A cost-benefit analysis of clearing invasive alien plants in the Berg River quaternary catchment of South Africa: Supplementary material

Annexure 1: The RESTOREBERG model

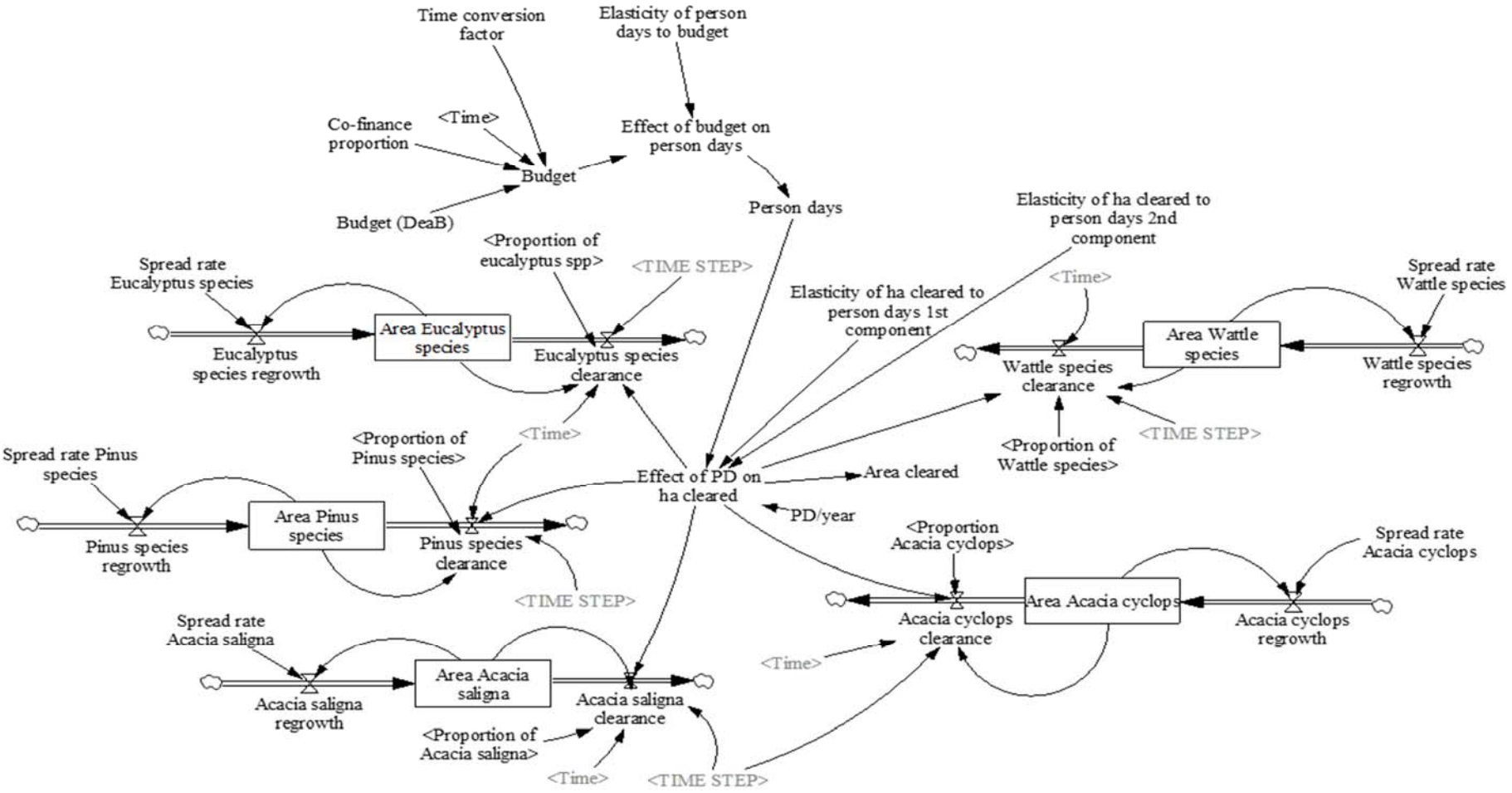

Figure A1: Land use sub-model of the RESTOREBERG model
Source: Own analysis

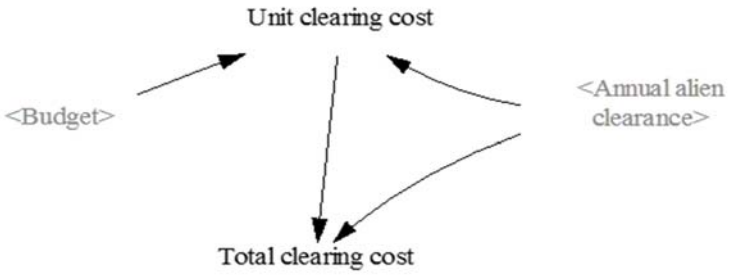

Figure A2: Total clearing cost sub-model of the RESTOREBERG model
Source: Own analysis

