	6600	19800	2	319200
4	Rigid/drawbar	784000	8	6272000	5000000	187078	144	55000	1540	0	221780
5											
6											
7											
8											
9											
Total		5049047	13	12671142			167	81400	340470		50558457

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/lt	R/M	lt/ha	ha/yr	shift length min	# of shifts	Workdays Days/yr	Total hrs	# machines	Total cost R/yr
1	Harvester	50.4	25.3	18919	7.0	2.1	221	221	3249	3	1301530
2	Forwarder	25.3	38.5	162594	7.0	1.9	221	221	2539	3	1051743
3	Loader	27.3	70.4	75619	7.0	2.0	221	221	3094	2	755874
4	Rigid/drawbar	1.7	0.7	79600	800.0	2.0	221	221	221000	8	4941730
5											
6											
7											
8											
9											
Total		105	138	318143					32082		8050877

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year
1 Harvester	442000	6	0	0	0	221000	2673000
2 Forwarder	300560	6	0	0	0		1803360
3 Loader	300560	4	0	0	0		1202240
4 Rigid/drawbar	225420	16	0	0	0		3606720
5							0
6							0
7							0
8							0
9							0
Total		1268540	0	0	0	221000	9485320

2: Cash outflows per year, based on input data										
Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow	
0	5640000	4887142	1512000	6272000	0	0	0	0	18311142	
1						887040	8050877	9485320	18423237	
2						1654800	8050877	9485320	19220996	
3						887040	8050877	9485320	18423237	
4			1512000			2041200	8050877	9485320	21089396	
5						887040	8050877	9485320	18423237	
6						665280	8050877	9485320	18201477	
7							8050877	9485320	17536197	
8									0	
9									0	
10									0	
11									0	
12									0	
13									0	
14									0	
15									0	
16									0	
17									0	
18									0	
19									0	
20									0	

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Harvester	5	1410000	175430
2	Forwarder	5	1221785	159533
3	Loader	4	378000	185540
4	Rigid/drawbar	23	0	187076
5				
6				
7				
8				
9				
			3009785	185640

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		556920	556920
2		556920	556920
3		556920	556920
4	378000	556920	934920
5		556920	556920
6	3009785	556920	3566705
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years 5

Tax rate 20
Hurdle rate 0.05

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	18311142	0	-18311142	-18311142	0	0	-18311142	1	-18311142		-18311142	
1	18423237	556920	-17866317	-36177458	-24201886	0	-17866317	0.952	-17015540	#REF!	-17015540	#NUM!
2	19220996	556920	-18664076	-54841534	-22485419	0	-18664076	0.907	-16928867	#REF!	-16928867	#NUM!
3	18423237	556920	-17866317	-72707851	-20400945	0	-17866317	0.864	-15433596	#REF!	-15433596	#NUM!
4	21089396	934920	-20154476	-92862328	-20154476	0	-20154476	0.823	-16581138	#REF!	-16581138	#NUM!
5	18423237	556920	-17866317	-110728645	-17866317	0	-17866317	0.784	-13968727	#REF!	-13968727	#NUM!
6	18201477	3566705	-14634771	-125363416	-14634771	0	-14634771	0.746	-10920692	#REF!	-10920692	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-109189701	#NUM!

Annexure 15

Financial evaluation of the *Eucalyptus* pulpwood value chain

Current Exc pulp

Current Eucalyptus pulpwood	Financial Inputs										Eucalyptus (9,25m ³)			Time worked				
	Machine name	Purchase price	Useful life (mths)	Resale value	Fuel cons (l/mhr)	R & M (R/mh or R/km)	License (R/yr)	Insurance (R/yr)	LAI (Total) / tyre	Tyre/track cost per	# of tyres	Tyre/track life (hr/mh)	LF	(m ³ /shft)	m ³ /year	no of shifts	mhrs/shft	Days/yr
Chainsaw belt & delim	3500	1100	700	1.80	4.81	0	175	175	N/A	0	N/A	2	80	17600	1.0	5	221	1105
Chainsaw crosscut	3500	1100	700	1.80	4.81	0	175	175	N/A	0	N/A	2	80	17600	1.0	5	221	1105
112kW Cable skidder	1141414	10000	222863	18.00	45.00	24	58716	58740	18000	4	2700	5	N/A	0.0	0	7	221	0
130kW Grapple skidder	1491369	10000	298274	18.00	65.00	24	74568	74592	18000	4	2500	5	350	86550	1.1	7	221	1771
TJ1010 forwarder	2036309	18000	407262	8.71	35.00	24	101819	101839	18000	6	12000	5	128	53915	1.9	7	221	2630
Timber feller buncher disc	1800000	10000	360000	35.00	53.65	24	80000	80024	200000	1	6000	1	308	168203	2.5	7	221	3658
Timber feller buncher cdb	1800000	10000	360000	37.00	53.90	24	80000	80024	200000	1	6000	4	N/A	0.0	0	7	221	0
Cable excavator HD 820	945000	10000	189000	9.78	64.00	24	47250	47274	145118	1	6000	3	161	81636	2.3	7	221	3556
Bell 220 A logger	275000	10000	55000	8.00	20.00	24	13750	13774	3400	3	1800	1	150	33150	1.0	6	221	1326
Bell ADT timber truck	1130000	15000	226000	14.00	45.00	24	86500	86524	11900	6	3800	1	0	0.0	0	7	221	0
8 X 4 truck	500000	480000	100000	0.50	0.60	1200	25000	26200	1400	10	25000	1	N/A	0.0	0	320	221	0
8 X 4 truck with trailer	980000	1000000	190000	0.62	0.70	1800	49000	50500	1400	18	50000	1	45	19990	2.0	500	221	221000
Front end loader	1100000	10000	220000	18.00	45.00	24	55000	55024	12500	4	4000	1	426	0	0.0	7	221	0
Steeper steer truck	950000	790000	190000	62.00	0.70	1500	47500	48000	1800	18	80000	1	90	0	0.0	7	221	0
Bigwood Warratah F/D/C	2960000	18000	582000	0.24	55.00	24	148000	148024	180000	1	8000	1	N/A	0.0	0	7	221	0
Bigwood Warratah Proc	2960000	18000	582000	0.24	55.00	24	148000	148024	180000	1	8000	1	N/A	0.0	0	7	221	0
Warratah 616 F/D	2340000	15000	470000	18.00	23.00	24	117500	117524	145000	1	6000	1	80	41789	2.1	7	221	3249
Warratah 616 F/D/C	2340000	15000	470000	18.00	23.00	24	117500	117524	145000	1	6000	1	70	34034	2.2	7	221	3403
Timberack 1810 forwarder	3749469	18000	749894	31.00	45.00	24	187473	187497	18000	8	12000	1	N/A	0.0	0	7	221	0
Bell Intract/trailer	510000	10000	102000	12.00	25.00	24	25500	25524	4375	8	3000	1	43	9282	1.0	7	221	1947
Intract/trailer	1180000	1000000	230000	0.85	0.77	1500	58000	59500	1800	16	80000	1	45	19990	2.0	500	221	221000
20t Excavator and slasher	1000000	15000	200000	9.78	64.00	24	50000	50024	145000	1	7000	1	250	82875	1.5	7	221	2321
Timber clamshell skidder	1800000	10000	360000	22.00	35.00	24	80000	80024	1068	8	10000	1	175	88013	1.5	7	221	2321
Peterson Pacific D/C/L	6704183	10000	1340837	80.00	120.00	24	335000	335024	N/A	0	N/A	1	480	162435	1.5	7	221	2381
Chip Truck	1800000	700000	300000	0.68	0.77	1500	75000	76500	3511	18	50000	0	45	19990	2.0	600	221	221000

Labour cost input data: current figures

	Days	Days/yr	Total/yr
Supervisor	200	221	44200
Chainsaw operator	130	221	28730
Harvester operator	200	221	44200
Machine operator	170	221	37570
Truck driver 8 X 4	170	221	37570
Truck driver EC1	200	221	44200
Tallyman	100	221	22100
Chockerman	100	221	22100
Labourer	80	221	17680
Diurnal price	3		
Patrol Price	1		

Labour productivity figures

	Days	Days/yr	Total/yr
Manual stacking pine pulpwood	11		2431
Manual loading pine pulpwood	12		2662
Debar/track Eucalyptus pulpwood	4		774
Load Eucalyptus pulpwood	12		2662

Scenario Inputs	Current
Diurnal price	1.00
Patrol Price	1.00
Oil as a % of fuel	0.05
Supervisor	1.00
Chainsaw operator	1.00
Harvester operator	1.00
Machine operator	1.00
Truck driver 8 X 4	1.00
Truck driver EC1	1.00
Tallyman	1.00
Chockerman	1.00
Labourer	1.00
Purchase price	1.00
Useful life (mths)	1.00
Resale value	0.20
Fuel cons (l/mhr)	1.00
R & M (R/mhr)	1.00
License (R/yr)	1.00
Insurance (R/yr)	0.05
Tyre/track cost per tyre	1.00
Tyre/track life (hr/mh)	1.00
Pine 1m ³ (m ³ /shft)	1.00
Pine 0.3m ³ (m ³ /shft)	1.00
Eucalyptus (m ³ /shft)	1.00
Manual stacking pine pulpwood	1.00
Manual loading pine pulpwood	1.00
Debar/track Eucalyptus pulpwood	1.00
Load Eucalyptus pulpwood	1.00
mhrs/shft or km/shft	1.00
Days/yr	1.00
Warratah 616 F/D	1.00
Warratah 616 F/D/C	1.00
Tax rate	0.20
Hurdle rate	0.05

System Description: 1. Eucalyptus pulwood: System 1

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs										1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Months	Annual vol. cub m	Number of Tyres/tracks	Tyre life Months	Cost/Tyre Rands	Tyre cycle %/yr	Cost/cycle Rands			
1	Chainsaw	3500	9	31500	1100	159120	0	0	0	0	0			
2	Tract/Trail	510000	18	9180000	10000	167076	144	3000	4375	2	830000			
3	Loader	845000	2	1690000	10000	163673	2	6000	14518	2	290236			
4	Interlink	1160000	8	9280000	1000000	159120	144	50000	1800	0	730400			
5														
6														
7														
8														
9														
Total		2618500	28	20350000			250	59000	151063		43816870			

1.3: Operating cost

Item	Machine Description	Fuel & oil R/yr	R/M R/yr	Ins & sc R/Year	shft length m/hr	# of shifts	Workdays Days/Year	Total hrs M/hr/yr	# machines	Total cost R/Year
1	Chainsaw	7.16	4.81	375	8.0	1.0	221	1105	9	120835
2	Tract/Trail	40.99	23.09	2354	7.0	1.0	221	1547	18	229576
3	Loader	33.31	64.00	4724	7.0	2.3	321	3558	2	786997
4	Interlink	2.22	0.77	59500	500.0	2.0	221	221000	8	5759005
5										
6										
7										
8										
9										
Total			85	132298						8962713

1.4: Labour cost

Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Chainsaw	26520	9	17680	206	0	176800	4052509
2 Tract/Trail	37570	18	17680	60	0		1737060
3 Loader	37570	4	0	0	0		150280
4 Interlink	44200	18	0	0	0		707200
5							
6							
7							
8							
9							
Total	145860		35360	266	0	176800	6647049

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw R	Ownership Cost Tract/Trail R	Ownership Cost Loader R	Ownership Cost Interlink R	Ownership Cost 0 R	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	31500	9180000	1890000	9280000	0	0	0	0	20381500
1	31500					921600	8962713	6647049	16562862
2	31500					1841836	8962713	6647049	17483096
3	31500		1890000			921600	8962713	6647049	18452862
4	31500					1841836	8962713	6647049	17483096
5	31500					921600	8962713	6647049	16562862
6	31500					691200	8962713	6647049	16332462
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Chainsaw	1	6300	159120
2	Tract/Trail	6	1836000	167076
3	Loader	3	378000	163673
4	Interlink	5	1850000	159120
5				
6				
7				
8				
9			4076300	167076

1.5: Project life span

Years:

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	0	0
1	6300	0	6300
2	6300	0	6300
3	384300	0	384300
4	6300	0	6300
5	6300	0	6300
6	4076300	0	4076300
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

Tax rate: 0.05, Net cash flow

YEAR	OUT FLOW R	IN- FLOW R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	20381500	0	-20381500	-20381500	0	0	-20381500	1	-20381500		-20381500	
1	16562862	6300	-16556562	-36938062	-26731562	0	-16556562	0.952	-15768154	#REF!	-15768154	#NUM!
2	17483096	6300	-17476796	-54414859	-23581796	0	-17476796	0.907	-15851971	#REF!	-15851971	#NUM!
3	18452862	384300	-18068562	-72483421	-22138562	0	-18068562	0.864	-15608303	#REF!	-15608303	#NUM!
4	17483096	6300	-17476796	-89960219	-17476796	0	-17476796	0.823	-14378205	#REF!	-14378205	#NUM!
5	16562862	6300	-16556562	-106516780	-18556562	0	-18556562	0.784	-12972499	#REF!	-12972499	#NUM!
6	16332462	4076300	-12256162	-118772942	-12256162	0	-12256162	0.746	-9145737	#REF!	-9145737	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

2. Eucalyptus pulpwood: System 2

1: CASH OUTFLOWS: Input Data											
1.1: Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol cu m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle years	Cost/cycle Rands
1	Chainsaw	3500	9	31500	1100	159120	0	0	0	0	0
2	Forwarder	2036309	3	6108927	15000	161745	18	12000	18000	4	324000
3	Loader	945000	2	1890000	10000	163673	2	6000	145118	2	290236
4	Rigid drawbar	860000	8	7480000	1000000	159120	144	50000	1400	0	201600
5											
6											
7											
8											
9											
Total		3964809	13	15838927			164	68000	164518		2698995

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	ins & lc R/year	shift length mths	# of shifts	Workdays Days/year	Total hrs M/hr	# machines		
1	Chainsaw	7.18	53.00	175	7.0	1.0	221	1547	9		
2	Forwarder	29.72	33.00	101539	7.0	1.9	221	2239	3		
3	Loader	33.31	64.00	47274	7.0	2.3	221	3558	2		
4	Rigid drawbar	2.12	0.70	50500	500.0	2.0	221	221000	8		
5											
6											
7											
8											
9											
Total			153	189613							

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year
1 Chainsaw	37570	9	17680	206	0	176800	3975150
2 Forwarder	37570	3	0	0	0	0	225420
3 Loader	37570	2	0	0	0	0	150280
4 Rigid drawbar	44200	8	0	0	0	0	707200
5	0						
6	0						
7	0						
8	0						
9	0						
Total	156910		17680	206	0	176800	5059059

2: Cash outflows per year, based on input data									
Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	31500	6108927	1890000	7840000	0	0	0	0	15870427
1	31900					806400	7884970	5058059	13780929
2	31900					1096636	7884970	5058059	14071165
3	31900		1890000			806400	7884970	5058059	15670929
4	31900					1096636	7884970	5058059	14071165
5	31900					1130400	7884970	5058059	14104929
6						604800	7884970	5058059	13547829
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS					
Item	Machine Description	Machine life Years	Volume m ³ /year	Price R/m ³	
1	Chainsaw	1	6300	159120	0
2	Forwarder	5	1221785	161745	
3	Loader	3	378000	163673	
4	Rigid drawbar	5	1569000	159120	
5					
6					
7					
8					
9					
3		3	3174085	163673	

1.5: Project life span			
Years			
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

3. Net cashflow											
YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	15870427	0	-15870427	-15870427	0	0	-15870427	1	-15870427	-15870427	
1	13780929	6300	-13774629	-29645056	-21694062	0	-13774629	0.952	-13118694	-13118694	#NUM!
2	14071165	6300	-14064865	-43709920	-18819543	0	-14064865	0.907	-12757247	-12757247	#NUM!
3	15670929	384300	-15286629	-58996549	-18454414	0	-15286629	0.864	-13205185	-13205185	#NUM!
4	14071165	6300	-14064865	-73061414	-14064865	0	-14064865	0.823	-11871199	-11871199	#NUM!
5	14104929	6300	-14098629	-87160043	-14098629	0	-14098629	0.784	-11046845	-11046845	#NUM!
6	13547829	3174085	-10373743	-97533786	-10373743	0	-10373743	0.746	-7741047	-7741047	#NUM!
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
										-85310423	#NUM!

