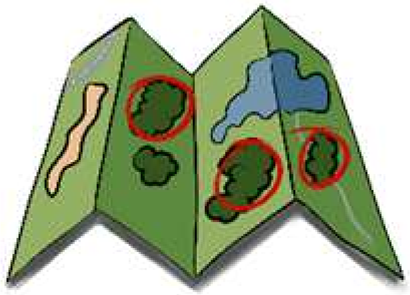
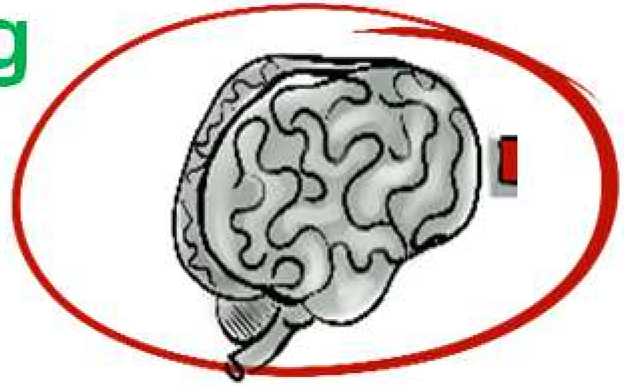
Clear To Grow

Where is the Demand?

Invasive & Alien Plant Biomass Value Chain Mapping



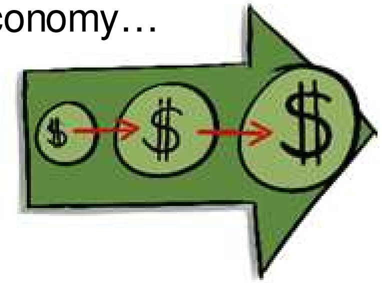


10th June, 2019

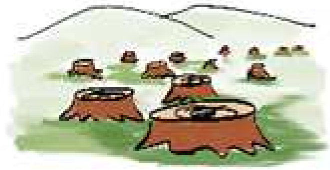
David Gardner

The Clear to Grow Programme will:

Catalyse a strong Biomass Economy…

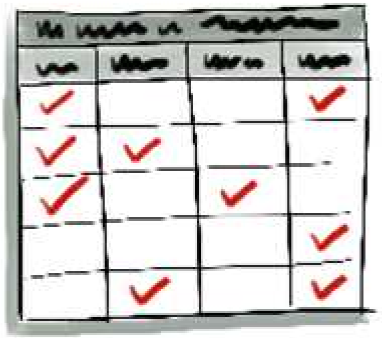


…by stimulating demand for invasive biomass as an input into value-adding processes, that will…