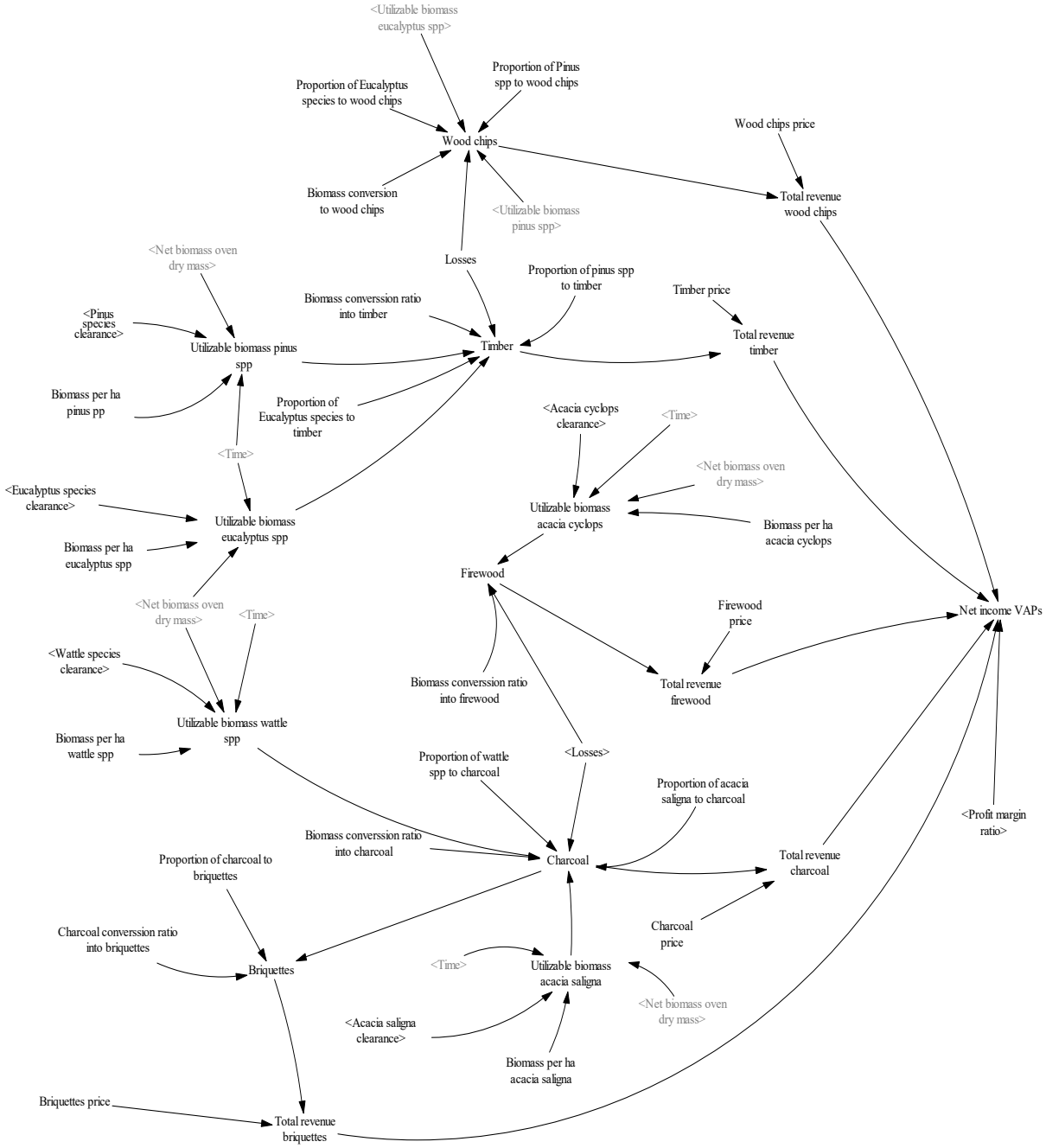

Figure A3: The sub-model of the RESTOREBERG model for value-added products (VAPs)
Source: Own analysis

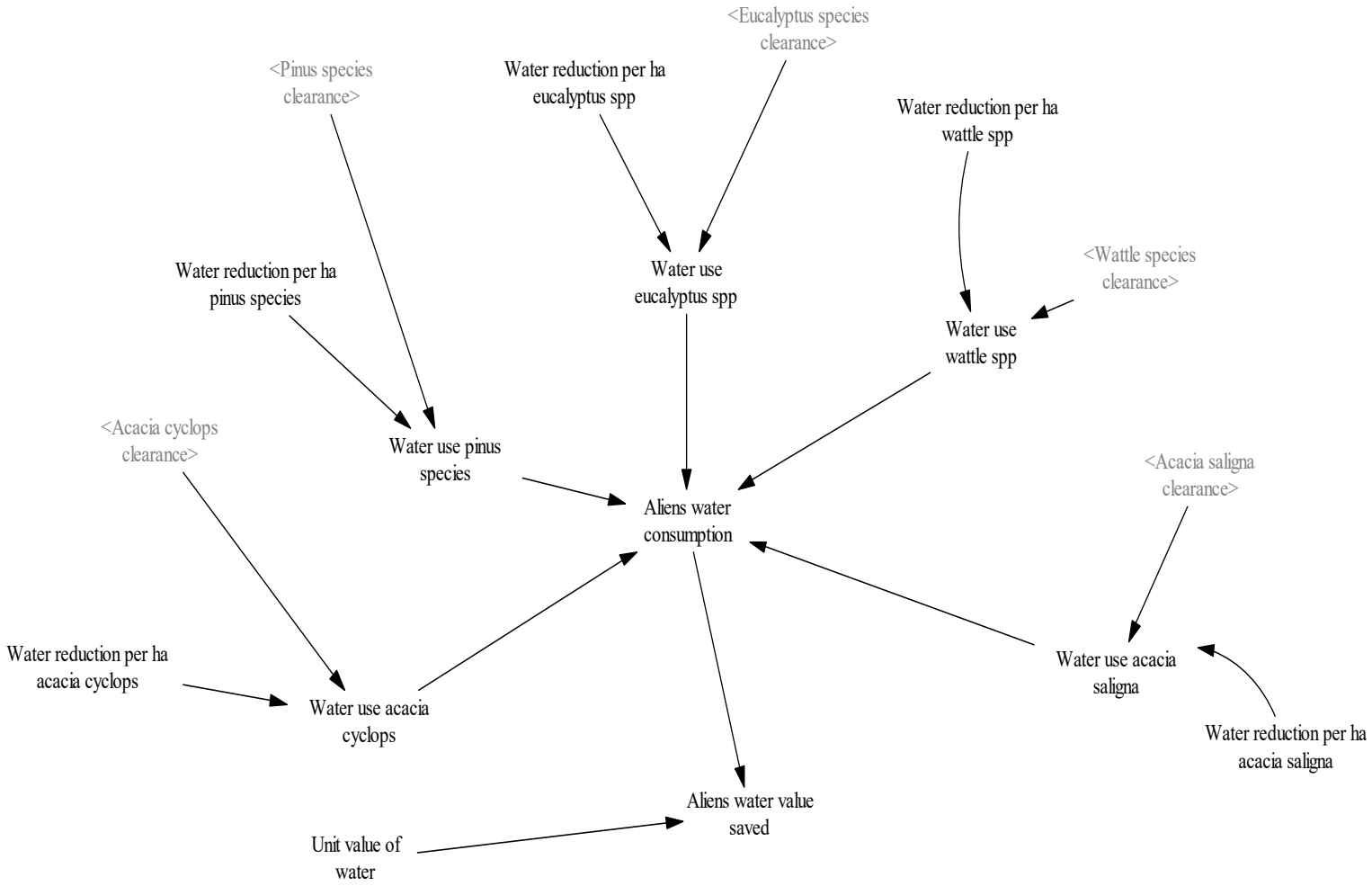

Figure A4: The water savings sub-model of the RESTOREBERG model
Source: Own analysis