System Description: 1. Eucalyptus pulpwood; System 3

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yr	Cost/Tyre Rands	Tyre cycle YRS#	Cost/cycle Rands
1	Harvester	296000	4	1184000	15000	187076	4	6000	148000	2	580000
2	Clambunk	180000	3	540000	10000	174038	18	10000	1096	4	19196
3	Loader/slasher	100000	2	200000	15000	165750	2	7000	148000	3	260000
4	Rigid/drawb	98000	8	784000	100000	159120	144	5000	1400	0	201800
5											
6											
Total		6740000	13	15240000			168	73000	292466		49134288

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Ins & lc R/Year	shll length m/hrs	# of shifts	Workdays Day/year	Total hrs Mhr/yr	# machines	Total cost R/Year
1	Harvester	61.43	33.00	117524	7.0	2.1	221	3249	4	1567182
2	Clambunk	75.08	35.00	80024	7.0	1.5	221	2321	3	690206
3	Loader/slasher	33.31	64.00	50024	7.0	1.5	221	2321	2	551845
4	Rigid/drawb	2.12	0.70	50000	900.0	2.0	221	221000	8	5382246
5										
6										
7										
8										
9										
Total				123	190548					8191979

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Harvester	37570	8	0	0	0	88400	300560
2 Clambunk	37570	6	0	0	0		225420
3 Loader/slasher	37570	4	0	0	0		150280
4 Rigid/drawb	44200	16	0	0	0		707200
5							0
6							0
7							0
8							0
9							0
Total		156910	0	0	0	88400	1383480

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Clambunk	Ownership Cost Loader/slasher	Ownership Cost Rigid/drawb	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1184000	540000	200000	784000	0	0	0	0	0	2708000
1							806400	8191979	1383460	10381839
2							1386400	8191979	1383460	10671839
3							1096400	8191979	1383460	10671839
4							1386400	8191979	1383460	10961839
5							825588	8191979	1383460	10401027
6							604800	8191979	1383460	10180239
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value (a) ² /year	Price R/m ²
1	Harvester	5	1440000	17076	16706
2	Clambunk	4	894821	174038	3
3	Loader/slasher	6	1184000	165750	
4	Rigid/drawb	5	1568000	159120	
5				0	
6				0	
7				0	
8				0	
9				0	
			508821	174038	

YEAR	Resale value R	Annual income R	TOTAL INFLOWS R
0		469901	469901
1		469901	469901
2		469901	469901
3		469901	469901
4		469901	469901
5		469901	469901
6	508821	469901	5558723
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 0

Tax rate	0	0.05															
YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CLM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %					
0	2708000	469901	-2661009	-2661009	0	0	-2661009	1	-2661009	#REF!	-2661009	#NUM!					
1	10381839	469901	-9911938	-36522037	-17931938	0	-9911938	0.952	-9439941	#REF!	-9439941	#NUM!					
2	10961839	469901	-10491938	-47015975	-15048338	0	-10491938	0.907	-9515497	#REF!	-9515497	#NUM!					
3	10671839	469901	-10201938	-57215913	-13246938	0	-10201938	0.864	-8912818	#REF!	-8912818	#NUM!					
4	10961839	469901	-10491938	-67707651	-10491938	0	-10491938	0.823	-8631743	#REF!	-8631743	#NUM!					
5	10401027	469901	-9931126	-77638977	-8631126	0	-9931126	0.784	-7781297	#REF!	-7781297	#NUM!					
6	10180239	5558723	-4623517	-82262493	-4623517	0	-4623517	0.746	-3450139	#REF!	-3450139	#NUM!					
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
											-74242534	#NUM!					

4. System Description: *Eucalyptus pulwood*, System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/years	Annual vol. cost R	Number of Tyres/tracks	Tyre life Mths/years	Cost/Tyre Rands	Tyre cycle years	Cost/cycle Rands
1	Feller buncher	1800000	1	1800000	10000	180000	1	6000	300000	2	200000
2	Grapple skidder	1481369	2	2962738	10000	177100	0	2500	19000	1	144000
3	Peterson DDCL	6704183	1	6704183	10000	162435	0	N/A	N/A	0	0
4	Chip truck trailer	1500000	9	13500000	700000	179010	162	50000	3611	0	584982
5											
6											
7											
8											
9											
Total		11495552	12	23186921			171	58500	221611		37895481

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & Isc R/year	shft length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/year
1	Feller buncher	119.44	53.63	80024	7.0	2.5	221	3658	1	759363
2	Grapple skidder	81.43	65.00	74292	7.0	1.1	221	1771	2	259491
3	Peterson DDCL	39.31	54.00	50224	2.0	1.5	221	2321	1	271523
4	Chip truck trailer	2.32	0.77	76500	500.0	2.0	221	221000	9	6835505
5										
6										
7										
8										
9										
Total			183	201116						8189181

1.4: Labour cost							
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year
1 Feller buncher	44200	3	0	0	0	44200	176800
2 Grapple skidder	37570	1	22100	0	0	0	37570
3 Peterson DDCL	37570	2	22100	4	0	0	163540
4 Chip truck trailer	44200	18	0	0	0	0	795600
5							0
6							0
7							0
8							0
9							0
Total	163540		44200	4	0	44200	1173510

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skid	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trailer	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1800000	2982738	6704183	13500000	0	0	0	0	0	24986921
1							2339928	8169181	1173510	11682619
2							2683928	8169181	1173510	12026619
3	1800000						2339928	8169181	1173510	13482619
4							2683928	8169181	1173510	12026619
5							2339928	8169181	1173510	11682619
6							1754946	8169181	1173510	11097637
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value in ⁷ /year	Price R/m ³
1	Feller buncher	3	360000	169203	0
2	Grapple skidder	6	596548	177100	
3	Peterson DDCL	4	1340837	162435	
4	Chip truck trailer	3	2700000	179010	
5					
6					
7					
8					
9					
Total			4997384	175010	

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1			0
2			0
3	360000		360000
4			0
5			0
6	4997384	0	4997384
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 0

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CLM FLOW R	TAXABLE INCOME R	Tax R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	24986921	0	-24986921	-24986921	0	0	-24986921	1	-24986921		-24986921	
1	11682619	0	-11682619	-3696540	-23279078	0	-11682619	0.952	-11126304	#REF!	-11126304	#NUM!
2	12026619	0	-12026619	-4896199	-18922695	0	-12026619	0.907	-10908498	#REF!	-10908498	#NUM!
3	13482619	360000	-13122619	-6181877	-1760003	0	-13122619	0.864	-11335811	#REF!	-11335811	#NUM!
4	12026619	0	-12026619	-7384396	-12026619	0	-12026619	0.823	-9894329	#REF!	-9894329	#NUM!
5	11682619	0	-11682619	-86528015	-11682619	0	-11682619	0.784	-9153637	#REF!	-9153637	#NUM!
6	11097637	4997384	-6100253	-81628267	-6100253	0	-6100253	0.746	-4552102	#REF!	-4552102	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total											-81957603	#NUM!

5. System Description: Eucalyptus pulwood System 5

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mhrs/kms	Annual vol. cub.m	Number of Tyres/tracks	Tyre life Mhrs/km	Cost/tyre Rands	Tyre cycle YRS/8	Cost/cycle Rands
1	Harvester	235000	5	1175000	15000	170170	5	6000	145000	2	725000
2	Forwarder	205809	3	610827	15000	161745	16	12000	18000	4	324000
3	Loader	84500	2	169000	10000	103673	2	8000	145118	2	290236
4	Rigid/drawbar	95000	8	784000	100000	159120	144	5000	1400	0	201600
5											
6											
7											
8											
9											
Total		6311309	13	15638927			169	74000	309518		5209542

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/lt	Risk R/lt	R/Yield	Int & Lic m/ha	shill length	# of shifts	Workdays	Total hrs	Total cost R/Year	Total cost
1	Harvester	61.43	23.00	117534	7.0	2.2	221	221	3403	5	2024280
2	Forwarder	39.72	35.00	101838	7.0	1.9	221	221	2939	3	876238
3	Loader	33.31	64.00	47274	7.0	2.3	221	221	3558	2	786997
4	Rigid/drawbar	2.12	0.70	50500	500.0	2.0	221	221000	6	5382246	
5											
6											
7											
8											
9											
Total		127	123	199613					23091		9069761

1.4: Labour cost								
Machine	Operator	Operator	Assistants	Assistants	Overheads	Supervision	Total cost	
Description	R/Year	Number	R/Year	Number	Percent	R/Year	R/Year	
1	Harvester	44200	8	0	0	0	44200	397800
2	Forwarder	37570	6	0	0	0	37570	225420
3	Loader	37570	4	0	0	0	37570	150280
4	Rigid/drawbar	37570	16	0	0	0	37570	601120
5								0
6								0
7								0
8								0
9								0
Total		156910		0	0	0	44200	1374620

2: Cash outflows per year, based on Input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1175000	610827	189000	784000	0	0	0	0	0	2758827
1							806400	9069761	1374620	11250781
2							1821636	9069761	1374620	1226017
3			189000				806400	9069761	1374620	13140781
4							1821636	9069761	1374620	1226017
5							1130400	9069761	1374620	11574781
6							604800	9069761	1374620	11049181
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Harvester	4	235000	170170
2	Forwarder	5	1221785	161745
3	Loader	3	378000	103673
4	Rigid/drawbar	5	1568000	159120
5				
6				
7				
8				
9				
			551785	170170

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		510510	510510
2		510510	510510
3	378000	510510	888510
4		510510	510510
5		510510	510510
6	551785	510510	6028295
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.3: Project life span
Years 5

Tax rate 20
Inflation rate 0.05

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	2758827	0	-2758827	-2758827	0	0	-2758827	1	-2758827		-2758827	
1	11250781	510510	-10740271	-38329198	-18659735	0	-10740271	0.952	-10228630	#REF!	-10228630	#NUM!
2	1226017	510510	-1175507	-50084706	-16507185	0	-1175507	0.907	-10662592	#REF!	-10662592	#NUM!
3	13140781	888510	-12252271	-62336977	-15420057	0	-12252271	0.864	-10583973	#REF!	-10583973	#NUM!
4	1226017	510510	-1175507	-74092484	-1175507	0	-1175507	0.823	-9671285	#REF!	-9671285	#NUM!
5	11574781	510510	-11064271	-85156756	-11064271	0	-11064271	0.784	-8669146	#REF!	-8669146	#NUM!
6	11049181	6028295	-5020886	-90177642	-5020886	0	-5020886	0.746	-3746662	#REF!	-3746662	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-81151415	#NUM!

Machine name	Purchase price	Useful life (mths)	Resale value	Financial inputs							Eucalyptus (0,35m ³)		Time worked					
				Fuel cons (litres/h)	R & M (R/mh or R/hr)	License (R/yr)	Insurance (R/yr)	LMI (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/mh)	LF	(m ³ /shift)	m ³ /year	no of shifts	mhrs/shift	Days/yr	mhrs/yr
Chainsaw fell & delim	2450	1420	809	1.35	4.57	0	123	123	N/A	0	N/A	2	86	19448	1	5	221	1105
Chainsaw crosscut	2450	1420	809	1.35	4.57	0	123	123	N/A	0	N/A	0	66	14586	1	5	221	1105
112kW Cable skidder	78000	13000	267407	12.00	42.75	17	29001	36016	15000	4	3410	8	3410	N/A	0	7	221	0
132kW Grapple skidder	104568	13000	344508	13.50	61.75	17	62188	62215	17100	4	3250	5	385	82978	1	7	230	1691
TJ1010 forwarder	1425416	18000	470387	6.63	33.23	17	71271	71288	17100	8	18600	8	141	62428	2	7	221	3094
Timber feller buncher disc	1260000	13000	418600	26.25	50.95	17	63000	63017	180000	1	7800	1	337	178533	2.4	7	221	3713
Timber feller buncher c&b	1260000	13000	418600	20.25	50.35	17	63000	63017	180000	1	7800	4	7800	N/A	0	7	221	0
Cato excavator HD 620	651500	13000	218295	7.32	60.80	17	33075	33092	137862	1	7800	3	177	78278	2.0	7	221	3094
Ball 220 A logger	132500	13000	48593	6.90	19.00	17	9625	9642	3250	3	2940	0	185	36485	1.0	6	221	1326
Ball 407 tender truck	781000	18000	261081	10.50	43.25	17	38550	38567	13955	8	4550	0	0	0	0	7	221	0
6 X 4 truck	350000	886000	115500	0.38	0.57	840	17500	18340	1330	10	32000	0	N/A	0.0	0	320	221	0
6 X 4 truck with trailer	686000	2000000	226380	0.47	0.70	1050	34300	35330	1330	16	65000	0	80	21879	2.0	500	221	221000
Front loader	770000	13000	254100	13.50	42.75	17	38900	38917	11875	4	5200	0	482	0	0.0	7	221	0
Stringer skidder truck	695000	875000	218450	46.50	0.67	1050	32750	34300	1330	16	65000	0	86	0	0.0	7	221	0
Skidder Warratah F/D/C	2072000	23400	683780	0.18	52.25	17	103600	103617	152000	1	7800	N/A	N/A	0.0	0	7	221	0
Skidder Warratah Prec	2072000	23400	683780	18.00	52.25	17	103600	103617	152000	1	7800	N/A	N/A	0.0	0	7	221	0
Warratah 616 F/D	1645000	18500	542850	13.50	21.85	17	82250	82267	137750	1	7800	0	126	59477	2.1	7	221	3048
Warratah 616 F/D/C	1645000	18500	542850	13.50	21.85	17	82250	82267	137750	1	7800	0	86	43316	2.0	7	221	3094
Timberjack 1810 forwarder	2824828	23400	866127	15.78	42.75	17	121231	121248	17100	8	18600	0	N/A	0.0	0	7	221	0
Ball tractor/trailer	397000	13000	117810	9.00	23.75	17	17890	17897	4198	5	3900	0	48	10210	1.0	7	221	1547
Harvester truck	812000	1300000	267960	0.48	0.73	1050	40600	41650	1330	16	65000	0	80	21879	2.0	600	221	221000
33 Excavator and skidder	700000	18500	231000	7.32	60.80	17	33000	33017	137750	1	9100	0	275	81863	1.5	7	221	2321
Timber skidder skidder	1280000	13000	418600	16.90	33.23	17	63000	63017	1013	8	13000	0	183	83814	1.5	7	221	2321
Pearson Pacific DDL	4892828	13000	1548666	60.00	114.00	17	23466	234663	N/A	0	N/A	0	539	178679	1.5	7	221	2321
Chip Truck	1050000	810000	346500	0.51	0.73	1050	62500	63550	3430	18	65000	0	44	14586	1.5	500	221	165750

Labour cost input data: current figures

	R/day	Days/yr	Total/year
Supervisor	1200	221	265200
Chainsaw operator	340	221	53040
Harvester operator	1400	221	308400
Machine operator	1020	221	225420
Truck driver 6 X 4	850	221	187850
Truck driver EC1	1000	221	221000
Tallyman	250	221	44250
Chackman	300	221	44200
Labourer	216	221	47736
Diesel price	5		
Petrol Price	6		

Labour productivity figures

	T/shift	T/year
Manual stacking pine pulpwood	11	2455
Manual loading pine pulpwood	12	2679
Debar/stack Eucalyptus pulpwood	4	781
Load Eucalyptus pulpwood	12	2679