…accelerate the eradication of invasive biomass…

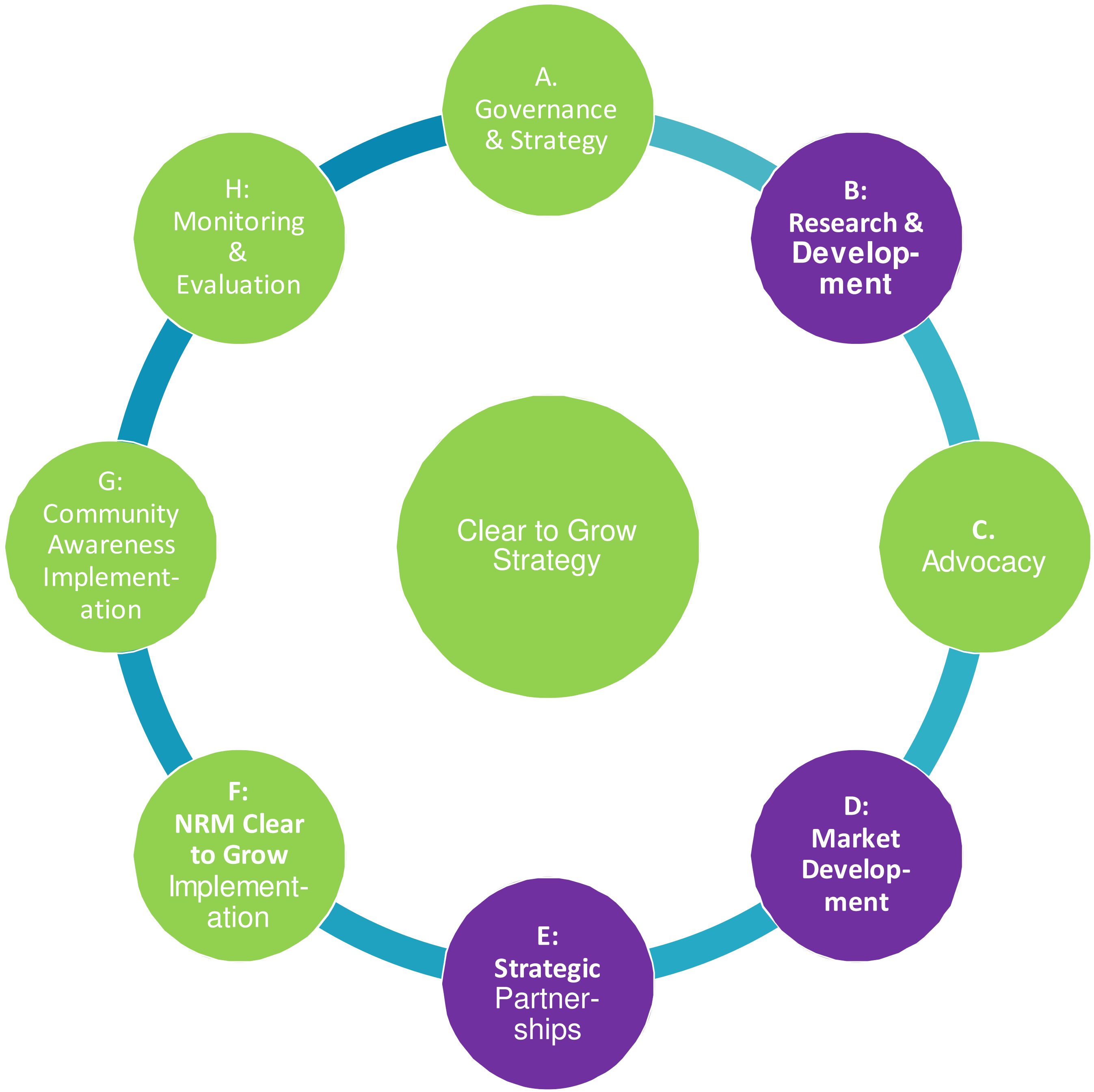
…enhancing utilisation of and growth potential for SMME's engaged in the Green Value Chain…



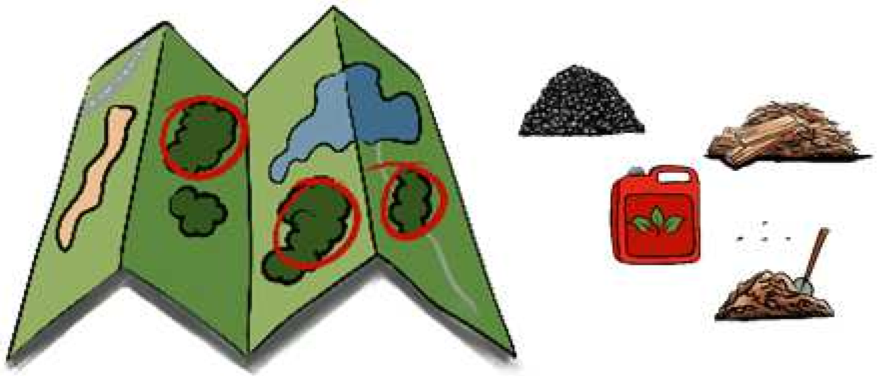
…and driving clear understanding of roles and responsibilities, and contributions of public and private sector