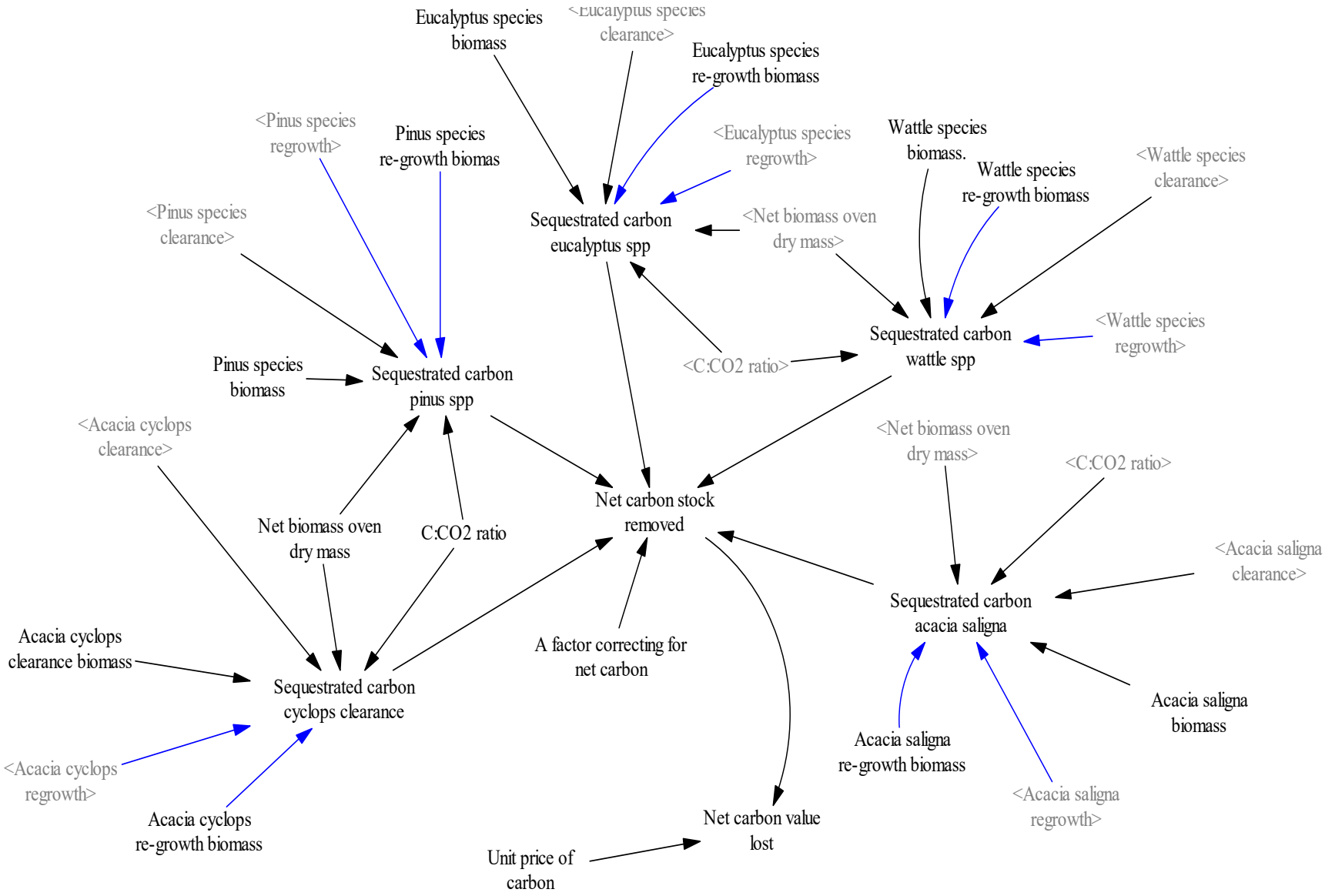

Figure A5: The carbon sequestration sub-model of the RESTOREBERG model

Source: Own analysis

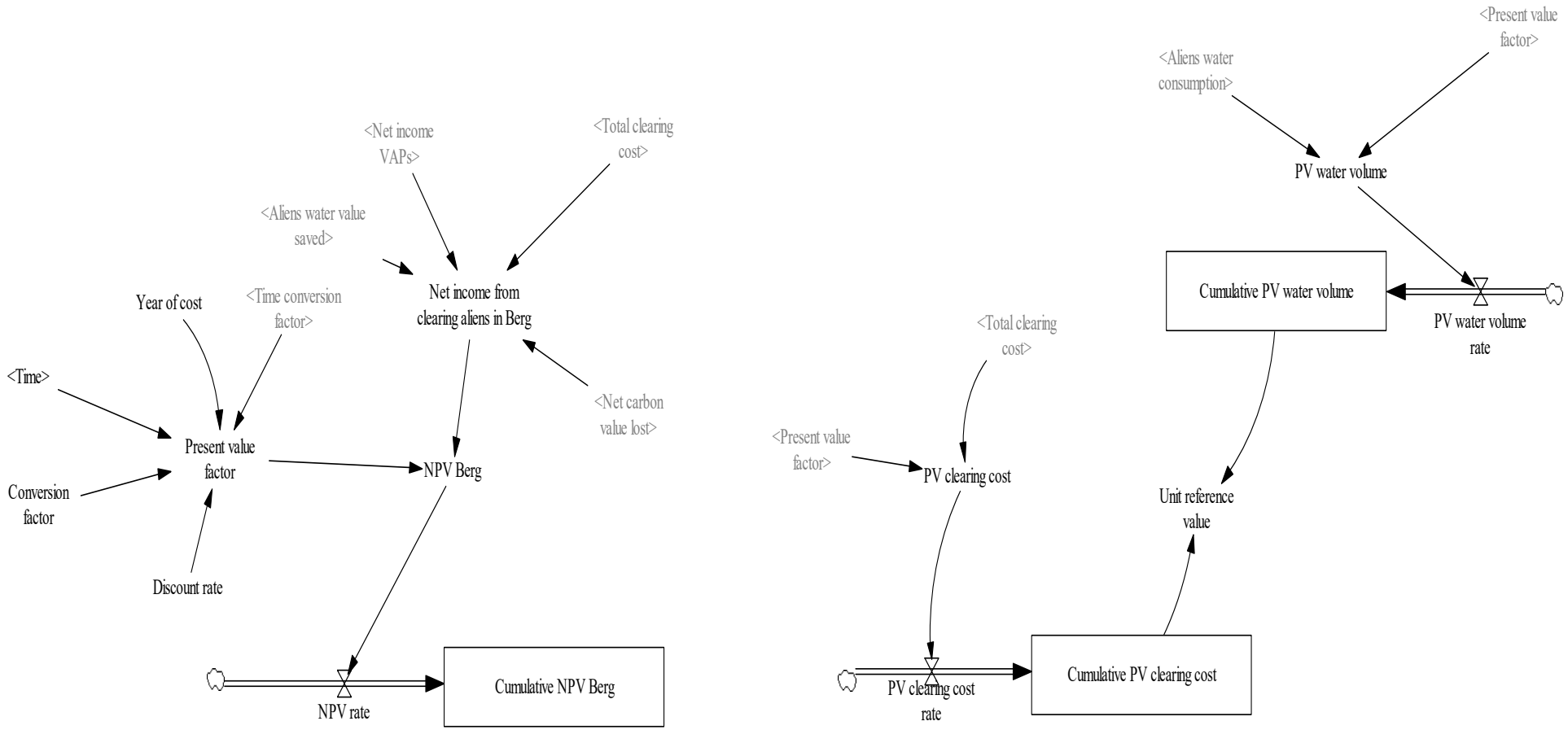

Figure A6: The economic sub-model of the RESTOREBERG model
Source: Own analysis

Annexure 2: RESTOREBERG model boundary

Table A1: RESTOREBERG model boundary chart

Endogenous variables	Exogenous variables	Excluded variables
DEA DH+ budget	Elasticity of ha cleared to person days 1st component	Cumulative NPV Berg
DEA DH budget	Elasticity of ha cleared to person days 2nd component	Unit Reference Value
Co-finance proportion	Elasticity of person days to budget	Cumulative invaded area
Effect of budget on person days	Spread rate *Eucalyptus* species	Other various respective VAPs
Effect of person days on hectares cleared	Spread rate *Acacia saligna*	Fire cost per ha
Person days	Spread rate *Acacia Cyclops*	Fire damage on standing biomass
Eucalyptus species regrowth	Spread rate Wattle species	% standing IAP burnt
Eucalyptus species clearance	Spread rate *Pinus* species	Fire incidence
Area *Eucalyptus* species	Biomass conversion into wood chips	% Illegal IAP planting
Proportion of *Eucalyptus* species	Proportion of *Pinus* species to wood chips	Unit cost of illegal planting
Acacia saligna regrowth	Wood chips price	Area illegally planted
Acacia saligna clearance	Losses	Species abundance
Area *Acacia saligna*	Biomass per ha *Pinus* species	Endangered species
Proportion of *Acacia saligna*	Biomass conversion ratio into timber	Silt
Acacia cyclops regrowth	Proportion of *Eucalyptus* species to timber	Soil Erosion
Acacia cyclops clearance	Biomass per ha *Eucalyptus* species	Surface Runoff
Area *Acacia cyclops*	Proportion *Eucalyptus* species to wood chips	Grazing capacity
Proportion *Acacia cyclops*	Proportion *Pinus* to timber	Job creation
Wattle species regrowth	Timber price	Happiness index
Wattle species clearance	Biomass conversion ratio into firewood	Training
Area wattle species	Biomass per ha Wattle species	Active restoration