Scenario inputs

	Low cost
Diesel price	1.50
Petrol Price	1.50
Oil as a % of fuel	0.05
Supervisor	6.50
Chainsaw operator	2.00
Harvester operator	7.00
Machine operator	6.00
Truck driver 6 X 4	5.00
Truck driver EC1	5.00
Tallyman	2.00
Chackman	2.00
Labourer	2.70
Purchase price	0.70
Useful life (mths)	1.30
Resale value	0.33
Fuel cons (litres/h)	0.23
R & M (R/mh)	0.88
License (R/yr)	0.70
Insurance (R/yr)	0.08
Tyre/track cost per tyre	0.88
Tyre/track life (hrs/mh)	1.30
Pine 1m3 (m ³ /shift)	1.10
Pine 0.3m3 (m ³ /shift)	1.10
Eucalyptus (m ³ /shift)	1.10
Manual stacking pine pulpwood	1.01
Manual loading pine pulpwood	1.01
Debar/stack Eucalyptus pulpwood	1.01
Load Eucalyptus pulpwood	1.01
mhrs/shift or km/shift	1.00
Days/yr	1.00
Warratah 616 F/D	1.40
Warratah 616 F/D/C	1.40
Tax rate	20.00
murder rate	0.04

System Description: 1. Eucalyptus pulpwood System 1

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle VSR%	Cost/cycle Rands
1	Chainsaw	2450	8	22050	1430	175032	0	0	0	0	0
2	Tract/Trail	357000	18	6426000	13000	183784	144	3900	4188	3	598500
3	Loader	891500	2	1783000	13000	156596	2	7800	137962	3	278724
4	Interlink	812000	8	6496000	1300000	175032	144	65000	1330	0	191820
5											
6											
7											
8											
9											
Total		1832950	28	14245000			290	76700	143348		41871022

1.3: Operating cost

Item	Machine Description	Fuel & oil R/Year	RAM R/mh	ing & lic R/Year	shift length mh/shift	# of shifts	Workdays R/Year	Total hrs Mths/Year	# machines	Total cost R/Year
1	Chainsaw	7.20	4.57	133	5.0	1.0	221	1105	8	123073
2	Tract/Trail	46.49	23.75	17987	7.0	1.0	221	1547	18	2277817
3	Loader	37.82	60.80	33082	7.0	2.0	221	3094	2	678414
4	Interlink	2.52	0.73	41850	500.0	2.0	221	221000	8	6079067
5										
6										
7										
8										
9										
Total		90	82609							9158171

1.4: Labour cost

Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year	
1 Chainsaw	53040	9	47736	224	0	1060800	12233185	
2 Tract/Trail	187850	18	47736	65	0	0	6500682	
3 Loader	225420	4	0	0	0	0	901880	
4 Interlink	221000	18	0	0	0	0	3535000	
5								
6								
7								
8								
9								
Total		687310		95472	289	0	1060800	23171547

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Tract/Trail	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	22050	6426000	1323000	6496000	0	0	0	0	0	14267050
1	22050						574560	9156171	23171547	32824328
2	22050						574560	9156171	23171547	32824328
3	22050						1448784	9156171	23171547	33798552
4	22050		1323000				574560	9156171	23171547	34247328
5	22050						1448784	9156171	23171547	33798552
6							383040	9156171	23171547	32710758
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Chainsaw	4	7277	175032
2	Tract/Trail	8	2120580	183784
3	Loader	4	436590	165556
4	Interlink	6	2143680	175032
5				
6				
7				
8				
9				
			4708127	183784

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0	0	0	0
1	7277	0	7277
2	7277	0	7277
3	7277	0	7277
4	443867	0	443867
5	7277	0	7277
6	4708127	0	4708127
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

1.5: Project life span

Years:

3. Net cash flow

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	14267050	0	-14267050	-14267050	0	0	-14267050	1	-14267050		-14267050	
1	32824328	7277	-32917051	-47184101	-40039551	0	-32917051	0.962	-31651011	#REF!	-31651011	#NUM!
2	32824328	7277	-32917051	-80101153	-37190951	0	-32917051	0.925	-30433664	#REF!	-30433664	#NUM!
3	33798552	7277	-33791276	-113892428	-36940276	0	-33791276	0.889	-3040321	#REF!	-3040321	#NUM!
4	34247328	443867	-33803461	-147695889	-33803461	0	-33803461	0.855	-28895341	#REF!	-28895341	#NUM!
5	33798552	7277	-33791276	-181487166	-33791276	0	-33791276	0.822	-2773965	#REF!	-2773965	#NUM!
6	32710758	4708127	-28002631	-209489797	-28002631	0	-28002631	0.790	-22130886	#REF!	-22130886	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-185192239	#NUM!

2. Eucalyptus eucalypt: System 2

1: CASH OUTFLOWS: Input Data												
1.1: Ownership Costs							1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol. cub. m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle Rands	Cost/cycle Rands	
1	Chainsaw	2450	9	22050	1430	175032	0	0	0	0	0	
2	Forwarder	1429418	3	4278249	15000	187294	18	15600	17100	5	307800	
3	Loader	881900	2	1763800	3000	156558	2	7800	137882	3	375724	
4	Rigid drawbar	886000	8	8488000	200000	175032	144	85000	1330	0	191500	
5												
Total		2775386	13	11087249			164	88400	156292		29631904	

1.3: Operating cost												
Item	Machine Description	Fuel & oil R/mtr	RAM R/mtr	Ins & oil R/Year	shill length m/mtr	# of shifts	Workdays R/Year	Total hrs M/Year	# machines			
1	Chainsaw	104.6	50.4	123	7.0	1.0	221	1547	9			
2	Forwarder	35.1	33.3	71288	7.0	2.0	221	3084	3			
3	Loader	37.8	60.8	33092	7.0	2.0	221	3084	2			
4	Rigid drawbar	2.4	0.7	35350	500.0	2.0	221	221000	8			
Total				145	138728							

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Chainsaw	225420	9	47736	224	0	1060800	12723805	
2 Forwarder	225420	6	0	0	0	0	1352520	
3 Loader	225420	4	0	0	0	0	801880	
4 Rigid drawbar	221000	16	0	0	0	0	3536000	
Total		897260		47736	224	0	1060800	18514005

2: Cash outflows per year, based on input data										
Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	22050	4278249	1323000	8488000	0	0	0	0	0	11109299
1	22050						574560	9450730	18514005	28561344
2	22050						574560	9450730	18514005	28561344
3	22050		1323000				850284	9450730	18514005	30180069
4	22050	4278249					574560	9450730	18514005	32837593
5	22050						1158084	9450730	18514005	29144869
6							180000	9450730	18514005	28144734
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS										
Item	Machine Description	Machine life Years	Rands	Volume m ³ /year	Price R/m ³	YEAR	Rease value R	Annual income R	TOTAL INFLOWS R	
1	Chainsaw	1	7277	175032	0	0	0	0	0	
2	Forwarder	5	1411162	187284	0	1	7277	0	7277	
3	Loader	4	436590	156558	0	2	7277	0	7277	
4	Rigid drawbar	9	1811040	175032	0	3	1855029	0	1855029	
5					0	4	7277	0	7277	
6					0	5	7277	0	7277	
7					0	6	3666069	0	3666069	
8					0	7	0	0	0	
9					0	8	0	0	0	
10					0	9	0	0	0	
11					0	10	0	0	0	
12					0	11	0	0	0	
13					0	12	0	0	0	
14					0	13	0	0	0	
15					0	14	0	0	0	
16					0	15	0	0	0	
17					0	16	0	0	0	
18					0	17	0	0	0	
19					0	18	0	0	0	
20					0	19	0	0	0	
20					0	20	0	0	0	

3. Net cash flow												
YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %	
0	11109299	0	-11109299	-11109299	0	0	-11109299	1	-11109299	-11109299	#NUM!	
1	28561344	7277	-28554068	-39653367	-34097692	0	-28554068	0.862	-27455834	-27455834	#NUM!	
2	28561344	7277	-28554068	-68217435	-31880242	0	-28554068	0.825	-26399841	-26399841	#NUM!	
3	30180069	1855029	-28305040	-96522474	-30522490	0	-28305040	0.889	-25163077	-25163077	#NUM!	
4	32837593	7277	-32830317	-12932791	-32630317	0	-32630317	0.855	-28063492	-28063492	#NUM!	
5	29144869	7277	-29137592	-15849383	-29137592	0	-29137592	0.822	-23948977	-23948977	#NUM!	
6	28144734	3666069	-24478666	-182969049	-24478666	0	-24478666	0.790	-19345845	-19345845	#NUM!	
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
										-161486366	#NUM!	

System Description:

3. Eucalyptus pulpwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/years	Annual cost R/cub m	Number of Tyres/tracks	Tyre life Mths/years	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands
1	Harvester	2072000	3	6216000	19500	17530	3	7800	137750	2	413250
2	Clambunk	1260000	3	3780000	13000	19141	18	13000	1013	6	18229
3	Loader/slasher	700000	2	1400000	19500	18235	2	9100	137785	4	275800
4	Rigid/drawb	689000	8	5488000	2000000	17503	144	85000	1330	0	191520
5											
6											
Total		4718000	13	10668000			167	94900	277843		46399731

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mtr	Risk/Rmtr	log & sc R/cy	stilt length m/ha	# of stils	Workdays R/year	Total hrs Mths/yr	# machines	Total cost R/cy
1	Harvester	69.7	21.8	42287	7.0	2.1	221	3249	3	1139455
2	Clambunk	85.2	33.3	63017	7.0	1.5	221	2321	3	675941
3	Loader/slasher	37.8	60.8	36017	7.0	1.5	221	2321	2	527706
4	Rigid/drawb	2.4	0.7	35350	500.0	2.0	221	221000	8	5787472
5										
6										
7										
8										
9										
Total			117	133384						8110575

1.4: Labour cost									
Machines Description	Operator R/year	Operator R/mtr	Assistants R/year	Assistants R/mtr	Ovrsheads R/year	Supervision R/year	Total cost R/year		
1 Harvester	225420	6	0	0	0	530400	1352520		
2 Clambunk	225420	6	0	0	0		1352520		
3 Loader/slasher	225420	4	0	0	0		901680		
4 Rigid/drawb	221000	16	0	0	0		3538000		
5							0		
6							0		
7							0		
8							0		
9							0		
Total		897260	0	0	0	530400	7142720		

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Clambunk	Ownership Cost Loader/slasher	Ownership Cost Rigid/drawb	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	6216000	3780000	1400000	5488000	0	0	0	0	0	16884000
1							574560	8110575	7142720	15827855
2							574560	8110575	7142720	15827855
3							987610	8110575	7142720	16241105
4							850080	8110575	7142720	16103355
5							574560	8110575	7142720	15827855
6							363040	8110575	7142720	15636335
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Harvester	6	1247400	175430
2	Clambunk	6	1033518	191441
3	Loader/slasher	8	0	182325
4	Rigid/drawb	9	1811040	175032
5				0
6				0
7				0
8				0
9				0
			4091958	191441

1.5: Project life span	
years	
	8

YEAR	Resale value R	Annual income R	TOTAL INFLOWS R
0		516891	516891
1		516891	516891
2		516891	516891
3		516891	516891
4		516891	516891
5		516891	516891
6	4091958	516891	4608850
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

Tax rate 20

hurdle rat 0.04

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	16884000	516891	-16367109	-16367109	0	0	-16367109	1	-16367109	#REF!	-16367109	#NUM!
1	15827855	516891	-15310963	-31678072	-20544963	0	-15310963	0.962	-14722080	#REF!	-14722080	#NUM!
2	15827855	516891	-15310963	-46989035	-18511263	0	-15310963	0.925	-14155846	#REF!	-14155846	#NUM!
3	16241105	516891	-15724213	-62713249	-1787613	0	-15724213	0.889	-13978786	#REF!	-13978786	#NUM!
4	16103355	516891	-15586463	-78299712	-15586463	0	-15586463	0.855	-13323374	#REF!	-13323374	#NUM!
5	15827855	516891	-15310963	-93610676	-15310963	0	-15310963	0.822	-12584496	#REF!	-12584496	#NUM!
6	15636335	4608850	-11027485	-104638160	-11027485	0	-11027485	0.790	-8715181	#REF!	-8715181	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-53846855	#NUM!

4. System Description: System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub. m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle YRS/Yr	Cost/cycle Rands
1	Feller buncher	1260000	1	1260000	13000	178533	1	7800	180000		180000
2	Grappler skidder	1043956	2	2087912	13000	185955	8	3250	17100		136800
3	Peterson DDCL	4692928	1	4692928	13000	178679	0	N/A	N/A		0
4	Chip truck trailer	1090000	9	9450000	910000	131274	162	65000	3430		866733
5											
6											
7											
8											
9											
Total		8046886	12	16230945			171	76050	210530		36000707

1.3: Operating cost

Item	Machine Description	Fuel & oil R/mhr	R/M	hrs & lic R/Year	shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/Yr	# machines	Total cost R/year
1	Feller buncher	135.6	50.8	83017	7.0	24	231	3713	1	755662
2	Grappler skidder	68.4	61.8	52216	7.0	1.1	230	1691	2	273878
3	Peterson DDCL	37.8	60.8	35017	7.0	1.5	221	2321	1	263853
4	Chip truck trailer	2.6	0.7	53550	800.0	1.5	221	165750	9	5503419
5										
6										
7										
8										
9										
Total			174	140782						6796811

1.4: Labour cost

Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads R/year	Subsistence R/year	Total cost R/year	
1 Feller buncher	225420	3	0	0	0	265200	941480	
2 Grapple skidder	225420	2	44200	0	0		450640	
3 Peterson DDCL	225420	2	44200	0	4		627640	
4 Chip truck trailer	221000	18	0	0	0		3978000	
5							0	
6							0	
7							0	
8							0	
9							0	
Total		897260		88400	4	0	265200	5997940

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trailer	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	1260000	2087917	4692928	9450000	0	0	0	0	0	0	17490845
1								1667199	6796811	5997940	14451949
2								1993999	6796811	5997940	14788749
3								1667199	6796811	5997940	14461949
4	1260000							1993999	6796811	5997940	16048749
5								1667199	6796811	5997940	14451949
6								1111466	6796811	5997940	13906217
7											0
8											0
9											0
10											0
11											0
12											0
13											0
14											0
15											0
16											0
17											0
18											0
19											0
20											0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ²
1	Feller buncher	4	415800	178533
2	Grappler skidder	8	89012	185955
3	Peterson DDCL	6	1548666	178679
4	Chip truck trailer	5	3118500	131274
5				
6				
7				
8				
9				
			5771979	185955

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		3161235	3161235
1		3161235	3161235
2		3161235	3161235
3		3161235	3161235
4	415800	3161235	3577035
5		3161235	3161235
6	5771979	3161235	8933214
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span

Years	6
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Tax rate 20

hurdle rat 0.04

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	DISC. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	17490845	3161235	-14329610	-14329610	0	0	-14329610	1	-14329610		-14329610	
1	14461949	3161235	-11300714	-29630324	-19418137	0	-11300714	0.962	-10866072	#REF!	-10866072	#NUM!
2	14788749	3161235	-11627514	-37257839	-19496788	0	-11627514	0.925	-10750291	#REF!	-10750291	#NUM!
3	14461949	3161235	-11300714	-39598653	-14549883	0	-11300714	0.889	-10046294	#REF!	-10046294	#NUM!
4	16048749	3577035	-12471714	-61030687	-12471714	0	-12471714	0.855	-10660874	#REF!	-10660874	#NUM!
5	14461949	3161235	-11300714	-72330982	-11300714	0	-11300714	0.822	-9288364	#REF!	-9288364	#NUM!
6	13906217	8933214	-4973003	-77303855	-4973003	0	-4973003	0.790	-3530236	#REF!	-3530236	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-69871740	#NUM!