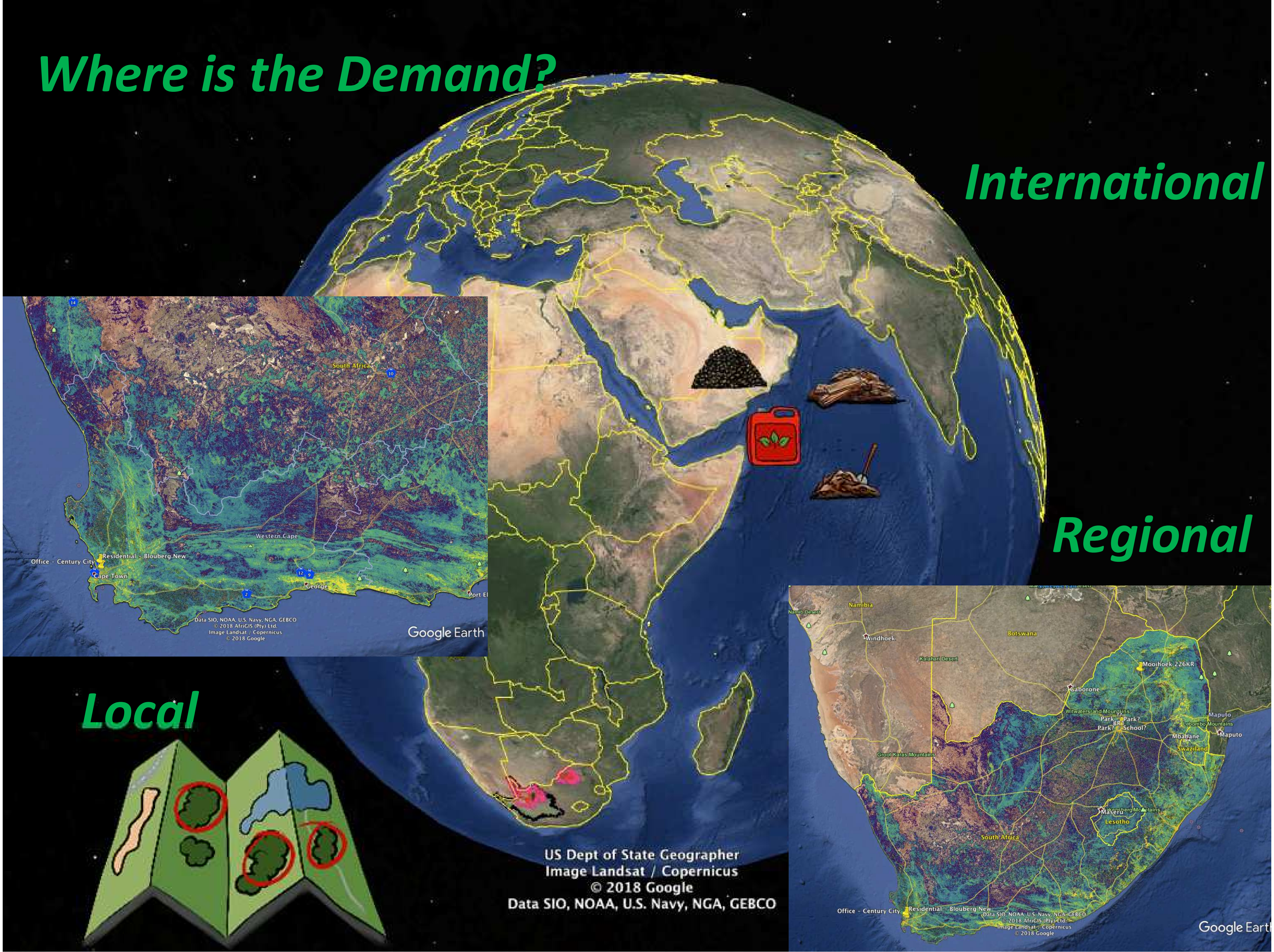
And therefore Strengthen South Africa's water security and reduce fire risk