Proportion wattle species	Firewood price	Soil carbon
Pinus species regrowth	Proportion of *Acacia Cyclops* to firewood	Tourism
Pinus species clearance	Biomass per ha *Acacia Cyclops*	Fynbos products
Area *Pinus* species	Proportion Wattle species to charcoal	Biodiversity
Proportion *Pinus* species	Biomass conversion into charcoal	Other ecosystem goods and services
Total revenue wood chips	Charcoal price	
Usable biomass *Pinus* species	Proportion of charcoal to briquettes	
Usable biomass *Eucalyptus* species	Charcoal conversion ratio into briquettes	
Wood chips	Briquettes price	
Timber	Biomass per ha *Acacia Saligna*	
Total revenue timber	Proportion *Acacia Saligna* to charcoal	
Firewood	Profit Margin Ratio	
Usable biomass wattle species	Water reduction per ha *Eucalyptus* species	
Total revenue firewood	Water reduction per ha *Pinus* Species	
Usable biomass *Acacia cyclops*	Water reduction per ha *Acacia Cyclops*	
Charcoal	Water reduction per ha *Wattle* Species	
Total revenue charcoal	Water reduction per ha *Acacia Saligna*	
Briquettes	Unit value of water	
Total revenue briquettes	Percent Carbon	
Utilisable biomass *Acacia saligna*	Unit price of carbon	
Net income VAPs (i.e. value-added products)	CO_2 to Carbon ratio	
Unit clearing cost	Conversion factor	
Total clearing cost	Discount rate	
Water use *Pinus* species		

Water use *Eucalyptus* species		
Water use *Wattle* species		
Water use *Acacia saligna*		
Water use *Acacia cyclops*		
Aliens water consumption		
Sequestrated carbon *Pinus* species		
Sequestrated carbon *Acacia cyclops*		
Sequestrated carbon Wattle species		
Sequestrated carbon *Eucalyptus* species		
Sequestrated carbon *Acacia saligna*		
Net carbon stock removed		
Aliens water value saved		
Net income from clearing aliens in Berg		
Year of cost		
Present value cost		
Net present value (NPV) Berg		
NPV rate		
Present value (PV) clearing cost		
PV clearing cost rate		
Cumulative PV clearing cost		
Cumulative PV water volume		
PV water volume rate		
PV water volume		
PV factor		