5. System Description: System 5

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/yr	Annual cost R/yr	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre Rands	Tyre cycle Rands	Cost/cycle Rands
1	Harvester	1645000	4	6580000	18500	173264	4	7800	137750	3	551000
2	Forwarder	1425418	3	4276254	15000	187284	18	15600	17100	5	307800
3	Loader	661500	2	1323000	13000	156556	2	7800	137862	3	27524
4	Rigid/drawbar	689000	8	5512000	200000	179033	144	69000	1330	0	191520
5											
6											
7											
8											
9											
Total		4417916	13	11087249			168	96200	294042		4939073

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/yr	RM R/yr	Ins & lic R/yr	shft length mhrs	# of shifts	Workdays R/yr	Total hrs R/yr	# machines	Total cost R/yr
1	Harvester	89.7	21.8	82267	7.0	2.0	221	3094	4	1462597
2	Forwarder	35.1	33.3	71286	7.0	2.0	221	3094	3	848512
3	Loader	37.8	60.8	33082	7.0	2.0	221	3094	2	676414
4	Rigid/drawbar	2.4	0.7	35350	500.0	2.0	221	221000	8	5767472
5										
6										
7										
8										
9										
Total		145	117	138729				230282		8754686

1.4: Labour cost							
Machine Description	Operator R/yr	Operator Number	Assistants R/yr	Assistants Number	Overhead Percent	Supervision R/yr	Total cost R/yr
1 Harvester	309400	6	0	0	0	265200	2740400
2 Forwarder	225420	6	0	0	0	1362520	
3 Loader	225420	4	0	0	0	901680	
4 Rigid/drawbar	187850	16	0	0	0	3005600	
5							
6							
7							
8							
9							
Total		948090	0	0	0	265200	8000200

2: Cash outflows per year, based on Input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	6580000	4276249	1323000	5488000	0	0	0	0	0	17667249
1							574560	8754686	8000200	17329456
2							574560	8754686	8000200	17329456
3							1401284	8754686	8000200	18156180
4			1323000				574560	8754686	8000200	18652456
5							1433360	8754686	8000200	18188256
6							383040	8754686	8000200	17137936
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ²
1	Harvester	5	2171400	173264
2	Forwarder	5	1411162	187284
3	Loader	4	436590	156556
4	Rigid/drawbar	9	1811040	175032
5				
6				
7				
8				
9				
			5830192	187284

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		561853	561853
2		561853	561853
3		561853	561853
4	1847782	561853	2409635
5		561853	561853
6	5830192	561853	6392045
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 20

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	17667249	0	-17667249	-17667249	0	0	-17667249	1	-17667249	#REF!	-17667249	#NUM!
1	17329456	561853	-16767603	-34434852	-22311227	0	-16767603	0.962	-16122695	#REF!	-16122695	#NUM!
2	17329456	561853	-16767603	-51202455	-20093778	0	-16767603	0.925	-15502591	#REF!	-15502591	#NUM!
3	18156180	561853	-17594327	-68796782	-18611777	0	-17594327	0.866	-15841293	#REF!	-15841293	#NUM!
4	18652456	2409635	-16242821	-85039633	-16242821	0	-16242821	0.815	-13884457	#REF!	-13884457	#NUM!
5	18188256	561853	-17626403	-102666036	-17626403	0	-17626403	0.822	-14487618	#REF!	-14487618	#NUM!
6	17137936	6392045	-10745891	-113411926	-10745891	0	-10745891	0.790	-8492634	#REF!	-8492634	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20											-101798537	#NUM!

Machine name	Purchase price	Useful life (mths)	Resale value	Financial inputs						Eucalyptus (0,25m ³)			Time worked					
				Fuel cons (litres/hr)	R & M (R/mh or R/hr)	License (R/yr)	Insurance (R/yr)	L&I (Fuel)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/tyre)	LF	(m ³ /shft)	m ³ /year	no of shifts	mhrs/shft	Days/yr	mhrs/yr
Chainsaw fell & cutlimb	17500	625	675	2.34	24.05	0	3500	3500	N/A	0	N/A	2	48	10800	1.0	5	221	1105
Chainsaw crosscut	17500	625	675	2.34	24.05	0	3500	3500	N/A	0	N/A	1	36	7560	1.0	8	221	1105
1120W Cable skidder	5571570	7500	278578	20.80	325.00	96	1114314	1114410	64000	4	3610	5	210	90718	1.1	7	220	1681
1320W Grapple skidder	7456848	7900	272842	23.40	325.00	96	1481389	1491465	72000	4	3250	5	210	90718	1.1	7	220	1681
TJ1010 forwarder	10181545	15000	508077	11.32	175.00	96	2038309	2038405	72000	6	19600	5	77	34082	2.0	7	221	3094
Timber feller buncher disc	9000000	7800	450000	45.50	268.15	96	1800000	1800096	800000	1	7800	1	184	101522	2.5	7	221	3868
Timber feller buncher cab	9000000	7900	450000	35.10	265.00	96	1800000	1800096	800000	1	7800	4	N/A	0.0	0.0	7	221	0
Cato excavator HD 820	4728000	7800	236250	12.68	320.00	96	849000	849096	580472	1	7800	3	87	42897	2.0	7	221	3094
Beet 220 A Egger	1375000	7500	46750	10.40	100.00	96	275000	275096	13600	3	2340	80	19880	1.0	8	221	1328	
Beet ADT timber truck	5650000	11250	282500	18.20	225.00	96	1130000	1130096	48000	8	4180	0	0.0	0.0	0.0	7	221	0
6 x 4 truck	2500000	337500	125000	0.65	3.00	4800	500000	504800	5600	10	32500		N/A	0.0	0.0	320	221	0
6 x 4 truck with trailer	4900000	500000	245000	0.81	0.70	6000	980000	986000	5600	18	65000		27	11834	2.0	500	221	221000
Front end loader	8500000	7800	279000	23.40	225.00	96	1100000	1100096	50000	4	6200		252	0.0	0.0	7	221	0
Stinger steer truck	4750000	862500	237500	80.60	3.50	6000	950000	958000	6400	18	65000		84	0.0	0.0	7	221	0
Raymond Warran F/D/C	14800000	13500	740000	0.31	278.00	96	2980000	2980096	640000	1	7800		N/A	0.0	0.0	7	221	0
Raymond Warran Pw	14800000	13500	740000	31.20	275.00	96	2980000	2980096	640000	1	7800		N/A	0.0	0.0	7	221	0
Warran 618 F/D	11750000	11250	587500	23.40	115.00	96	2350000	2350096	580000	1	7800		84	23889	2.0	7	221	3094
Warran 618 F/D/C	11750000	11250	587500	23.40	115.00	96	2350000	2350096	580000	1	7800		42	18564	2.0	7	221	3094
Timberjack 1810 forwarder	18747345	13500	837367	27.30	225.00	96	3749489	3749585	72000	8	15600		N/A	0.0	0.0	7	221	0
Beet tractor/trailer	2550000	7500	127500	15.60	125.00	96	510000	510096	17500	8	3600		25	5589	1.0	7	221	1547
Isarim truck	8500000	750000	290000	0.85	3.85	6000	1180000	1180000	6400	18	65000		27	11834	2.0	600	221	221000
20 Excavator and shearer	8000000	11250	260000	12.88	320.00	96	1000000	1000096	580000	1	8100		150	49735	1.5	7	221	2321
Timber skidder skidder	8000000	7500	450000	28.80	175.00	96	1800000	1800096	4284	8	13000		105	34608	1.5	7	221	2321
Peterson Pacific DDCL	35320815	7500	1678048	104.00	600.00	96	6704183	6704278	N/A	0	N/A		294	87461	1.5	7	221	2321
Chip Truck	7500000	525000	375000	0.85	3.85	6000	1500000	1506000	14444	18	68000		27	11934	2.0	600	221	221000

Labour cost input data: current figures

	R/day	Days/yr	Total/year
Stationer	1200	221	265200
Chainsaw operator	800	221	176800
Harvester operator	300	221	66300
Machine operator	1360	221	300560
Truck driver 6 X 4	1105	221	244205
Truck driver EC1	1300	221	287300
Tallyman	700	221	154700
Checkman	700	221	154700
Labourer	480	221	106080
Diesel price	13		
Petrol Price	15		

Labour productivity figures

	T/day	T/year
Manual stacking pine pulpwood	11	1439
Manual loading pine pulpwood	12	1591
Debar/track Eucalyptus pulpwood	4	464
Load Eucalyptus pulpwood	12	1591

Scenario inputs

	Expense
Diesel price	4.00
Petrol Price	4.00
Oil as a % of fuel	0.05
Stationer	5.00
Chainsaw operator	5.00
Harvester operator	1.50
Machine operator	8.00
Truck driver 6 X 4	6.50
Truck driver EC1	6.50
Tallyman	7.00
Checkman	7.00
Labourer	6.00
Purchase price	5.00
Useful life (mths)	0.75
Resale value	0.05
Fuel cons (litres/hr)	1.30
R & M (R/mh)	5.00
License (R/yr)	4.00
Insurance (R/yr)	0.20
Tyre/track cost per tyre	4.00
Tyre/track life (hrs/tyre)	1.30
Pine fcl (m ³ /shft)	0.80
Pine D 3x3 (m ³ /shft)	0.80
Eucalyptus (m ³ /shft)	0.60
Manual stacking pine pulpwood	0.60
Manual loading pine pulpwood	0.60
Debar/track Eucalyptus pulpwood	0.60
Load Eucalyptus pulpwood	0.60
mhrs/shft of track	1.00
Days/yr	1.00
Tax rate	20.00
Hurdle rate	0.13

System Description: 1. Eucalyptus pulpwood: System 1

1: CASH OUTFLOWS: Input Data												
1.1 Ownership Costs							1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Total price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Type life Mths/Yr	Cost/tyre Rands	Type cycle X/Y/Z	Cost/cycle Rands	
1	Chainsaw	17900	10	179000	825	106900	0	0	0	0	0	
2	Tract/Trailer	255000	18	4590000	7500	100246	144	3900	17500	3	252000	
3	Loader	472500	3	1417500	7500	129062	3	7800	580472	3	1741418	
4	Interlink	580000	8	4640000	75000	85472	144	65000	6400	0	821800	
5												
6												
7												
8												
9												
Total		13092500	29	106475000			291	76700	604372		17987292	

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R/M	lit & lic R/Year	shift length m/hr/km	# of shifts	Workdays	Total hrs	# machines	Total cost R/Year
1	Chainsaw	35.87	24.09	2500	3.0	1.0	221	1105	10	693779
2	Tract/Trailer	212.94	123.00	510096	7.0	1.0	221	1547	18	18592005
3	Loader	173.18	330.00	945068	7.0	2.0	221	3094	3	7413089
4	Interlink	11.53	3.65	1186000	500.0	2.0	221	221000	8	36527354
5										
6										
7										
8										
9										
Total			473	2621192						63226227

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year
1 Chainsaw	132800	8	106080	229	0	884000	26191657
2 Tract/Trailer	244205	7	106080	67	0		8781435
3 Loader	300560	6	0	0	0		1803360
4 Interlink	287300	14	0	0	0		4022200
5							
6							
7							
8							
9							
Total	964665		212160	295	0	884000	40798652

2: Cash outflows per year, based on input data										
Year	Ownership Cost Chainsaw	Ownership Cost Tract/Trailer	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost	Ownership Cost	Time Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	175000	4590000	1417500	4640000	0	0	0	0	0	106650000
1	175000						2764800	63226227	40798652	106964679
2	175000		1417500				2764800	63226227	40798652	121139679
3	175000						7028216	63226227	40798652	111226095
4	175000		1417500				2764800	63226227	40798652	121139679
5	175000						7028216	63226227	40798652	111226095
6	175000						1843200	63226227	40798652	106043079
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS										
Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R		
1	Chainsaw	1	8750	106080	0	0	0	0		
2	Tract/Trailer	5	2295000	100246	1	8750	0	8750		
3	Loader	2	708750	129062	2	717500	0	717500		
4	Interlink	3	0	95472	3	8750	0	8750		
5					4	717500	0	717500		
6					5	8750	0	8750		
7					6	3012500	0	3012500		
8					7	0	0	0		
9					8	0	0	0		
10					9	0	0	0		
11					10	0	0	0		
12					11	0	0	0		
13					12	0	0	0		
14					13	0	0	0		
15					14	0	0	0		
16					15	0	0	0		
17					16	0	0	0		
18					17	0	0	0		
19					18	0	0	0		
20					19	0	0	0		

1.5: Project life span													
Tax rate		3. Net cash flow											
YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %	
0	106650000	0	-106650000	-106650000	0	0	-106650000	1	-106650000		-106650000		
1	106964679	8750	-106955929	-213005929	-160193429	0	-106955929	0.885	-94651265	#REF!	-94651265	#N/UM!	
2	121139679	717500	-120422179	-334028108	-152364679	0	-120422179	0.783	-94308230	#REF!	-94308230	#N/UM!	
3	111226095	8750	-111217345	-445245453	-132512345	0	-111217345	0.693	-77079199	#REF!	-77079199	#N/UM!	
4	121139679	717500	-120422179	-565667632	-129422179	0	-120422179	0.613	-73857178	#REF!	-73857178	#N/UM!	
5	111226095	8750	-111217345	-676884977	-111217345	0	-111217345	0.543	-60364319	#REF!	-60364319	#N/UM!	
6	106043079	3012500	-103030579	-779915556	-103030579	0	-103030579	0.480	-49487496	#REF!	-49487496	#N/UM!	
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
Total											-566397686	#N/UM!	

2. Eucalyptus mullewood, System 2

1. CASH OUTFLOWS: Input Data												
1.1: Ownership Costs							1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol. Cub m	Number of Tyres/tracks	Tyre life Mths	Cost/Tyre Rands	Tyre cycle YR/M	Cost/cycle Rands	
1	Chainsaw	17500	10	175000	825	106260	0	0	0	0	0	
2	Forwarder	10181543	3	30544635	15000	102155	18	18000	79000	5	1296000	
3	Loader	4725000	3	14175000	7500	128092	3	7800	580472	3	1741418	
4	Rigid drawbar	4900000	8	39200000	5000000	85472	144	85000	8600	0	806400	
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total		19824045	14	83919635			165	88400	658072		108581880	

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Re & lc R/Year	shft length mhrs	# of shifts	Workdays Day/Year	Total hrs Mhrs/yr	# machines	
1	Chainsaw	479.1	24.1	3500	5.0	1.0	221	1105	10	
2	Forwarder	180.7	175.0	2036405	7.0	2.0	221	3094	3	
3	Loader	173.2	320.0	845096	7.0	2.0	221	3094	3	
4	Rigid drawbar	11.0	0.7	986000	800.0	2.0	221	221000	8	
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
Total			520	3067501						

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Chainsaw	132600	8	106080		229	0	884000	2530767
2 Forwarder	300560	8	0	0	0	0	2404480	
3 Loader	300560	4	0	0	0	0	1202240	
4 Rigid drawbar	297300	14	0	0	0	0	4022200	
5	0							
6	0							
7	0							
8	0						0	
9	0						0	
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
Total	1021020		106080	229	0	884000	32936577	

2: Cash outflows per year, based on Input data										
Year	Ownership Cost Chainsaw	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	175000	30544635	14175000	39200000		0	0	0		84094635
1	175000						2419200	50810380	32936577	86341157
2	175000						2419200	50810380	32936577	100516157
3	175000						4160616	50810380	32936577	88082573
4	175000		14175000				2419200	50810380	32936577	100516157
5	175000						5450516	50810380	32936577	86378573
6							1612800	50810380	32936577	85359757
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS										
Item	Machine Description	Machine life Years	Volume n ³ /year	Price R/m ³	YEAR	Retail value R	Annual Income R	TOTAL INFLOWS R		
1	Chainsaw	1	8750	106080	0	0	0	0		
2	Forwarder	5	1527232	102155	0	8750	0	8750		
3	Loader	2	708750	128092	1	717500	0	717500		
4	Rigid drawbar	23	0	95472	2	8750	0	8750		
5					3	717500	0	717500		
6					4	8750	0	8750		
7					5	717500	0	717500		
8					6	2244732	0	2244732		
9					7			0		
10					8			0		
11					9			0		
12					10			0		
13					11			0		
14					12			0		
15					13			0		
16					14			0		
17					15			0		
18					16			0		
19					17			0		
20					18			0		
21					19			0		
22					20			0		