Clear to Grow Focus Areas

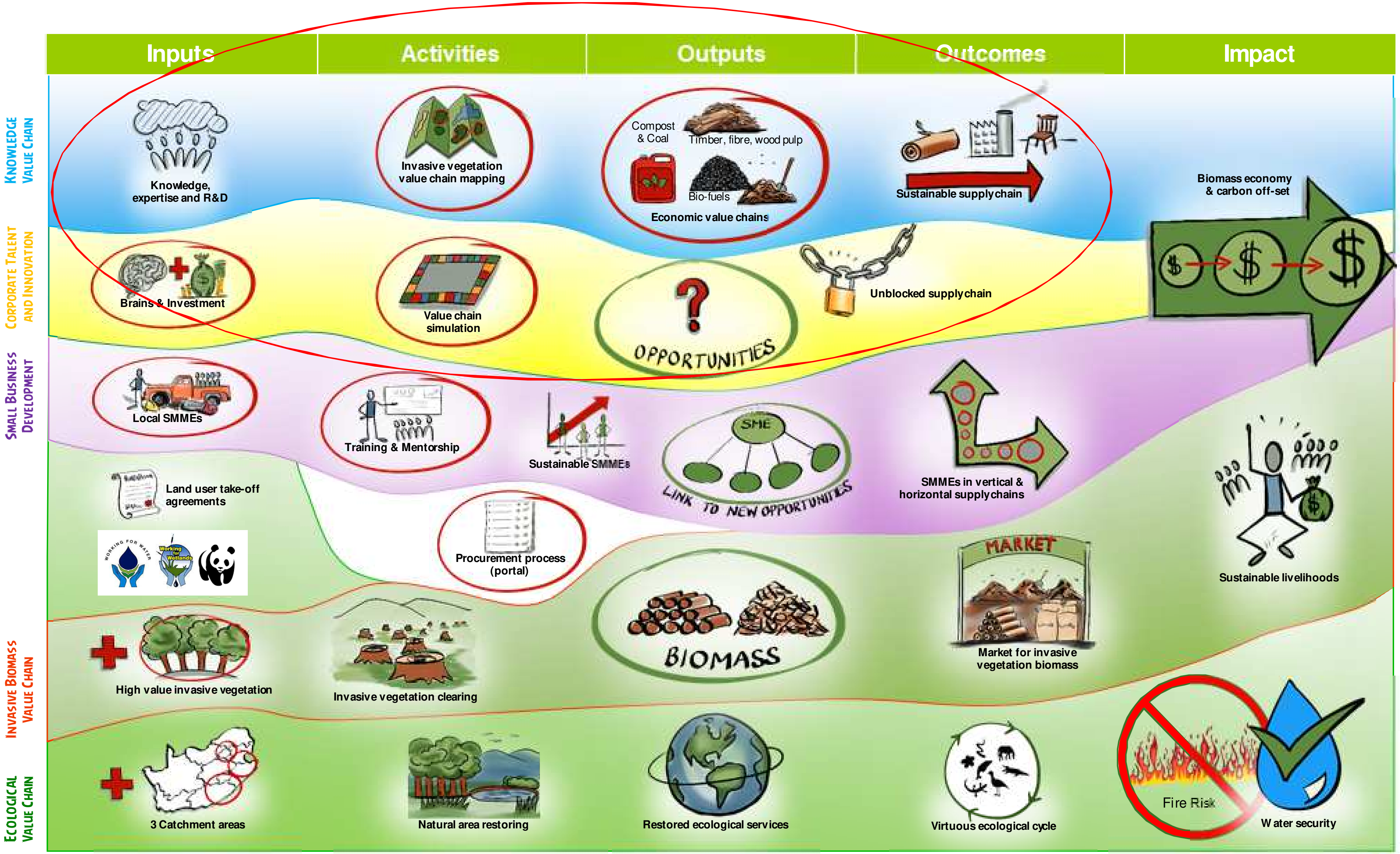


Where is the Demand?
Mapping the
(IAP) Biomass Value Chain



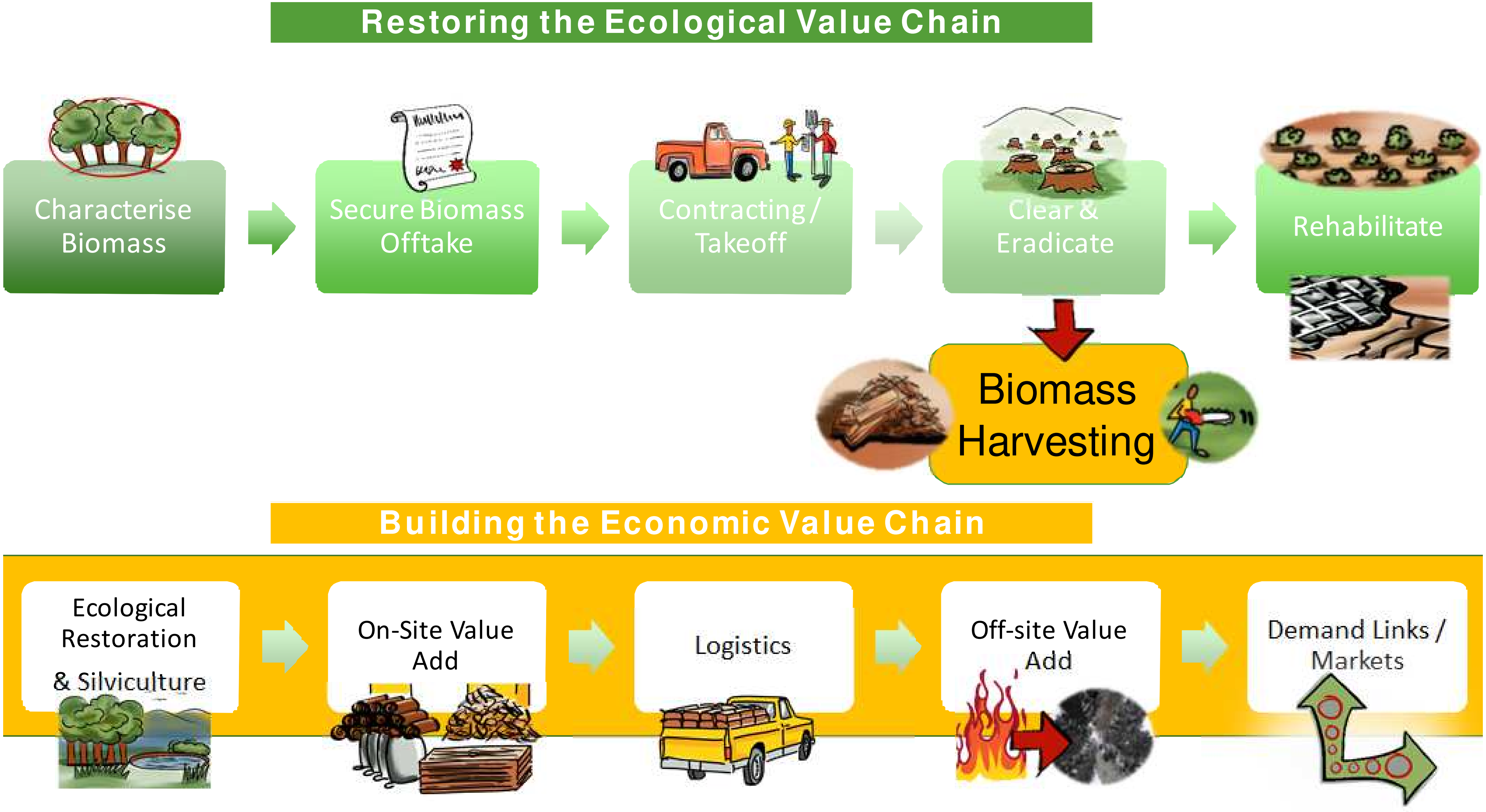

Where is the Demand?
International
Regional
Local
South Africa
Western Cape
Residential - Blouberg New
Office - Century City
Cape Town
George
Port El
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2018 AfriGIS (Pty) Ltd.
Image Landsat / Copernicus
© 2018 Google
Google Earth
US Dept of State Geographer
Image Landsat / Copernicus
© 2018 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Namibia
Windhoek
Botswana
Kalahari Desert
Mooihoek 226KR
Gaborone
Witwatersrand Mountains
Maputo
Mbabane
Swaziland
Maseru
Lesotho
South Africa
Groot Karas Mountains
Office - Century City
Residential - Blouberg New
Google Earth