Source: Own analysis

Annexure 3: RESTOREBERG Model parameters and model equations

Table A2: Model parameters and model equations used in the RESTOREBERG-model

Description	Formula or value	Unit	Reference	Comment
A factor correcting for net carbon =	0.75	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Acacia cyclops clearance biomass =	45	ton/ha	Mugido *et al*. (2014)	Default biomass range is 40 to 45
Acacia saligna re-growth biomass =	2.32	ton/ha	Mugido *et al*. (2014) and consultation with experts	Conservative estimates; it takes approximately 10 years for IAP trees to reach maximum biomass, as a result this was divided by 10 years to apportion for biomass emanating from re-invasion per annum
Acacia saligna biomass =	23.2	ton/ha	Mugido *et al*. (2014)	
Biomass conversion ratio into charcoal =	1	ton/ton	Policy variable (own analysis)	Assumption set for the purpose of this model
Biomass conversion ratio into firewood =	1	ton/ton	Policy variable (own analysis)	Assumption set for the purpose of this model
Biomass conversion ratio into wood chips =	1	ton/ton	Policy variable (own analysis)	Assumption set for the purpose of this model
Biomass conversion ratio into timber =	1	ton/ton	Policy variable (own analysis)	Assumption set for the purpose of this model
Biomass per ha *Eucalyptus* spp. =	45	ton/ha	Mugido *et al*. (2014)	Default biomass range is 40 to 45
Biomass per ha *Pinus* spp. =	45	ton/ha	Mugido *et al*. (2014)	Default Biomass range is 40 to 45
Biomass per ha *Wattle* spp. =	45	ton/ha	Mugido *et al*. (2014)	Default biomass range is 40 to 45
Acacia cyclops, *Wattle*, *Pinus* and *Eucalyptus* spp. re-growth biomass	4.5	ton/ha	Mugido *et al*. (2014) and consultation with experts	Conservative estimates; it takes approximately 10 years for IAP trees to reach maximum biomass, as a result this was divided by 10 years to apportion for biomass emanating from re-invasion per annum
Other species biomass =	0	Ton/ha	Policy variable (own analysis)	Assumption set for the purpose of this model
Briquettes price =	6 250	ZAR/ton	Pers. comm. (private producer)	
Charcoal price =	6 000	ZAR/ton	Pers. comm. (private producer)	
C:CO_2 ratio =	3.6667	Dmnl	Thomas & Martin (2012)	
"Co-finance proportion" =	1.2	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Conversion factor =	1	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Discount rate =	0.06	Dmnl	Policy variable (own analysis)	Based on National Treasury rates
Elasticity of ha cleared to person days =	16 098	ha/PD	Own calculation	
Elasticity of person days to budget =	0.0035	PD/R	Own calculation	
Eucalyptus species biomass =	45	ton/ha	Mugido *et al*. (2014)	

Eucalyptus spp. re-growth biomass =	4.5	ton/ha	Mugido *et al*. (2014) and consultation with experts	Conservative estimates; it takes approximately 10 years for IAP trees to reach maximum biomass, as a result this was divided by 10 years to apportion for biomass emanating from re-invasion per annum
FINAL TIME = Units:	2 030	year	Own calculation	The final (end) time for the simulation
Firewood price =	1 800	R/ton	Pers. comm. (private producer) & Cohen *et al*. (2015)	
Initial area *Acacia cyclops* =	889.52	ha	Kotzé *et al*. (2010)	
Initial area *Acacia saligna* =	849.69	ha	Kotzé *et al*. (2010)	
Initial area *Eucalyptus* species =	1 640.53	ha	Kotzé *et al*. (2010)	
Initial area other species =	0	ha	Kotzé *et al*. (2010)	
Initial area Pinus species =	4 882.75	ha	Kotzé *et al*. (2010)	
Initial area Wattle spp. =	375.94	ha	Kotzé *et al*. (2010)	
INITIAL TIME =	2008	year		The initial (starting) time for the simulation
Losses =	0.9	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Percent carbon =	0.45	Dmnl	Thomas & Martin (2012)	
Profit margin ratio =	0.2	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of *Acacia saligna* to charcoal =	1	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of Eucalyptus spp. to wood chips =	0.15	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of *Pinus* spp. to wood chips =	0.15	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of Pinus spp. to timber =	0.85	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of *Acacia cyclops* to firewood =	1	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of Eucalyptus species to timber =	0.85	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Proportion of wattle species to charcoal =	1	Dmnl	Policy variable (own analysis)	Assumption set for the purpose of this model
Spread rate *Acacia cyclops* =	0.15	Dmnl/year	Van Wilgen & Le Maitre (2013)	Conservative estimate for annual spread rate
Spread rate *Acacia saligna* =	0.15	Dmnl/year	Van Wilgen & Le Maitre (2013)	Conservative estimate for annual spread rate
Spread rate Eucalyptus species = Units:	0.15	Dmnl/year	Van Wilgen & Le Maitre (2013)	Conservative estimate for annual spread rate
Spread rate other species =	0.15	Dmnl/year	Van Wilgen & Le Maitre (2013)	Conservative estimate for annual spread rate
Spread rate Pinus species =	0.15	Dmnl/year	Van Wilgen & Le Maitre (2013)	Conservative estimate for annual spread rate
Spread rate Wattle species =	0.15	Dmnl/year	Van Wilgen & Le Maitre (2013)	Conservative estimate for annual spread rate
Timber price =	10 259	ZAR/ton	Pers. comm. (private producer) & Cohen *et al*. (2015)	

Unit price of carbon =	120	ZAR/ton	National Treasury (2013)	
Unit value of water =	2	ZAR/m^3		
Water reduction per ha *Acacia cyclops* =	909.49	m^3/ha	Le Maitre *et al*. (2013)	
Water reduction per ha *Acacia saligna* =	634.81	m^3/ha	Le Maitre *et al*. (2013)	
Water reduction per ha eucalyptus spp. =	1 250.69	m^3/ha	Le Maitre *et al*. (2013)	
Water reduction per ha other species =	100	m^3/ha	Le Maitre *et al*. (2013)	
Water reduction per ha Pinus species =	2 550.32	m^3/ha	Le Maitre *et al*. (2013)	
Water reduction per ha wattle species =	1 434.73	m^3/ha	Le Maitre *et al*. (2013)	
"Wattle species biomass" =	45	ton/ha	Mugido *et al*. (2014)	
Wood chips price =	900	ZAR/ton	Pers. comm. (private producer) & Cohen *et al*. (2015)	
IAPs clearance =	IF THEN ELSE(Time < = 2014/2030, MIN(Effect of PD on ha cleared*Proportion of IAP spp., Area IAP spp./TIME STEP), 0)	ha/year	Own calculation	
Acacia cyclops regrowth =	Area *Acacia cyclops**Spread rate *Acacia cyclops*	ha/year	Own calculation	
Acacia saligna regrowth =	Area *Acacia saligna**Spread rate *Acacia saligna*	ha/year	Own calculation	
Aliens water consumption =	Water use Eucalyptus spp. + Water use Pinus spp. + Water use wattle spp. + Water use other species	m^3/year	Own calculation	
Aliens water value saved =	Unit value of water*Aliens water consumption	ZAR/year	Own calculation	
Annual alien clearance =	*Acacia cyclops* clearance + *Acacia saligna* clearance + Eucalyptus species clearance + Pinus species clearance + Other species clearance + Wattle species clearance	ha/year	Own calculation	
Area *Acacia cyclops* =	INTEG (*Acacia cyclops* regrowth - *Acacia cyclops* clearance, initial area *Acacia cyclops*)	ha	Own calculation	