1.5: Project life span											
Years											
8											

3. Net cashflow												
Tax rate	0.20											
Hurdle rate	0.15	IN FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %	
0	84094635	0	-84094635	-84094635	0	0	-84094635	1	-84094635	-84094635	#NUM!	
1	86341157	8750	-8332407	-17042762	-12629223	0	-8332407	0.885	-76400360	-76400360	#NUM!	
2	100516157	717500	-99786657	-370225699	-124974548	0	-99786657	0.783	-78156987	-78156987	#NUM!	
3	88082573	8750	-88073823	-358299522	-104857750	0	-88073823	0.693	-61039577	-61039577	#NUM!	
4	100516157	717500	-99786657	-458085179	-99786657	0	-99786657	0.613	-61208385	-61208385	#NUM!	
5	89378573	8750	-89369823	-547486002	-89369823	0	-89369823	0.543	-48506359	-48506359	#NUM!	
6	85359757	2244732	-83115025	-63063028	-83115025	0	-83115025	0.480	-39921687	-39921687	#NUM!	
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
Total												

System Description: 3_Eucalyptus subwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/years	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre Rands	Tyre cycle YRS	Cost/cycle Rands
1	Harvester	1480000	4	5920000	11250	95472	4	7800	580000		2320000
2	Clambunk	500000	3	1500000	7500	104423	18	13000	4294	6	76753
3	Loader/flasher	500000	2	1000000	11250	8645	2	1150	50000	4	1160000
4	Rigid/drawb	490000	8	3920000	5000000	95472	144	65000	5600	0	806400
5											
6											
	Total	3370000	13	7820000			168	94900	1169864		186537153

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/Year	RAM R/yr	Ins & ls R/Yr	shel length m/yr	# of shifts	Weekdays Days/Year	Total km Mths/yr	# machines	Total cost R/Year	
1	Harvester	319.4	115.0	235098	7.0	2.0	221	3094	4	14779642	
2	Clambunk	390.4	175.0	180096	7.0	1.5	221	2321	3	6224167	
3	Loader/flasher	173.2	330.0	100096	7.0	1.5	221	2321	2	4289092	
4	Rigid/drawb	11.0	0.7	86600	800.0	2.0	221	221000	8	28576959	
5											
6											
7											
8											
9											
	Total		611	3781192						53866861	

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Harvester	300560	8	0	0	0	442000	2404480
2 Clambunk	300560	8	0	0	0		2404480
3 Loader/flasher	300560	2	0	0	0		601120
4 Rigid/drawb	287300	14	0	0	0		4022200
5							0
6							0
7							0
8							0
9							0
	Total	1189880	0	0	0	442000	9432280

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Clambunk	Ownership Cost Loader/flasher	Ownership Cost Rigid/drawb	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	5920000	2700000	1000000	3920000	0	0	0	0	0	13540000
1							2419200	5386686	9432280	65718341
2							2418200	5386686	9432280	65718341
3		2700000					4739200	5386686	9432280	95038341
4							3579200	5386686	9432280	66878341
5							2419200	5386686	9432280	65718341
6							1512600	5386686	9432280	64911941
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Harvester	4	900000	95472
2	Clambunk	3	1118527	104423
3	Loader/flasher	5	1480000	99450
4	Rigid/drawb	23	0	95472
5				0
6				0
7				0
8				0
9				0
			3498527	104423

YEAR	Resale value R	Annual income R	TOTAL INFLOWS R
0			281941
1			281941
2			281941
3	118527		1400468
4			281941
5			281941
6	3498527		3780468
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 8

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	13540000	281941	-135118059	-135118059	0	0	-135118059	1	-135118059		-135118059	
1	65718341	281941	-65436400	-202584459	-103836400	0	-65436400	0.885	-57908319	#REF!	-57908319	#NUM!
2	65718341	281941	-65436400	-265990859	-82296400	0	-65436400	0.783	-51246300	#REF!	-51246300	#NUM!
3	95038341	1400468	-63637873	-359628732	-109877873	0	-63637873	0.693	-44895743	#REF!	-44895743	#NUM!
4	66878341	281941	-65436400	-425225132	-85396400	0	-65436400	0.613	-4084819	#REF!	-4084819	#NUM!
5	65718341	281941	-65436400	-491661532	-65436400	0	-65436400	0.543	-35516256	#REF!	-35516256	#NUM!
6	64911941	3780468	-61131473	-552793006	-81131473	0	-61131473	0.480	-29362579	#REF!	-29362579	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20											-14892075	#NUM!

4. System Description: Eucalyptus mulwood, System 4

1. CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Total price Rands	Machine life Mths/hrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/hrs	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands
1	Feller buncher	900000	1	900000	7500	101320	1	7500	800000	2	800000
2	Grapple skidder	1491360	2	2982720	7500	101430	8	3250	72000	2	876000
3	Peterson DDCL	33520915	1	33520915	7500	87481	0	N/A	N/A	0	0
4	Chip truck trailer	7600000	9	67800000	525000	107406	182	85000	14444	0	239920
5											
6											
7											
8											
9											
	Total	57477780	12	115934605			171	76050	886444		151581924

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & sc R/Year	shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Feller buncher	821.1	268.2	1800096	7.0	2.5	221	3868	1	5239174
2	Grapple skidder	317.7	325.0	1491465	7.0	1.1	230	1691	2	2579853
3	Peterson DDCL	173.2	320.0	1000096	7.0	1.5	221	2321	1	2144546
4	Chip truck trailer	12.1	2.9	1506000	800.0	2.0	221	221000	9	45212117
5										
6										
7										
8										
9										
	Total			917						55173620

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Feller buncher	85300	3	0	0	0	221000	419900
2 Grapple skidder	300560	2	154700	0			601120
3 Peterson DDCL	300560	2	154700	4			1219920
4 Chip truck trailer	287300	18	0	0			5171400
5							0
6							0
7							0
8							0
9							0
	Total	954720		308400	4	221000	7412340

2: Cash outflows per year, based on input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skid	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trailer	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	9000000	14913600	33520915	67500000	0	0	0	0	124934605
1						7019784	55173820	7412340	69605944
2	9000000					8395784	55173820	7412340	79981944
3			33520915			7019784	55173820	7412340	103126859
4	9000000					8395784	55173820	7412340	79981944
5						7019784	55173820	7412340	69605944
6						4679856	55173820	7412340	67265016
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	2	450000	101522
2	Grapple skidder	4	372842	101430
3	Peterson DDCL	3	1678048	97451
4	Chip truck trailer	2	0	107406
5				
6				
7				
8				
9				
			248888	107406

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		1825902	1825902
1		1825902	1825902
2		1825902	1825902
3	1678048	1825902	3501948
4	450000	1825902	2275902
5		1825902	1825902
6	248888	1825902	4324790
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span years 8

Tax rate 20 handle ml 0.13

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	124934605	1825902	-123108703	-123108703	0	0	-123108703	1	-123108703		-123108703	
1	69605944	1825902	-67780042	-190888745	-125747345	0	-67780042	0.885	-59823338	#REF!	-59823338	#NUM!
2	79981944	1825904	-78155040	-269043786	-112636422	0	-78155040	0.783	-61207644	#REF!	-61207644	#NUM!
3	103126859	3501948	-99624912	-368668698	-122811633	0	-99624912	0.693	-69045061	#REF!	-69045061	#NUM!
4	79981944	2275902	-77706042	-446375740	-77706042	0	-77706042	0.613	-4768571	#REF!	-4768571	#NUM!
5	69605944	1825902	-67780042	-514155782	-67780042	0	-67780042	0.543	-36788291	#REF!	-36788291	#NUM!
6	67265016	4324790	-62941226	-577097008	-62941226	0	-62941226	0.480	-30231837	#REF!	-30231837	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

-428022448 #NUM!
-713

5. System Description: Eucalyptus pulpwood System 5

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Ann	Annual cost sub m	Number of Tyres/tracks	Type life Mths/Ann	Cost/tyr Rands	Type cycle YRS#	Cost/cycle Rands
1	Harvester	1175000	5	5875000	11250	92820	5	7800	56000	3	2900000
2	Forwarder	10181545	3	30544635	15000	102155	18	15600	72000	5	1296000
3	Loader	4728000	3	14175000	7800	128092	3	7800	56072	3	1741416
4	Rigid/drawbar	490000	8	3920000	5000000	95472	144	69000	9600	0	956400
5											
6											
7											
8											
9											
Total		31556645	14	83919635			170	96200	1238072		21047240

1.3: Operating cost												
Item	Machine Description	Fuel & oil R/mtr	RAM R/mtr	ins & lc R/Yr/mtr	shft length mhrs	# of shifts	Days/yr	Total hrs Mths/yr	# machines	Total cost R/yr		
1	Harvester	219.4	115.0	235096	7.0	2.0	221	3094	5	18470803		
2	Forwarder	160.7	178.0	2096405	7.0	2.0	221	3094	3	8225359		
3	Loader	173.2	320.0	945096	7.0	2.0	221	3094	3	7413089		
4	Rigid/drawbar	11.0	0.7	986000	500.0	2.0	221	221000	8	28576659		
5												
6												
7												
8												
9												
Total		664	611	3967501				230382		63686209		

1.4: Labour cost								
Machine Description	Operator Number	Operator R/yr	Assistants Number	Assistants R/yr	Overhead Percent	Supervision R/yr	Total cost R/yr	
1 Harvester	65300	10	0	0	0	221000	894000	
2 Forwarder	300550	8	0	0	0	2404480		
3 Loader	300560	4	0	0	0	1202240		
4 Rigid/drawbar	244205	16	0	0	0	3907280		
5						0		
6						0		
7						0		
8						0		
9						0		
Total		911625	0	0	0	221000	8396000	

2: Cash outflows per year, based on Input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/drawbar	Ownership Cost	Ownership Cost	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	5875000	30544635	14175000	3920000	0	0	0	0	0	142669635
1							2419200	63686209	8396000	74563409
2			14175000				2419200	63686209	8396000	8678409
3							705616	63686209	8396000	79144825
4			14175000				2419200	63686209	8396000	8678409
5							8356616	63686209	8396000	80440825
6							1612800	63686209	8396000	73697009
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Harvester	4	1468750	92820
2	Forwarder	5	1527232	102155
3	Loader	2	708750	128092
4	Rigid/drawbar	23	0	95472
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		384275	384275
2	708750	384275	1093025
3		384275	384275
4	708750	384275	1093025
5		384275	384275
6	3704732	384275	4089007
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 20

YEAR	OUT FLOWS R	IN FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	142669635	0	-142669635	-142669635	0	0	-142669635	1	-142669635		-142669635	
1	74503409	384275	-74119135	-216789770	-116078952	0	-74119135	0.885	-65592154	#REF!	-65592154	#NUM!
2	8678409	1093025	-87585385	-304374154	-112761275	0	-87585385	0.783	-68592203	#REF!	-68592203	#NUM!
3	79144825	384275	-78760551	-383134705	-9544478	0	-78760551	0.693	-54850712	#REF!	-54850712	#NUM!
4	8678409	1093025	-87585385	-470720089	-87585385	0	-87585385	0.613	-53717757	#REF!	-53717757	#NUM!
5	80440825	384275	-8056551	-550778640	-80056551	0	-80056551	0.543	-43451488	#REF!	-43451488	#NUM!
6	73697009	4089007	-69608003	-620384643	-69608003	0	-69608003	0.480	-33434013	#REF!	-33434013	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

Machine name	Financial inputs										Eucalyptus (0,25m ³)			Time worked				
	Purchase price	Useful life (mhrs)	Resale value	Fuel cons (litres)	R & M (R/mh or R/hr)	License (R/yr)	Insurance (R/yr)	L&I (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/km)	LF	(m ³ /shft)	m ³ /year	no of shifts	mhrs/shft	Days/yr	mhr/yr
Chainsaw fuel & delim	14000	880	880	2.34	18.24	0	2800	2800	N/A	0	N/A	2	56	12376	1.0	5	221	1105
Chainsaw onroad	14000	880	880	2.34	18.24	0	2800	2800	N/A	0	N/A	2	56	12376	1.0	5	221	1105
112kW Cable skidder	4457256	8000	312006	20.80	180.00	48	881451	881489	480000	4	2029	6	N/A	0.0	0.0	7	221	0
130kW Single skidder	5865478	8000	417563	23.40	280.00	48	1120295	1120143	540000	4	1875	6	245	50260	1.0	7	221	1610
TJ1010 forwarder	8145296	15000	570187	11.32	140.00	48	1629047	1629068	840000	8	8000	6	80	33798	1.7	7	221	2530
Timco feller buncher disc	7200000	8000	504000	45.50	214.52	48	1440000	1440048	800000	1	4500	1	214	104280	2.2	7	221	3403
Timco feller buncher c&b	7200000	8000	504000	35.10	212.00	48	1440000	1440048	800000	1	4500	4	N/A	0.0	0.0	7	221	0
Cato excavator HD 820	3780000	8000	264800	12.68	256.00	48	756000	756048	435354	1	4500	3	113	48813	2.0	7	221	3094
Beet 230 A loader	1100000	8000	77000	10.40	80.00	48	220000	220048	102000	3	1390	105	23205	1.0	6	221	1326	
Beet 40T timber truck	4530000	12000	316400	18.80	180.00	48	804000	804048	345000	8	2023	0	0.0	0.0	0.0	7	221	0
B X 4 truck	2000000	360000	140000	0.85	2.40	2400	400000	400400	4200	10	16780	N/A	0.0	236	221	0	0	
B X 4 truck with trailer	3820000	700000	274400	0.81	0.70	3000	784000	787000	4300	18	37500	32	13823	2.0	500	221	221000	
Front end loader	4400000	8000	308000	23.40	180.00	48	860000	860048	375000	4	3000	294	0	0.0	0.0	7	221	0
Stinger steer truck	3800000	800000	268800	80.80	2.80	3000	780000	783000	4800	18	37500	63	0	0.0	0.0	7	221	0
Bigwood Warratah F/D/C	11840000	14400	828800	0.31	220.00	48	2368000	2368048	480000	1	4500	N/A	0.0	0.0	0.0	7	221	0
Bigwood Warratah Proc	11840000	14400	828800	0.31	220.00	48	2368000	2368048	480000	1	4500	N/A	0.0	0.0	0.0	7	221	0
Warratah 618 F/D	9400000	12000	658000	23.40	82.00	48	1380000	1380048	435000	1	4500	83	33415	2.4	7	221	3713	
Warratah 618 F/D/C	9400000	12000	658000	23.40	82.00	48	1380000	1380048	435000	1	4500	48	20570	1.9	7	221	2839	
Timberjack 1810 forwarder	14997876	14400	1048851	27.30	180.00	48	2999575	2999623	540000	8	8000	N/A	0.0	0.0	0.0	7	221	0
Beet tractor/trailer	2040000	8000	142800	18.60	100.00	48	405000	408048	13125	8	2250	28	8497	1.0	7	221	1547	
Instrak truck	4640000	800000	324800	0.85	3.08	3000	826000	831000	4800	18	37500	32	13623	2.0	800	221	221000	
JD Excavator and loader	4000000	12000	280000	12.88	256.00	48	600000	600048	435000	1	5250	175	84145	1.4	7	221	2166	
Timco skidder skidder	7200000	8000	504000	28.80	140.00	48	1440000	1440048	3198	8	7500	123	27023	1.0	7	221	1547	
Peterson Pacific DDC	26816732	8000	1877171	104.00	480.00	48	5363348	5363394	N/A	0	N/A	343	106104	1.4	7	221	2186	
Chip Truck	8000000	560000	420000	0.88	3.08	3000	1200000	1203000	10633	18	37500	0	32	13823	2.0	500	221	221000

Labour cost input data: current figures

	R/day	Days/yr	Total/yr
Supervisor	140	221	30940
Chainsaw operator	84	221	18664
Harvester operator	300	221	66300
Machine operator	255	221	56355
Truck driver 6 X 4	256	221	56356
Truck driver EC1	300	221	66300
Tallyman	70	221	15470
Dispatcher	70	221	15470
Labourer	40	221	8840
Diesel price	8		
Patrol Price	10		

Labour productivity figures

	T/day	T/year
Manual stacking pine pulpwood	11	2387
Manual loading pine pulpwood	12	2587
Debar/stack Eucalyptus pulpwood	4	886
Load Eucalyptus pulpwood	12	2387