Logic Framework: Research Focus



avocado vision
a bts company

GBVC Value Chain Overview



IAP-VC Specification & Development

- Generic value chain analysis developed to conceptual level
- Continues to be refined as new knowledge & opportunity is discovered
- Specific Value Chain identification & mapping as part of “Clear to Grow” implementation
- Opportunistic potentials being identified and engaged with in relation to corporate opportunities

IAP-VC Specification & Development: Core Value Chain Prospects

Four initial broad categories of Value Chain potentials identified:

1. Ecosystem Services & Land Restoration Value Chains

2. Agricultural & Rural Livelihoods Value Chains

3. Raw Biomass Value Chains

4. Biomass to Energy (B2E) Value Chains

5. Other (miscellaneous and forthcoming)

Clear to Grow: Ecosystem Services & Land Restoration Value Chains

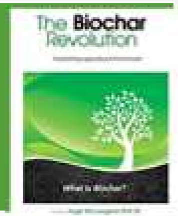
Clear to Grow: Agricultural & Rural Livelihoods Value Chains

Clear to Grow: I&AP Biomass to Energy Value Chains

Clear to Grow: Raw Biomass Value Chains: Examples

Other Invasive Biomass Opportunities

Biochar, Compost, Hydrosoils

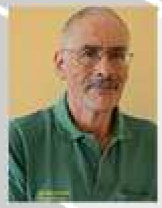


Erosion Control

Agricultural Mulch

Oom Braam se Cow Chow

Fireproof Building material



Other Invasive Biomass Opportunities

Packaging

Palettes

Mine Support Timber

Timber (NCT)

NCT
NCT FORESTRY CO-OPERATIVE LIMITED

Bio Jet Fuel

IATA

How do we make it viable?

		Biomass Value Potential		
		Low Value	Medium Value	High Value
Biomass Extraction Potential	Easy	50%	75%	100%
	Moderate	25%	50%	75%
	Difficult	0%	25%	50%

Charcoal Value Chain

Charcoal: Black Wattle and Green Wattle

Kiln

10% 90%

Artisan

25% 50% 15-25%

Small <20mm	Medium 20-40mm	Premium >40mm
 		
"Brikettes" "Small"	"Braai Grade"	"Restaurant Grade"
R1000? /Ton Ex Depot	R1600 /Ton Ex Depot	R3000 /Ton Ex Depot

BLAZE

Wood & Pulp Value Chain

Wood for Pulp

Felling &
Harvesting
2,4m Lengths

High Quality
Logs
50-500mm

Debarked
& Prepped

R1020 /Ton
At Source

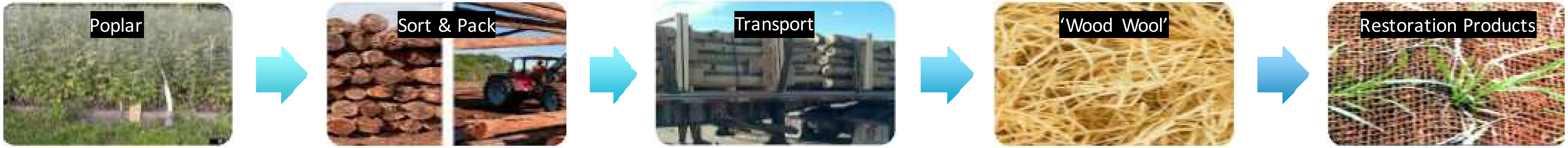
Collected:
40 Tons

R500 /Ton
Transport

R520 /Ton
= R20,800 per load

NCT

NCT FORESTRY CO-OPERATIVE LIMITED



Restoration Products Value Chain

Erosion Sausages

environmental affairs

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Hydroseeding

environmental affairs

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Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Enviromat®