Area *Acacia saligna* =	INTEG (*Acacia saligna* regrowth - *Acacia saligna* clearance, initial area *Acacia saligna*)	ha	Own calculation	
Area cleared =	Effect of PD on ha cleared - 149 293	ha/year	Own calculation	
Area Eucalyptus species =	INTEG (Eucalyptus species regrowth - Eucalyptus species clearance, initial area Eucalyptus species)	ha	Own calculation	
Area other species =	INTEG (Other species regrowth - other species clearance, initial area other species)	ha	Own calculation	
Area Pinus species =	INTEG (Pinus species regrowth - Pinus species clearance, initial area Pinus species)	ha	Own calculation	
Area Wattle species =	INTEG (Wattle species regrowth - Wattle species clearance, initial area Wattle species)	ha	Own calculation	
Briquettes =	(Utilisable biomass wattle spp.*Proportion of wattle spp. to briquettes*Biomass conversion ratio into briquettes*Losses) + (Utilisable biomass *Acacia saligna**Proportion of *Acacia saligna* to briquettes*Biomass conversion ratio into briquettes*Losses)	ton/year	Own calculation	
"Budget (DEA B+)" =	"Co-finance proportion" * "Budget (DEA B)" (Time)	ZAR	Own calculation	
Charcoal =	(Utilisable biomass wattle spp.*Proportion of wattle spp. to charcoal*Biomass conversion ratio into charcoal *Losses) + (Utilisable biomass *Acacia saligna**Proportion of *Acacia saligna* to charcoal	ton/year	Own calculation	

	*Biomass conversion ratio into charcoal*Losses)			
Cumulative invaded area =	Area *Acacia cyclops* + Area *Acacia saligna* + Area Eucalyptus species + Area Pinus species + Area other species + Area Wattle species	ha	Own calculation	
Cumulative NPV Berg =	INTEG (NPV rate, 0)	ZAR	Own calculation	
Cumulative PV clearing cost =	INTEG (PV clearing cost rate, 1e-006)	ZAR	Own calculation	
Cumulative PV water volume 0 =	INTEG (PV water volume rate, 1e-006)	m^3	Own calculation	
Effect of budget on person days =	Elasticity of person days to budget * "Budget (DEA B+)"	PD/year	Own calculation	
Effect of PD on ha cleared =	Elasticity of ha cleared to person days*LN(Person days)	ha/year	Own calculation	
Sequestered carbon IAPs =	(IAP spp. biomass*IAP spp. clearance*Net biomass oven dry mass* "C:CO_2 ratio") - ("IAP spp. re-growth biomass" * IAP regrowth * Net biomass oven dry mass * "C:CO_2 ratio")	ton/year	Own calculation	
Net carbon stock removed =	Sequestrated carbon Eucalyptus spp. + Sequestrated carbon Pinus spp. + Sequestrated carbon wattle spp. + Sequestrated carbon cyclops clearance + Sequestered carbon *Acacia saligna*) * A factor correcting for net carbon	ton/year	Own calculation	
Net carbon value lost =	Unit price of carbon*Net carbon stock remove	Ton/year	Own calculation	
Unit reference value =	Cumulative PV clearing cost/Cumulative PV water volume	R/m^3	Own calculation	