Scenario Inputs

	Labour Int.
Diesel price	2.50
Patrol Price	2.50
Oil as a % of fuel	0.05
Supervisor	0.70
Chainsaw operator	0.70
Harvester operator	1.50
Machine operator	1.50
Truck driver 6 X 4	1.50
Truck driver EC1	1.50
Tallyman	0.70
Dispatcher	0.70
Labourer	0.50
Purchase price	4.00
Useful life (mhrs)	0.80
Resale value	0.07
Fuel cons (l/mhr)	1.30
R & M (R/mhr)	4.00
License (R/yr)	2.00
Insurance (R/yr)	0.20
Tyre/track cost per tyre	3.00
Tyre/track life (hrs/km)	0.75
Pine 1m3 (m ³ /shft)	0.70
Pine 0.25m3 (m ³ /shft)	0.70
Eucalyptus (m ³ /shft)	0.70
Manual stacking pine pulpwood	0.90
Manual loading pine pulpwood	0.90
Debar/stack Eucalyptus pulpwood	0.90
Load Eucalyptus pulpwood	0.90
mhrs/shft or km/shft	1.00
Days/yr	1.00
Tax rate	20.00
Hurdle rate	0.11

System Description: 1. Eucalyptus rawwood: System 1

1: CASH FLOWS: Input Data

1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life yrs	Annual vol. cu.m	Number of Tyres/tracks	Type life Mths/yr	Cost/tyre Rands	Type cycle YRS	Cost/cycle Rands
1	Chainsaw	14000	8	112000	880	89008	0	0	0	0	0
2	Tract/Trail	204000	16	3264000	8000	103958	128	2250	13125	1	1680000
3	Loader	378000	2	756000	8000	99527	2	4500	433354	1	870708
4	Interlink	464000	7	3248000	800000	97461	128	37500	4800	0	804800
5											
6											
7											
8											
9											
Total		10474000	25	72680000			258	44250	453279		116039424

1.3: Operating cost

Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lic R/Year	shill length mhrs/km	# of shifts	Workdays	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Chainsaw	22.23	19.24	2800	9.0	1.0	221	1105	8	388995
2	Tract/Trail	133.09	102.30	408048	7.0	1.0	221	1547	16	12298153
3	Loader	108.24	296.00	756048	7.0	2.0	221	3094	2	3766041
4	Interlink	7.21	3.08	831000	500.0	2.0	221	221000	7	22433938
5										
6										
7										
8										
9										
Total			379	2085094						38887124

1.4: Labour cost

Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Percent	Supervision R/Year	Total cost R/Year
1 Chainsaw	18584	8	8840	142	0	123760	1520616
2 Tract/Trail	56355	16	8540	41	0		1266378
3 Loader	56355	4	0	0	0		225420
4 Interlink	66300	14	0	0	0		928200
5							
6							
7							
8							
9							
Total	197574		17680	184	0	123760	3951513

2: Cash outflows per year, based on input data

Year	Ownership Cost Chainsaw	Ownership Cost Tract/Trail	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	112000	3264000	756000	3248000	0	0	0	0	0	72792000
1	112000						3628800	38887124	3951513	46579436
2	112000						6179508	38887124	3951513	49130144
3	112000		756000				6179508	38887124	3951513	56690144
4	112000						3628800	38887124	3951513	46579436
5	112000						6179508	38887124	3951513	49130144
6	112000						3024000	38887124	3951513	45974636
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
1	Chainsaw	1	7840	99008	0	0	0	0
2	Tract/Trail	5	2284500	103958	1	7840	0	7840
3	Loader	3	529200	99527	2	7840	0	7840
4	Interlink	4	2273600	97461	3	537040	0	537040
5					4	7840	0	7840
6					5	7840	0	7840
7					6	5095440	0	5095440
8					7	0	0	0
9					8	0	0	0
			6089440	103958	9	0	0	0
					10	0	0	0
					11	0	0	0
					12	0	0	0
					13	0	0	0
					14	0	0	0
					15	0	0	0
					16	0	0	0
					17	0	0	0
					18	0	0	0
					19	0	0	0
					20	0	0	0

1.5: Project life span

Years:

YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	72792000	0	-72792000	-72792000	0	0	-72792000	0.1	-72792000		-72792000	
1	46579436	7840	-46571596	-119363596	-82911596	0	-46571596	0.901	-41956303	#REF!	-41956303	#NUM!
2	49130144	7840	-49122304	-168485900	-70526304	0	-49122304	0.812	-39688764	#REF!	-39688764	#NUM!
3	56690144	537040	-56153104	-224639005	-70889104	0	-56153104	0.721	-41058666	#REF!	-41058666	#NUM!
4	46579436	7840	-46571596	-271210601	-46571596	0	-46571596	0.659	-30678153	#REF!	-30678153	#NUM!
5	49130144	7840	-49122304	-320332905	-49122304	0	-49122304	0.583	-29151697	#REF!	-29151697	#NUM!
6	45974636	5095440	-40879196	-381212102	-40879196	0	-40879196	0.535	-21855668	#REF!	-21855668	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20											-277361360	#NUM!

2. Eucalyptus pulpwood: System 2

1. CASH OUTFLOWS: Input Data											
1.1 Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths	Annual vol cuts m	Number of Tyres/tracks	Tyre life Mths	Cost/tyre Rands	Tyre cycle VSEES	Cost/cycle Rands
1	Chainsaw	14000	8	112000	850	89008	0	0	0	0	0
2	Forwarder	8145236	3	24435708	18000	101304	18	9000	54000	3	872000
3	Loader	2780000	2	5560000	8000	89627	2	4500	43534	1	870708
4	Rigid drawbar	3620000	7	25340000	70000	97481	126	37500	4200	0	528200
5											
6											
7											
8											
9											
Total		15859236	12	59435708			146	51000	493554		7205884

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/lt	BLM R/lt	Oil & Lc R/lt	Oil & Lc mths	# of shifts	Workdays Days/year	Total hrs M/hr	# machines		
1	Chainsaw	299.4	212.0	2800	7.0	1.0	221	1547	8		
2	Forwarder	100.4	140.0	1829095	7.0	1.7	221	2630	3		
3	Loader	108.2	256.0	756048	7.0	2.0	221	3094	2		
4	Rigid drawbar	8.9	0.7	787000	500.0	2.0	221	221000	7		
5											
6											
7											
8											
9											
Total		608.7	3172143								

1.4: Labour cost											
Machine Description	Operator R/year	Operator Number	Assessments R/year	Assessments Number	Overheads Percent	Supervision R/year	Total cost R/year				
1 Chainsaw	56355	8	8840	142	0	123760	1708084				
2 Forwarder	56355	6	0	0	0	0	338130				
3 Loader	56355	4	0	0	0	0	225420				
4 Rigid drawbar	66300	14	0	0	0	0	528200				
5	0						0				
6	0						0				
7	0						0				
8	0						0				
9	0						0				
Total	235365		8840	142	0	123760	3199834				

2: Cash outflows per year, based on input data											
Year	Ownership Cost	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid drawbar	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R	
0	112000	24435708	7560000	27440000	0	0	0	0	0	5947708	
1	112000						3175200	34131829	3199834	40618863	
2	112000						4045908	34131829	3199834	41489571	
3	112000		7560000				5017908	34131829	3199834	50021571	
4	112000						3175200	34131829	3199834	40618863	
5	112000						4045908	34131829	3199834	41489571	
6							2649000	34131829	3199834	38977863	
7										0	
8										0	
9										0	
10										0	
11										0	
12										0	
13										0	
14										0	
15										0	
16										0	
17										0	
18										0	
19										0	
20										0	

2. CASH INFLOWS											
Item	Machine Description	Machine Life Years	Rands	Volume m ³ /year	Price R/m ³	YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R		
1	Chainsaw	1	7840	99008	0	0	0	0	0		
2	Forwarder	6	1710500	101304	0	1	7840	0	7840		
3	Loader	3	529200	99627	0	2	7840	0	7840		
4	Rigid drawbar	3	1920800	97461	0	3	537040	0	537040		
5					0	4	7840	0	7840		
6					0	5	7840	0	7840		
7					0	6	4168340	0	4168340		
8					0	7			0		
9					0	8			0		
10					0	9			0		
11					0	10			0		
12					0	11			0		
13					0	12			0		
14					0	13			0		
15					0	14			0		
16					0	15			0		
17					0	16			0		
18					0	17			0		
19					0	18			0		
20					0	19			0		

3. Net cashflow											
YEAR	CUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	5947708	0	-5947708	-5947708	0	0	-5947708	1	-5947708	-5947708	#NUM!
1	40618863	7840	-40611023	-100158731	-70328877	0	-40611023	0.901	-36586507	-36586507	#NUM!
2	41489571	7840	-41481731	-141804462	-80324443	0	-41481731	0.812	-33667503	-33667503	#NUM!
3	50021571	537040	-49484531	-191124993	-61371673	0	-49484531	0.731	-36182563	-36182563	#NUM!
4	40618863	7840	-40611023	-231736016	-40611023	0	-40611023	0.659	-26751739	-26751739	#NUM!
5	41489571	7840	-41481731	-273217747	-41481731	0	-41481731	0.593	-24617388	-24617388	#NUM!
6	38977863	4168340	-35809323	-308027071	-35809323	0	-35809323	0.535	-19145127	-19145127	#NUM!
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
										-23649635	#NUM!

System Description:

3. Eucalyptus pulwood, System 3

1. CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price R/mtr	Number of Machines	Tot. Price R/mtr	Machine life Mths/Yrs	Annual unit cost R	Number of Tyres/tracks	Type life Mths/Yrs	Cost/tyre R/mtr	Type cycle YRS/yr	Cost/cycle R/mtr
1	Harvester	11840000	3	35520000	12000	100248	3	4500	435000	1	1305000
2	Clambunk	7200000	4	28800000	8000	106290	24	7500	318	5	7675
3	Loader/Slash	4000000	2	8000000	12000	106290	2	5350	435000	2	870000
4	Rigid/Draw	3920000	7	27440000	70000	97461	126	37800	4200	0	528200
5											
6											
Total		26960000	13	64240000			155	54750	877398		13596680

1.3: Operating cost									
Item	Machine Description	Fuel & oil R/mtr	R/M	hrs & ltr	shift length	# of shifts	Days/year	Total hrs	Total cost R/year
1	Harvester	189.6	92.0	1890048	7.0	2.4	221	3713	3898450
2	Clambunk	244.0	140.0	1442048	7.0	1.0	221	1547	4059173
3	Loader/Slash	108.2	256.0	800048	7.0	1.4	221	2166	3177857
4	Rigid/Draw	6.9	0.7	787000	500.0	2.0	221	221000	17229362
5									
6									
7									
8									
9									
Total			488	3027086					33363842

1.4: Labour cost								Total cost R/year
Machine Description	Operator	Operator Number	Assistants	Assistants Number	Overheads	Supervision		
1	Harvester	56355	8	0	0	0	61800	338130
2	Clambunk	56355	8	0	0	0		450840
3	Loader/Slash	56355	7	0	0	0		112710
4	Rigid/Draw	66300	14	0	0	0		928200
5								0
6								0
7								0
8								0
9								0
Total		235385		0	0	0	61800	1829880

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Clambunk	Ownership Cost Loader/Slash	Ownership Cost Rigid/Draw	Ownership Cost 0	Ownership Cost 0	Type Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	35520000	28800000	8000000	27440000	0	0	0	0	0	99760000
1							4480200	33363842	1829880	39673922
2							5350200	33363842	1829880	40543922
3	35520000						4480200	33363842	1829880	75193922
4							3175200	33363842	1829880	38366822
5							5428952	33363842	1829880	40620674
6							2646000	33363842	1829880	37839722
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value R/mtr	Price R/m ²
1	Harvester	3	1512000	100246
2	Clambunk	5	1670333	106290
3	Loader/Slash	5	1657600	106290
4	Rigid/Draw	3	1920800	97461
5				0
6				0
7				0
8				0
9				0
			8760733	106290

YEAR	Resale value R	Annual income R	TOTAL INFLOWS R
0	0	292383	292383
1	0	292383	292383
2	0	292383	292383
3	0	292383	292383
4	0	292383	292383
5	6760733	292383	7053116
6			0
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

Tax rate			NET FLOW	CUM. FLOW	TAXABLE INCOME	TAX	NET FLOW	NPV FACTOR	NPV after tax	IRR after tax	NPV before tax	IRR before tax
20	OUT FLOWS R	IN-FLOWS R	R	R	R	R	R		R	%	R	%
0	99760000	292383	-99467617	-99467617	0	0	-99467617	0.1	-99467617	#REF!	-99467617	#NUM!
1	39673922	292383	-39381539	-138846156	-71501539	0	-38381539	0.901	-35478864	#REF!	-35478864	#NUM!
2	40543922	292383	-40251539	-179100694	-59523539	0	-40251539	0.812	-32699052	#REF!	-32699052	#NUM!
3	75193922	292383	-74901535	-254002220	-87749535	0	-74901535	0.731	-54767357	#REF!	-54767357	#NUM!
4	38366822	292383	-38074439	-292076659	-30076539	0	-30076539	0.659	-25062196	#REF!	-25062196	#NUM!
5	40620674	292383	-40328291	-332407056	-40328291	0	-40328291	0.593	-23032878	#REF!	-23032878	#NUM!
6	37839722	7053116	-30786605	-363193661	-30786605	0	-30786605	0.535	-16459776	#REF!	-16459776	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20											-28785773	#NUM!

4. System Description: Eucalyptus pulpwood System 4

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/Yrs	Annual vol. cub m	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle years	Cost/cycle Rands
1	Feller buncher	720000	1	720000	8000	104229	1	4900	60000	1	60000
2	Grapple skidder	5965476	2	11930952	8000	112700	8	1875	94000	1	432000
3	Peterson DDCL	26816732	1	26816732	8000	106124	0	N/A	N/A	0	0
4	Chip truck trailer	6000000	8	48000000	80000	111384	144	37800	10833	0	1589952
5											
6											
7											
8		0									
9		0									
		0									
Total		45982206	11	86747684			153	43875	664833		101719449

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mv	RM R/mhr	Ins & lic R/Year	shift length m/hr	# of shifts	Workdays Days/year	Total hrs Mths/Yr	# machines	Total cost R/Year
1	Feller buncher	389.2	214.5	1440048	7.0	2.2	221	3403	1	3491250
2	Grapple skidder	196.6	260.0	1183143	7.0	1.0	230	1610	2	1931449
3	Peterson DDCL	106.2	296.0	800048	7.0	1.4	221	2186	1	1588229
4	Chip truck trailer	7.5	3.1	1203000	800.0	2.0	221	221000	8	28403053
5										
6										
7										
8										
9										
Total			733.6	3196191						35414660

1.4: Labour cost							
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year
1 Feller buncher	66300	3	0	0	0	30940	229840
2 Grapple skidder	56355	2	15470	0			112710
3 Peterson DDCL	56355	2	15470	4			174590
4 Chip truck trailer	66300	16	0	0			1060800
5							0
6							0
7							0
8							0
9							0
Total	245310		30940	4	0	30940	1577940

2: Cash outflows per year, based on Input data

Year	Ownership Cost Feller buncher	Ownership Cost Grapple skidder	Ownership Cost Peterson DDCL	Ownership Cost Chip truck trailer	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
0	720000	11930952	26816732	48000000	0	0	0	0	83947684
1						10391712	35414660	1577940	47384312
2						10391712	35414660	1577940	54584312
3						10391712	35414660	1577940	47384312
4	720000		26816732			8359712	35414660	1577940	80369044
5						10391712	35414660	1577940	47384312
6						7799760	35414660	1577940	44792360
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2: CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Feller buncher	2	504000	104229
2	Grapple skidder	5	835167	112700
3	Peterson DDCL	4	1877171	106124
4	Chip truck trailer	3	3360000	111384
5				
6				
7				
8				
9				
			6676338	112700

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		1915900	1915900
1		1915900	1915900
2	504000	1915900	2419900
3		1915900	1915900
4	2381171	1915900	4297071
5		1915900	1915900
6	6576338	1915900	8492238
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span
Years: 6