Biodegradable Erosion Control Blanket

Protects
Minimises Soil Loss
Prevents Moisture Loss

KAYTECH ENGINEERED FABRICS

JHB: Tel +27 11 922 3300 | Fax +27 11 392 1112
CT: Tel +27 21 531 8110 | Fax +27 21 531 5498
KZN: Tel +27 31 717 2300 | Fax +27 31 702 0435
EL: Tel +27 43 727 1055 | Fax +27 43 727 1065
PE: Tel +27 41 453 0755
WEB: www.kaytech.co.za

BENEFACTOR

Soil erosion is a problem for every engineer. Effective prevention of soil erosion is best achieved through immediate treatment of exposed slopes. Such treatment minimises soil loss and stimulates vegetative growth. Enviromat® provides the solution.

What is Enviromat®?

Enviromat® is a biodegradable erosion control blanket that stabilises disturbed soil until vegetative cover is achieved.

Enviromat® consists of poplar woodwool contained within an external polypropylene mesh. It degrades with exposure to ultraviolet light and climatic conditions, with typical installations lasting between 12-36 months.

Enviromat® protects the topsoil and seed from:

- surface erosion from rainfall impact
- moisture loss through evaporation
- temperature extremes

Enviromat® works by protecting the soil from raindrop impact and reducing overland flow velocity.

Where is Enviromat® used?

Enviromat® is typically used in or around:

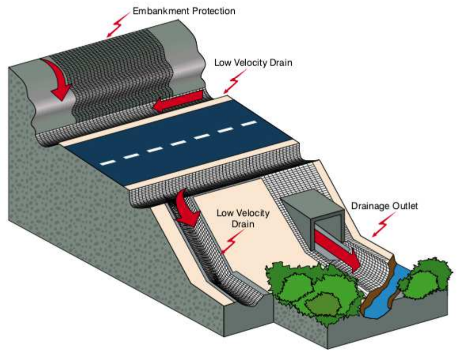
- embankments
- areas with heavy initial rainfall
- low velocity drainage channels
- areas subject to snow cover

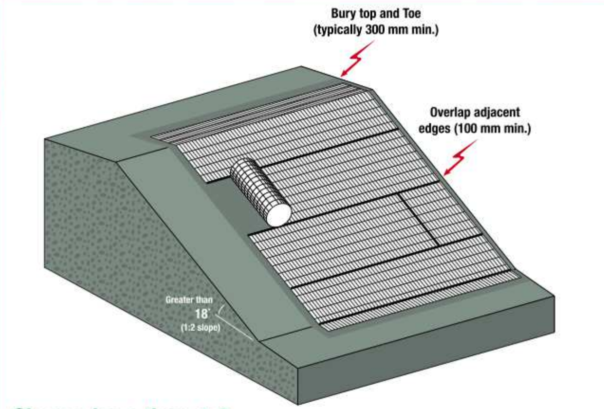
Enviromat® is installed following surface preparation and seeding.

Research shows **Enviromat®** significantly reduces soil loss in embankment applications.

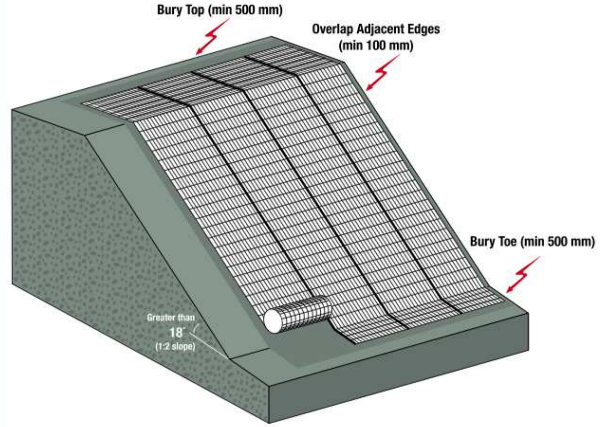
Rainfall Intensity	Rainfall Duration	Initial Soil Condition	Soil Loss c.f. Unprotected Embankment
40 mm/hr	1 hr	dry	6%
40 mm/hr	1 hr	wet	25%
75 mm/hr	20 min	wet	32%