Source: Own analysis

Annexure 4: RESTOREBERG causal loop diagram

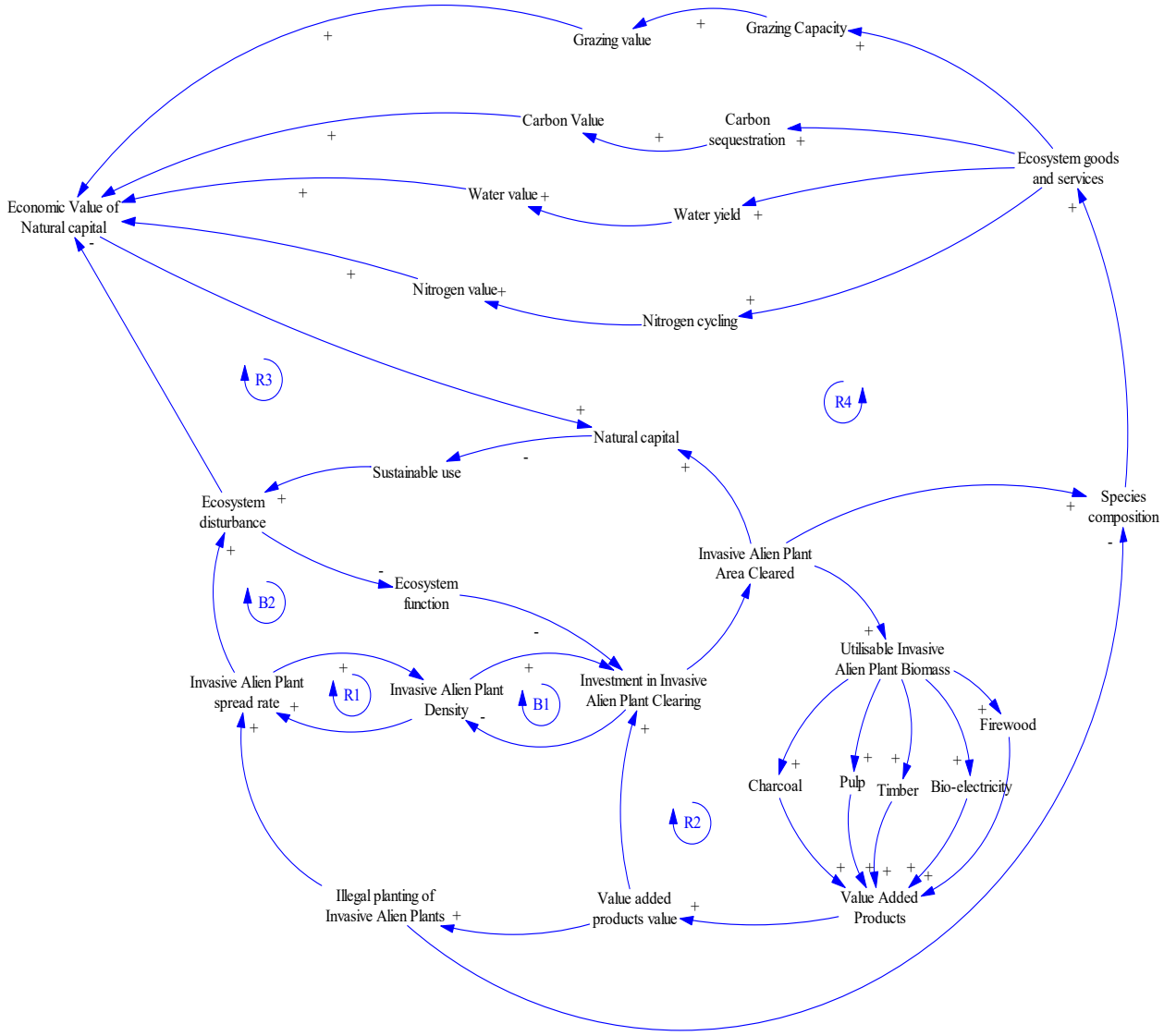

Figure A7: The RESTOREBERG causal loop diagram
Source: Own analysis

Annexure 5: RESTOREBERG model cost and benefit results

Table A3: Summary table for gross revenue of wood chips produced

Time (Year)	DEA B scenario 1a (ZAR/year)	DEA B scenario 1b (ZAR/year)	DEA B+ scenario 2a (ZAR/year)	DEA B+ scenario 2b (ZAR/year	Baseline scenario 3 (ZAR/year)
2008	0	5 138 875	0	9 319 377	0
2009	0	5 099 404	0	9 233 546	0
2010	0	5 649 944	0	2 648 572	0
2011	0	2 124 766	0	397 286	0
2012	0	1 405 902	0	59 593	0
2013	0	914 549	0	8 939	0
2014	0	548 004	0	1 341	0
2015	548 004	548 004	635 164	201	0
2016	548 004	548 004	635 164	30	0
2017	548 004	548 004	635 164	5	0
2018	548 004	548 004	635 164	1	0
2019-2030	548 004	548 004	635 164	0	0

Source: Own analysis

Table A4: Summary table for the gross revenue of timber produced

Time (Year)	DEA B scenario 1a (ZAR/year)	DEA B scenario 1b (ZAR/year)	DEA B+ scenario 2a (ZAR/year)	DEA B+ scenario 2b (ZAR/year)	Baseline scenario 3 (ZAR/year)
2008	0	331 647 744	0	601 444 928	0
2009	0	329 100 384	0	595 905 728	0
2010	0	364 630 624	0	170 931 008	0
2011	0	137 126 080	0	25 639 654	0
2012	0	90 732 768	0	3 845 948	0
2013	0	59 022 304	0	576 892	0
2014	0	35 366 572	0	86 534	0
2015	35 366 572	35 366 572	40 991 628	12 980	0
2016	35 366 572	35 366 572	40 991 628	1 947	0
2017	35 366 572	35 366 572	40 991 628	292	0
2018	35 366 572	35 366 572	40 991 628	44	0
2019	35 366 572	35 366 572	40 991 628	7	0
2020	35 366 572	35 366 572	40 991 628	1	0
2021-2030	35 366 572	35 366 572	40 991 628	0	0

Source: Own analysis

Table A5: Summary table for the gross revenue of firewood produced

Time (Year)	DEA B scenario 1a (ZAR/year)	DEA B scenario 1b (ZAR/year)	DEA B+ scenario 2a (ZAR/year)	DEA B+ scenario 2b (ZAR/year)	Baseline scenario 3 (ZAR/year)
2008	0	11 033 491	0	20 009 296	0
2009	0	10 948 743	0	19 825 014	0
2010	0	12 130 788	0	5 686 654	0
2011	0	4 562 007	0	852 998	0
2012	0	3 018 562	0	127 950	0
2013	0	1 963 596	0	19 192	0
2014	0	1 176 600	0	2 879	0
2015	1 176 600	1 176 600	1 363 738	432	0
2016	1 176 600	1 176 600	1 363 738	65	0
2017	1 176 600	1 176 600	1 363 738	10	0
2018	1 176 600	1 176 600	1 363 738	1	0
2019-2030	1 176 600	1 176 600	1 363 738	0	0

Source: Own analysis

Table A6: Summary table for the gross revenue of charcoal produced

Time (Year)	DEA B scenario 1a (ZAR/year)	DEA B scenario 1b (ZAR/year)	DEA B+ scenario 2a (ZAR/year)	DEA B+ scenario 2b (ZAR/year)	Baseline scenario 3 (ZAR/year)
2008	0	26 767 710	0	48 543 380	0
2009	0	26 562 108	0	48 096 312	0
2010	0	29 429 800	0	13 796 060	0
2011	0	11 067 620	0	2 069 409	0
2012	0	7 323 157	0	310 411	0
2013	0	4 763 765	0	46 562	0
2014	0	2 854 481	0	6 984	0
2015	2 854 481	2 854 481	3 308 486	1 048	0
2016	2 854 481	2 854 481	3 308 486	157	0
2017	2 854 481	2 854 481	3 308 486	24	0
2018	2 854 481	2 854 481	3 308 486	4	0
2019	2 854 481	2 854 481	3 308 486	1	0
2020-2030	2 854 481	2 854 481	3 308 486	0	0

Source: Own analysis

Table A7: Summary table for the gross revenue of briquettes produced

Time (Year)	DEA B scenario 1a (ZAR/year)	DEA B scenario 1b (ZAR/year)	DEA B+ scenario 2a (ZAR/year)	DEA B+ scenario 2b (ZAR/year)	Baseline scenario 3 (ZAR/year)
2008	0	13 941 516	0	25 283 010	0
2009	0	13 834 431	0	25 050 162	0
2010	0	15 328 021	0	7 185 448	0
2011	0	5 764 385	0	1 077 817	0
2012	0	3 814 144	0	161 673	0
2013	0	2 481 128	0	24 251	0
2014	0	1 486 709	0	3 638	0
2015	1 486 709	1 486 709	1 723 170	546	0
2016	1 486 709	1 486 709	1 723 170	82	0
2017	1 486 709	1 486 709	1 723 170	12	0
2018	1 486 709	1 486 709	1 723 170	2	0
2019-2030	1 486 709	1 486 709	1 723 170	0	0