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	83947684	1915900	-82031784	-82031784	0	0	-82031784	1	-82031784		-82031784	
1	47384312	1915900	-45468412	-13750196	-86842254	0	-45468412	0.901	-40962534	#REF!	-40962534	#NUM!
2	54584312	2419900	-52164412	-18966608	-78188717	0	-52164412	0.812	-42337807	#REF!	-42337807	#NUM!
3	47384312	1915900	-45468412	-235133021	-62817949	0	-45468412	0.731	-33246111	#REF!	-33246111	#NUM!
4	80369044	4297071	-76071973	-31204994	-76071973	0	-76071973	0.659	-50110965	#REF!	-50110965	#NUM!
5	47384312	1915900	-45468412	-35873408	-45468412	0	-45468412	0.593	-26983290	#REF!	-26983290	#NUM!
6	44792360	8492238	-36300122	-392973528	-36300122	0	-36300122	0.535	-19407528	#REF!	-19407528	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												

1. System Description: Eucalyptus pulpwood System 5

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs	Annual vol cub m	Number of Tyres/tracks	Tyre life Mths/hr	Cost/tyre Rands	Tyre cycle YRS/5	Cost/cycle Rands
1	Harvester	840000	5	4200000	12000	102876	5	4900	495000	2	2175000
2	Forwarder	8143236	3	24429708	18000	101304	18	8000	54000	3	873000
3	Loader	3780000	3	11340000	9000	99627	2	4900	493384	1	870708
4	Rigid/Drawbar	3600000	7	25200000	70000	97461	126	37500	4200	0	526000
5											
6											
7											
8											
9											
Total		25245236	12	59435708			151	55500	928554		140211604

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mtr	RAM R/mtr	tye & sc R/year	split weight mtr	# of shafts	Workdays Days/year	Total hrs Mths/yr	# machines	Total cost R/year	
1	Harvester	189.8	82.0	1880048	7.0	1.8	221	2939	5	13686199	
2	Forwarder	100.4	140.0	1629095	7.0	1.7	221	2630	3	6784359	
3	Loader	108.2	258.0	756048	7.0	2.0	221	3094	2	3766041	
4	Rigid/Drawbar	6.8	0.7	787000	500.0	2.0	221	221000	7	17229362	
5											
6											
7											
8											
9											
Total		415	489	3172143					22963	41465961	

1.4: Labour cost								
Item	Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overhead Percent	Supervision R/year	Total cost R/year
1	Harvester	66300	10	0	0	0	30940	693940
2	Forwarder	56355	6	0	0	0		338130
3	Loader	56355	4	0	0	0		225420
4	Rigid/Drawbar	56355	14	0	0	0		788970
5								0
6								0
7								0
8								0
9								0
Total		235365	0	0	0	0	30940	2046460

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/Drawbar	Ownership Cost 0	Ownership Cost 0	Tyre Cost R	Operating Cost R	Labour Cost R	Total Outflow R
0	47000000	24435708	7560000	27440000	0	0	0	0	0	108435708
1							3175200	41465961	2046460	49597621
2							6220908	41465961	2046460	49733329
3			7560000				4147200	41465961	2046460	47659621
4							6220908	41465961	2046460	57293329
5							6220908	41465961	2046460	49733329
6							2646000	41465961	2046460	46158421
7										0
8										0
9										0
10										0
11										0
12										0
13										0
14										0
15										0
16										0
17										0
18										0
19										0
20										0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Rands	Resale value m ³ /year	Price R/m ³
1	Harvester	4	1645000	102876	3
2	Forwarder	6	1710500	101304	
3	Loader	3	529200	99627	
4	Rigid/Drawbar	3	1929800	97461	
5					
6					
7					
8					
9					

1.5: Project life span
Years: 6

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		308627	308627
2		308627	308627
3		308627	308627
4		308627	308627
5		308627	308627
6	8805500	308627	6114128
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM. FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	108435708	0	-108435708	-108435708	0	0	-108435708	1	-108435708	#REF!	-108435708	#NUM!
1	49597621	308627	-49388994	-153814702	-78698948	0	-49388994	0.901	-41762876	#REF!	-41762876	#NUM!
2	49733329	308627	-49424702	-202239404	-67255416	0	-49424702	0.812	-40114197	#REF!	-40114197	#NUM!
3	47659621	308627	-47350994	-249690398	-69238138	0	-47350994	0.731	-34622639	#REF!	-34622639	#NUM!
4	57293329	308627	-56984702	-306675101	-56984702	0	-56984702	0.659	-37537588	#REF!	-37537588	#NUM!
5	49733329	308627	-49424702	-355999803	-49424702	0	-49424702	0.593	-29331155	#REF!	-29331155	#NUM!
6	46158421	6114128	-40044295	-396044098	-40044295	0	-40044295	0.535	-21409315	#REF!	-21409315	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-31123480	#NUM!

Mechanised Eucalyptus pulpwood

Machine name	Purchase price	Useful life (mhrs)	Resale value	Financial inputs							Eucalyptus (R,25m²)			Time worked				
				Fuel cons (lit/hr)	R & M (R/mh or R/km)	Licence (R/yr)	Insurance (R/yr)	LAI (Total)	Tyre/track cost per tyre	# of tyres	Tyre/track life (hrs/tyre)	LF	(m³/ha/yr)	m³/year	no of shifts	mhrs/shift	Days/yr	mhrs/yr
Chainsaw (set & delim)	2000	1265	700	1.48	5.28	0	280	280	N/A	0	N/A	2	84	16864	1.0	5	221	1105
Chainsaw operator	3000	1265	700	1.48	5.28	0	280	280	N/A	0	N/A	5	83	0	0.0	5	221	0
112kW Cable skidder	891451	11500	223963	13.12	49.50	19	89145	89194	17800	4	29710	4	N/A	0.0	0.0	7	221	0
130kW Hydraulic skidder	1193298	11500	238374	14.76	71.50	19	119310	119329	19800	4	2730	5	263	52070	1.1	7	221	1771
T1010 forwarder	1629017	18000	407382	7.14	28.50	19	162909	162924	18800	8	13000	5	136	88611	1.9	7	221	2638
Timber loader buncher disc	1440000	11500	360000	28.70	58.99	19	144000	144019	220000	1	6600	3	322	170507	2.4	7	221	3713
Timber loader buncher c&b	1440000	11500	360000	22.14	58.30	19	144000	144019	220000	1	6600	4	N/A	0.0	0.0	7	221	0
Cato excavator HD #20	756000	11500	189000	8.00	70.40	19	75600	75619	159600	1	6600	3	169	85229	2.3	7	221	3558
Bel 220 A loader	220000	11500	55000	6.86	22.00	19	22000	22019	3740	3	1890	156	34506	1.0	6	221	1326	
Bel AOT timber truck	804000	17250	220000	11.48	49.50	19	80400	80419	12600	8	3850	0	0.0	0.0	0.0	7	221	0
6 x 4 truck	400000	517500	100000	0.41	0.66	960	40000	40960	1540	10	27800	0	N/A	0.0	0.0	320	321	0
6 x 4 truck with trailer	784000	500000	186000	0.51	0.70	1200	78400	79600	1540	10	55000	47	20885	2.0	500	221	221000	
Front end loader	860000	11500	220000	14.76	48.50	19	86000	86019	13750	4	4400	441	0	0.0	0.0	7	221	0
Stinger steer truck	780000	862500	180000	80.84	0.77	1200	78000	77200	1790	18	55000	85	0	0.0	0.0	7	221	0
Bigwood Waratah F/D/C	2368000	20700	592000	0.20	60.50	19	236800	236819	176000	1	6600	N/A	N/A	0.0	0.0	7	221	0
Bigwood Waratah Proc	2368000	20700	592000	19.88	60.50	19	236800	236819	176000	1	6600	N/A	N/A	0.0	0.0	7	221	0
Waratah 616 F/D	1860000	17250	470000	14.76	25.30	19	186000	186019	159000	1	6600	117	56583	2.2	7	221	3326	
Waratah 616 F/D/C	1860000	17250	470000	14.76	25.30	19	186000	186019	159000	1	6600	91	42333	2.1	7	221	3248	
Timbjack 1810 forwarder	2899575	20700	748994	17.22	48.50	19	289958	289977	19800	8	13200	N/A	N/A	0.0	0.0	7	221	0
Bel tractor/trailer	408000	11500	102000	9.84	27.50	19	40800	40819	4813	8	3300	44	9746	1.0	7	221	1547	
Intertec truck	828000	118000	223000	0.53	0.85	1300	82800	84000	1760	18	85000	47	20885	2.0	600	221	221000	
Excavator and skidder	800000	17250	200000	8.00	70.40	19	80000	80019	159000	1	7700	263	87019	1.5	7	221	2321	
Timber skidder skidder	1440000	11500	360000	18.04	28.50	19	144000	144019	1173	8	11000	394	62913	1.5	7	221	2321	
Puritan Pacific DDC1	5363346	11500	1340837	65.60	132.00	19	536335	536354	N/A	0	N/A	515	170597	1.5	7	221	2321	
Chip Truck	1300000	805000	300000	0.56	0.85	1200	1300000	121200	3972	18	65000	0	47	20885	2.0	500	221	221000

Labour cost input data: current figures

	Rate	Days/yr	Total/year
Supervisor	1000	221	221000
Chainsaw operator	600	221	132600
Harvester operator	2000	221	442000
Machine operator	1360	221	300560
Truck driver 6 X 4	1020	221	225420
Truck driver EC1	1200	221	265200
Tallyman	650	221	143650
Chockman	650	221	143650
Labourer	480	221	106080
Diesel price	6		
Patrol Price	6		

Labour productivity figures

	Time/day	Year
Manual stacking pine pulpwood	11	1823
Manual loading pine pulpwood	12	1988
Debar/stack Eucalyptus pulpwood	4	880
Load Eucalyptus pulpwood	12	1988

Scenario inputs

	Mechanised
Diesel price	1.70
Patrol Price	1.70
Oil as a % of fuel	0.05
Supervisor	5.00
Chainsaw operator	3.00
Harvester operator	10.00
Machine operator	8.00
Truck driver 6 X 4	6.00
Truck driver EC1	6.00
Tallyman	6.50
Chockman	6.50
Labourer	6.00
Purchase price	0.80
Useful life (mhrs)	1.15
Resale value	0.25
Fuel cons (lit/hr)	0.82
R & M (R/mhr)	1.10
Licence (R/yr)	0.80
Insurance (R/yr)	0.10
Tyre/track cost per tyre	1.10
Tyre/track life (hrs/tyre)	1.10
Pine m3 (m³/ha/yr)	1.05
Pine 0.2m3 (m³/ha/yr)	1.05
Eucalyptus (m³/ha/yr)	1.05
Manual stacking pine pulpwood	0.75
Manual loading pine pulpwood	0.75
Debar/stack Eucalyptus pulpwood	0.75
Load Eucalyptus pulpwood	0.75
mhrs/shift or km/shift	1.00
Days/yr	1.00
Waratah 616 F/D	1.30
Waratah 616 F/D/C	1.30
Tax rate	30.00
Hurdle rate	0.05

System Description:

1. Fuelvalve pulwood, System 1

1. CASH OUTFLOWS: Input Data											
1.1: Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/hrs Annual vol	Number of Tyres/tracks	Tyre life Mths/hrs	Cost/tyre Rands	Tyre cycle YEAR	Cost/cycle Rands	
1	Chainsaw	2500	8	20000	126 187076	0	0	0	0	0	0
2	Tract/Trail	49000	18	702000	11900 175430	144	3300	4813	2	962000	
3	Loader	756000	2	1512000	11900 171856	2	8600	199630	2	319260	
4	Interlink	928000	8	7424000	1190000 167076	144	56000	1780	0	253440	
5											
6											
7											
8											
9											
Total		2094800	28	16280000		290	64900	166202		49196667	
1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	R&M R/mhr	Ins & mc R/Year	shft length mhrs/km	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year	
1	Chainsaw	10.01	5.29	280	5.0	1.0	221	1105	8	154705	
2	Tract/Trail	57.08	27.50	40819	7.0	1.0	221	1547	18	3090080	
3	Loader	46.43	70.40	75819	7.0	2.3	221	3558	2	982614	
4	Interlink	3.09	0.85	94000	500.0	2.0	221	221000	8	7716269	
5											
6											
7											
8											
9											
Total			104	210438						11943668	
1.4: Labour cost											
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year				
1 Chainsaw	132600	8	106080	288	0	864000	3262840				
2 Tract/Trail	225420	19	106080	84			13193700				
3 Loader	300560	4	0	0			1202240				
4 Interlink	265200	16	0	0			4243200				
5											
6											
7											
8											
9											
Total	923780		212160	372	0	864000	51267580				
2: Cash outflows per year, based on input data											
Year	Ownership Cost	Ownership Cost Tract/Trail	Ownership Cost Loader	Ownership Cost Interlink	Ownership Cost 0	Ownership Cost 0	Tyre Cost	Operating Cost	Labour Cost	Total Outflow	
0	25000	7344000	1512000	7424000	0	0	0	0	0	16305200	
1	25000						1013760	11943668	51267580	64250208	
2	25000						2026020	11943668	51267580	65262468	
3	25000		1512000				1013760	11943668	51267580	65762208	
4	25000						2026020	11943668	51267580	65262468	
5	25000						1013760	11943668	51267580	64250208	
6	25000						760320	11943668	51267580	63996768	
7										0	
8										0	
9										0	
10										0	
11										0	
12										0	
13										0	
14										0	
15										0	
16										0	
17										0	
18										0	
19										0	
20										0	
2. CASH INFLOWS											
Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ²							
1	Chainsaw	1	6300	167076	0						
2	Tract/Trail	7	1836000	175430							
3	Loader	3	378000	171856							
4	Interlink	5	1856000	167076							
5											
6											
7											
8											
9											
			4076300	175430							
1.5: Project life span											
Years	8										
YEAR	OUT FLOWS R	IN- FLOWS R	NET FLOW R	DIS- FLOW R	TAXABLE INCOME R	TAX R	NET- FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R
0	16305200	0	-16305200	-16305200	0	0	-16305200	1	-16305200		-16305200
1	64250208	6300	-64243908	-30549108	-23339008	0	-64243908	0.952	-61184675	#REF!	-61184675
2	65762208	6300	-65256168	-145805278	-70140168	0	-65256168	0.907	-59189288	#REF!	-59189288
3	65762208	384300	-65377908	-211183165	-68633908	0	-65377908	0.864	-56475895	#REF!	-56475895
4	65262468	6300	-65256168	-276436353	-65256168	0	-65256168	0.823	-53686411	#REF!	-53686411
5	64250208	6300	-64243908	-340683281	-64243908	0	-64243908	0.784	-50336783	#REF!	-50336783
6	63996768	4076300	-59920468	-400603730	-59920468	0	-59920468	0.746	-44713576	#REF!	-44713576
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
											-341891803
											-334

2. Eucalyptus pulpwood System 2

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life yrs	Annual vol. cut m	Number of Tyres/tracks	Tyre life mths	Cost/tyre Rands	Tyre cycle year	Cost/cycle Rands
1	Chainsaw	2600	8	22200	1200	167076	0	0	0	0	0
2	Forwarder	1636047	3	487142	19000	169833	18	13000	19600	4	366400
3	Loader	756000	2	1512000	11500	171856	2	6800	159630	2	319200
4	Rigid drawbar	784000	8	6272000	8000000	167076	144	65000	1540	0	221760
5											
6											
7											
8											
9											
Total		3171847	13	12671142			164	74800	180970		28676047

1.3: Operating cost

Item	Machine Description	Fuel & oil R/year	RAM R/mth	Ins & lic R/year	shft length mths	# of shifts	Workdays Days/year	Total hrs Mthx/yr	# machines
1	Chainsaw	10.01	58.30	280	7.0	1.0	221	1547	8
2	Forwarder	41.43	38.80	162294	7.0	1.8	221	2939	3
3	Loader	46.43	70.40	75619	7.0	2.3	221	3558	2
4	Rigid drawbar	2.98	0.70	784000	800.0	2.0	221	221000	8
5									
6									
7									
8									
9									
Total				966				318143	