Source: Own analysis

Table A8: Summary table for clearing costs and VAPs' production costs

Time (year)	Total clearing cost (ZAR/year)					VAPs' manufacturing costs (ZAR/year)				
	DEA B (scenario 1a)	DEA B (scenario 1b)	DEA B+ (scenario 2a)	DEA B+ (scenario 2b)	Baseline	DEA B (scenario 1a)	DEA B (scenario 1b)	DEA B+ (scenario 2a)	DEA B+ (scenario 2b)	Baseline
2008	8 503 740	8 503 740	8 503 740	10 204 488	8 503 740	0	310 823 488	0	563 680 000	0
2009	8 481 710	8 481 710	8 481 710	10 178 052	8 481 710	0	308 436 064	0	558 488 640	0
2010	8 774 630	8 774 630	8 774 630	10 529 556	8 774 630	0	341 735 360	0	160 198 192	0
2011	5 980 390	5 980 390	5 980 390	7 176 468	5 980 390	0	128 515 896	0	24 029 732	0
2012	4 800440	4 800440	4 800 440	5 760 528	4 800 440	0	85 035 632	0	3 604 459	0
2013	3 571 860	3 571 860	3 571 860	4 286 232	3 571 860	0	55 316 276	0	540 669	0
2014	2 108 580	2 108 580	2 108 580	2 530 296	2 108 580	0	33 145 894	0	81 100	0
2015	2 108 580	2 108 580	2 530 296	2 530 296	0	33 145 894	33 145 894	38 417 752	12165	0
2016	2 108 580	2 108 580	2530296	2 530 296	0	33 145 894	33 145 894	38 417 752	1825	0
2017	2 108 580	2 108 580	2530296	2 530 296	0	33 145 894	33 145 894	38 417 752	274	0
2018	2 108 580	2 108 580	2530296	2 530 296	0	33 145 894	33 145 894	38 417 752	41	0
2019	2 108 580	2 108 580	2530296	2 530 296	0	33 145 894	33 145 894	38 417 752	6	0
2020	2 108 580	2 108 580	2530296	2 530 296	0	33 145 894	33 145 894	38 417 752	1	0
2021-2030	2 108 580	2 108 580	2530296	2 530 296	0	33 145 894	33 145 894	38 417 752	0	0

Source: Own analysis

Table A9: Summary table for carbon sequestration losses due to clearance of IAPs

Time (Year)	DEA B scenario 1a (ZAR/year)	DEA B scenario 1b (ZAR/year)	DEA B+ scenario 2a (ZAR/year)	DEA B+ scenario 2b (ZAR/year)	Baseline scenario 3 (ZAR/year)
2008	16 951 064	16 951 064	16 951 064	31 464 780	16 951 064
2009	16 948 156	16 948 156	16 948 156	31 518 638	16 948 156
2010	19 011 694	19 011 694	19 011 694	9 057 292	19 011 694
2011	6 976 798	6 976 798	6 976 798	1 358 594	6 976 798
2012	4 531 740	4 531 740	4 531 740	203 789	4 531 740
2013	2 846 709	2 846 709	2 846 709	30 568	2 846 709
2014	1 572 518	1 572 518	1 572 518	4 585	1 572 518
2015	1 551 553	1 551 553	1 854 152	688	-350 990
2016	1 527 442	1 527 442	1 834 581	103	-403 638
2017	1 499 716	1 499 716	1 812 074	15	-464 184
2018	1 467 830	1 467 830	1 786 191	2	-533 811
2019	1 431 161	1 431 161	1 756 425	0	-613 883
2020	1 388 992	1 388 992	1 722 195	0	-705 966
2021	1 340 497	1 340 497	1 682 830	0	-811 861
2022	1 284 729	1 284 729	1 637 560	0	-933 640
2023	1 220 595	1 220 595	1 585 500	0	-1 073 686
2024	1 146 841	1 146 841	1 525 631	0	-1 234 738
2025	1 062 024	1 062 024	1 456 781	0	-1 419 949
2026	964 484	964 484	1 377 604	0	-1 632 942
2027	852 313	852 313	1 286 551	0	-1 877 883
2028	723 317	723 317	1 181 840	0	-2 159 565
2029	574972	574 972	1 061 421	0	-2 483 500
2030	404374	404 374	922 940	0	-2 856 025

Source: Own analysis

Table A10: Summary table for the annual water savings value and VAPs net income results

Time (year)	Water savings monetary value (ZAR/year)					VAPs' net income value (ZAR/year)				
	DEA B scenario 1a	DEA B scenario 1b	DEA B+ scenario 2a	DEA B+ scenario 2b	Baseline Scenario 3	DEA B scenario 1a	DEA B scenario 1b	DEA B+ scenario 2a	DEA B+ scenario 2b	Baseline Scenario 3
2008	9 858 992	9 858 992	9 858 992	17 879 334	9 858 992	0	77 705 872	0	140 920 000	0
2009	9 783 265	9 783 265	9 783 265	17 714 668	9 783 265	0	77 109 016	0	139 622 160	0
2010	10 839 483	10 839 483	10 839 483	5 081 318	10 839 483	0	85 433 840	0	40 049 548	0
2011	4 076 388	4 076 388	4 076 388	762 198	4 076 388	0	32 128 974	0	6 007 433	0
2012	2 697 240	2 697 240	2 697 240	114 330	2 697 240	0	21 258 908	0	901 115	0
2013	1 754 574	1 754 574	1 754 574	17 149	1 754 574	0	13 829 069	0	135 167	0
2014	1 051 353	1 051 353	1 051 353	2 572	1 051 353	0	8 286 474	0	20 275	0
2015	1 051 353	1 051 353	1 218 570	386	0	8 286 474	8 286 474	9 604 438	3 041	0
2016	1 051 353	1 051 353	1 218 570	58	0	8 286 474	8 286 474	9 604 438	456	0
2017	1 051 353	1 051 353	1 218 570	9	0	8 286 474	8 286 474	9 604 438	68	0
2018	1 051 353	1 051 353	1 218 570	1	0	8 286 474	8 286 474	9 604 438	10	0
2019	1 051 353	1 051 353	1 218 570	0	0	8 286 474	8 286 474	9 604 438	2	0
2020-2030	1 051 353	1 051 353	1 218 570	0	0	8 286 474	8 286 474	9 604 438	0	0

Source: Own analysis