1.4: Labour cost

Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overseer/Supervisor R/year	Overseer/Supervisor Number	Total cost R/year
1 Chainsaw	300560	8	106080	0	288	0	884000
2 Forwarder	300560	6	0	0	0	0	1803360
3 Loader	300560	4	0	0	0	0	1202240
4 Rigid drawbar	255200	18	0	0	0	0	4243200
5	0						
6	0						
7	0						
8							0
9							0
Total	1166880		106080	288	0	884000	40504880

2: Cash outflows per year, based on input data

Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow
Year	Chainsaw	Forwarder	Loader	Rigid drawbar	0	0	R	R	R
0	25200	4887142	1512000	6272000	0	0	0	0	12696342
1	25200						887040	10218717	51635837
2	25200						1206300	10218717	51955097
3	25200		1512000				887040	10218717	53147837
4	25200						1206300	10218717	51955097
5	25200						1243440	10218717	51992237
6							665280	10218717	51368877
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Volume m ³ /year	Price R/m ³
1	Chainsaw	1	6300	167076
2	Forwarder	5	1221785	169833
3	Loader	3	373650	171856
4	Rigid drawbar	23	1568500	167076
5				
6				
7				
8				
9				
Total		8	3174085	171856

1.5: Project life span

Years: 6

YEAR	Resale value R	Annual income R	TOTAL INFLOWS R
0	0	0	0
1	6300	0	6300
2	6300	0	6300
3	384300	0	384300
4	6300	0	6300
5	6300	0	6300
6	3174085	0	3174085
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

3. Net cashflow

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	NPV before tax R	IRR before tax %
0	12696342	0	-12696342	-12696342	0	0	-12696342	1	-12696342	-12696342	
1	51635837	6300	-51629537	-64325879	-57965108	0	-51629537	0.982	-49170988	-49170988	
2	51955097	6300	-51948797	-116274676	-55780139	0	-51948797	0.907	-47119090	-47119090	
3	53147837	384300	-52763537	-169038213	-55287786	0	-52763537	0.864	-45579127	-45579127	
4	51955097	6300	-51948797	-220987010	-51948797	0	-51948797	0.823	-42738404	-42738404	
5	51992237	6300	-51985937	-272978947	-51985937	0	-51985937	0.784	-40732342	-40732342	
6	51368877	3174085	-48214792	-321167739	-48214792	0	-48214792	0.746	-35978620	-35978620	
7	0	0	0								
8	0	0	0								
9	0	0	0								
10	0	0	0								
11	0	0	0								
12	0	0	0								
13	0	0	0								
14	0	0	0								
15	0	0	0								
16	0	0	0								
17	0	0	0								
18	0	0	0								
19	0	0	0								
20	0	0	0								
Total									-274014813		

System Description:

3. Eucalyptus mulchwood: System 3

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs								1.2: Tyres/tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Total price Rands	Machine life Mths/Yrs	Annual unit cost R	Number of Tyres/tracks	Tyre life Mths/Yrs	Cost/tyre Rands	Tyre cycle YEARS	Cost/cycle Rands	
1	Harvester	710000	3	2130000	17250	152778	3	5900	189500	2	478500	
2	Clambunk	1440000	3	4320000	11500	182739	18	11000	1173	6	21107	
3	Loader/slasher	800000	2	1600000	17250	174038	2	7700	159500	3	319000	
4	Rigid/drawb	784000	8	6272000	5000000	167076	144	59000	1540	0	221760	
5												
6												
Total		5392000	13	12192000			167	80300	321713		5378604	

1.3: Operating cost											
Item	Machine Description	Fuel & oil R/mhr	RAM R/mhr	Ins & lic R/Year	shft length m/hr	# of shifts	Workdays Days/Year	Total hrs Mhrs/Yr	# machines	Total cost R/Year	
1	Harvester	85.03	25.30	188019	7.0	2.2	221	3326	3	1670998	
2	Clambunk	104.85	38.50	144019	7.0	1.5	221	2321	3	952419	
3	Loader/slasher	48.43	76.40	80019	7.0	1.5	221	2321	2	702240	
4	Rigid/drawb	2.95	0.70	79800	900.0	2.0	221	221000	8	7088861	
5											
6											
7											
8											
9											
Total				303638						10414417	

1.4: Labour cost								
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overheads Percent	Supervision R/Year	Total cost R/Year	
1 Harvester	300560	6	0	0	0	442000	1803360	
2 Clambunk	300560	6	0	0	0		1803360	
3 Loader/slasher	300560	4	0	0	0		1202240	
4 Rigid/drawb	265200	18	0	0	0		4243200	
5							0	
6							0	
7							0	
8							0	
9							0	
Total	1168880		0	0	0	442000	9052160	

2: Cash outflows per year, based on Input data

Year	Harvester Ownership Cost	Clambunk Ownership Cost	Loader/slasher Ownership Cost	Rigid/drawb Ownership Cost	Tyre Ownership Cost	Operating Cost	Labour Cost	Total Outflow
0	7104000	4320000	1600000	6272000	0	0	0	19296000
1					867040	10414417	9052160	20353617
2					1365540	10414417	9052160	20632117
3					1206040	10414417	9052160	20672617
4					1365540	10414417	9052160	20632117
5					906147	10414417	9052160	20374724
6					665280	10414417	9052160	20131857
7								0
8								0
9								0
10								0
11								0
12								0
13								0
14								0
15								0
16								0
17								0
18								0
19								0
20								0

2: CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m²
1	Harvester	5	1080000	166778
2	Clambunk	6	894521	182739
3	Loader/slasher	7	1184038	174038
4	Rigid/drawb	23	1565000	167076
5				
6				
7				
8				
9				
			479621	182739

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0		493396	493396
1		493396	493396
2		493396	493396
3		493396	493396
4		493396	493396
5		493396	493396
6	479621	493396	522018
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

1.5: Project life span

Years:

YEAR	OUT FLOW	IN- FLOW	NET FLOW	CUM. FLOW	TAXABLE INCOME	TAX	NET FLOW	NPV FACTOR	NPV after tax	IRR after tax %	NPV before tax	IRR before tax %
0	19296000	493396	-18802604	-18802604	0	0	-18802604	1	-18802604	-	-18802604	-
1	20353617	493396	-19860221	-38662825	-2696221	0	-19860221	0.982	-18914466	#REF!	-18914466	#NUM!
2	20672617	493396	-20338721	-59001546	-2396321	0	-20338721	0.907	-18447820	#REF!	-18447820	#NUM!
3	20672617	493396	-20179221	-79180767	-22617821	0	-20179221	0.864	-17431570	#REF!	-17431570	#NUM!
4	20832117	493396	-20338721	-99519488	-20338721	0	-20338721	0.823	-16732716	#REF!	-16732716	#NUM!
5	20374724	493396	-19881328	-119406815	-19881328	0	-19881328	0.784	-15577541	#REF!	-15577541	#NUM!
6	20131857	5220218	-14911640	-134312485	-14911640	0	-14911640	0.746	-11127295	#REF!	-11127295	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
											-117034041	#NUM!

4. System Description: Eucalyptus pulwood, System 4

1: CASH OUTFLOWS: Input Data

1.1 Ownership Costs							1.2: Tyres/Tracks				
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Mths/yr	Annual vol. cuh m	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre Rands	Tyre cycle %REF	Cost/cycle Rands
1	Feller buncher	144000	1	144000	11500	17057	1	6600	22000		22000
2	Grapple skidder	119085	2	238170	11500	18955	8	2750	18500		158400
3	Peterson DDCL	536346	1	536346	11500	17057	0	N/A	N/A		0
4	Chip truck trailer	120000	9	1080000	805000	18761	162	55000	3972		643480
5											
6											
7											
8				0							
9				0							
Total		9196442	12	18549537			171	84350	243772		41685029

1.3: Operating cost													
Item	Machine Description	Fuel & oil R/mh	RAM R/hy	lvs & bc R/ha	shift length mh/ha	# of shifts	Workdays Days/year	Total hrs Mth/yr	# machines	Total cost R/year			
1	Feller buncher	165.50	59.99	144019	7.0	2.4	221	3713	1	981214			
2	Grapple skidder	85.63	71.90	119329	7.0	1.1	230	1771	2	397600			
3	Peterson DDCL	46.43	70.40	80019	7.0	1.5	221	2321	1	351120			
4	Chip truck trailer	3.23	0.85	121200	800.0	2.0	221	221000	9	9209454			
5													
6													
7													
8													
9													
Total		302	320548							10939388			

1.4: Labour cost								
Machine Description	Operator R/year	Operator Number	Assistants R/year	Assistants Number	Overheads Percent	Supervision R/year	Total cost R/year	
1 Feller buncher	442000	3	0	0	0	221000	1547000	
2 Grapple skidder	300560	1	143650	0			300560	
3 Peterson DDCL	300560	2	143650	4			1175720	
4 Chip truck trailer	265200	18	0	0			4773600	
5							0	
6							0	
7							0	
8							0	
9							0	
Total		1308320		287300	4	0	221000	7796880

2: Cash outflows per year, based on input data

Year	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow R
	Feller buncher	Grapple skid	Peterson DDCL	Chip truck trailer		R	R	R	
0	1440000	238190	536346	1080000	0	0	0	0	19989537
1						2573821	10939388	7796880	21310189
2						2952321	10939388	7796880	21688559
3	1440000					2573821	10939388	7796880	22750189
4						2952321	10939388	7796880	21688559
5						2573821	10939388	7796880	21310189
6						1930441	10939388	7796880	20666709
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Resale value m²/year	Price R/m²
1	Feller Buncher	3	360000	170557	0
2	Grapple skidder	6	595548	189555	0
3	Peterson DDCL	5	1340837	170557	0
4	Chip truck trailer	4	2700000	187961	0
5					
6					
7					
8					
9					
			4987384	187961	

YEAR	Resale value R	Annual income R	TOTAL INFLOWS R
0	0	0	0
1	0	0	0
2	0	0	0
3	360000	0	360000
4	0	0	0
5	0	0	0
6	4987384	0	4987384
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0

1.5: Project life span

Years	0
-------	---

YEAR	Tax rate	OUT FLOWS R	IN- FLOWS R	NET FLOW R	CUM- FLOW R	TAXABLE INCOME R	TAX R	NET- FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	0.05	19989537	0	-19989537	-19989537	0	0	-19989537	1	-19989537		-19989537	
1		21310189	0	-21310189	-41299726	-30584997	0	-21310189	0.952	-20295419	#REF!	-20295419	#NUM!
2		21688559	0	-21688559	-62988285	-27253450	0	-21688559	0.907	-19672190	#REF!	-19672190	#NUM!
3		22750189	360000	-22390189	-85378954	-26100895	0	-22390189	0.854	-19341487	#REF!	-19341487	#NUM!
4		21688559	0	-21688559	-107067093	-21688556	0	-21688559	0.823	-17843256	#REF!	-17843256	#NUM!
5		21310189	0	-21310189	-12837282	-21310189	0	-21310189	0.784	-16697091	#REF!	-16697091	#NUM!
6		20666709	4987384	-15689325	-144048607	-15689325	0	-15689325	0.746	-11692691	#REF!	-11692691	#NUM!
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
												-125531670	#NUM!

1. System Description: Eucalyptus pulpwood System 2

1: CASH OUTFLOWS: Input Data

1.1: Ownership Costs						1.2: Tyres/tracks					
Item	Machine Description	Unit price Rands	Number of Machines	Tot. price Rands	Machine life Annu. use (yrs/m)	Annual use (yrs/m)	Number of Tyres/tracks	Tyre life Mths/yr	Cost/tyre Rands	Tyre cycle YRS/R	Cost/cycle Rands
1	Harvester	188000	4	752000	1750	18833	4	6900	158500	2	638000
2	Forwarder	1629047	3	4887142	15000	16933	18	13200	18800	4	356400
3	Loader	786000	2	1572000	11500	171856	2	8600	159030	2	318060
4	Rigid/Drawbar	784000	8	6272000	500000	16708	144	55000	1840	0	221780
5											
6											
7											
8											
9											
Total		5049047	13	12671142			168	81400	340470		57198526

1.3: Operating cost										
Item	Machine Description	Fuel & oil R/mhr	R/M R/mhr	Ins & Lic R/Year	Shift length mhrs	# of shifts	Workdays Days/year	Total hrs Mhrs/yr	# machines	Total cost R/Year
1	Harvester	85.83	25.30	188019	7.0	2.1	221	3249	4	2193544
2	Forwarder	41.43	38.50	162924	7.0	1.9	221	2939	3	1139519
3	Loader	48.43	70.40	78619	7.0	2.3	221	3558	2	882914
4	Rigid/Drawbar	2.85	0.70	78600	600.0	2.0	221	221000	8	7088861
5										
6										
7										
8										
9										
Total		178	135	318143				230748		11458637

1.4: Labour cost						
Machine Description	Operator R/Year	Operator Number	Assistants R/Year	Assistants Number	Overhead Supervision Percent	Total cost R/Year
1 Harvester	442000	8	0	0	0	221000
2 Forwarder	300560	6	0	0	0	1603360
3 Loader	300560	4	0	0	0	1202240
4 Rigid/Drawbar	223420	16	0	0	0	3606720
5						0
6						0
7						0
8						0
9						0
Total	1288540		0	0	0	221000

2: Cash outflows per year, based on input data

Year	Ownership Cost Harvester	Ownership Cost Forwarder	Ownership Cost Loader	Ownership Cost Rigid/Drawbar	Ownership Cost	Tyre Cost	Operating Cost	Labour Cost	Total Outflow R
0	752000	4887142	1512000	6272000	0	0	0	0	20191142
1						887040	11458637	10369320	22714997
2						1844300	11458637	10369320	23672257
3			1512000			887040	11458637	10369320	24226997
4						1844300	11458637	10369320	23672257
5						1243440	11458637	10369320	23071387
6						685280	11458637	10369320	22463237
7									0
8									0
9									0
10									0
11									0
12									0
13									0
14									0
15									0
16									0
17									0
18									0
19									0
20									0

2. CASH INFLOWS

Item	Machine Description	Machine life Years	Resale value Rands	Price R/m ³
1	Harvester	5	188000	168932
2	Forwarder	5	1221785	169833
3	Loader	3	378000	171856
4	Rigid/Drawbar	23	1568000	167076
5				
6				
7				
8				
9				
Total			3047785	171856

1.5: Project life span	
Years	5

YEAR	Resale value R	Annual Income R	TOTAL INFLOWS R
0			0
1		515569	515569
2		515569	515569
3	378000	515569	893569
4		515569	515569
5		515569	515569
6	5047785	515569	5563354
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0

Tax rate 20
 hurdle rate 0.05

YEAR	OUT FLOWS R	IN-FLOWS R	NET FLOW R	CUM FLOW R	TAXABLE INCOME R	TAX R	NET FLOW R	NPV FACTOR	NPV after tax R	IRR after tax %	NPV before tax R	IRR before tax %
0	20191142	0	-20191142	-20191142	0	0	-20191142	1	-20191142		-20191142	
1	22714997	515569	-22199428	-42390570	-28534999	0	-22199428	0.952	-21142313	#REF!	-21142313	#NUM!
2	23672257	515569	-23156688	-65547258	-28998031	0	-23156688	0.907	-21003799	#REF!	-21003799	#NUM!
3	24226997	893569	-23334228	-88880987	-25867857	0	-23334228	0.854	-20156293	#REF!	-20156293	#NUM!
4	23672257	515569	-23156688	-112037975	-23156688	0	-23156688	0.823	-19051065	#REF!	-19051065	#NUM!
5	23071387	515569	-22555818	-134593793	-22555818	0	-22555818	0.784	-17673082	#REF!	-17673082	#NUM!
6	22493237	5563354	-16929863	-151523057	-16929863	0	-16929863	0.746	-12633339	#REF!	-12633339	#NUM!
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total											-131851032	#NUM!