Source: Jason Consultants (1985)

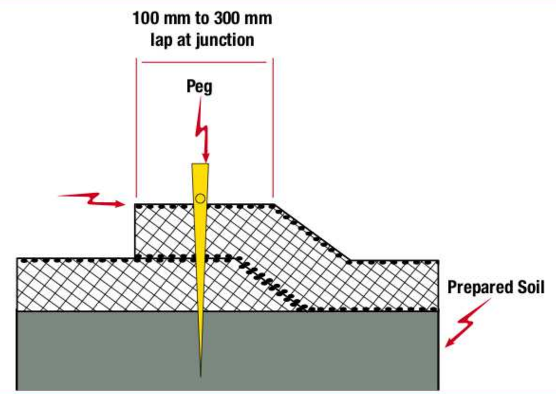




Slopes less than 1:3



Slopes greater than 1:3



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

roducts are critical and beyond our control. Information given by us in our documentation or orally, or
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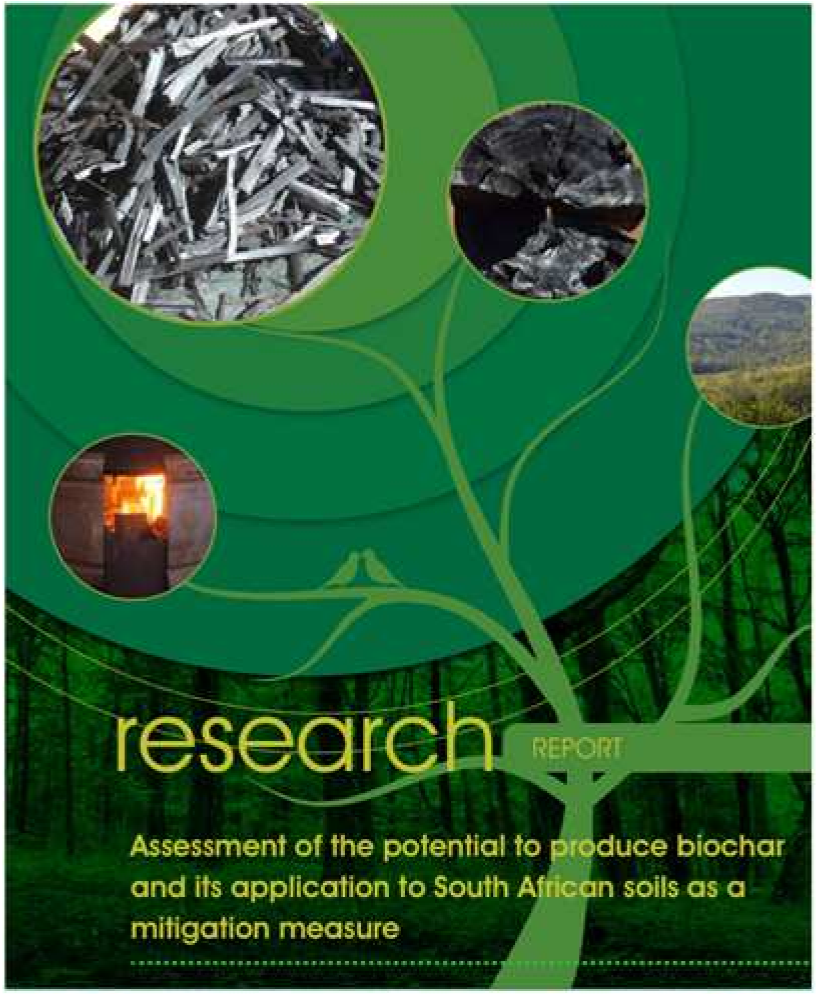
Biochar Value Chain



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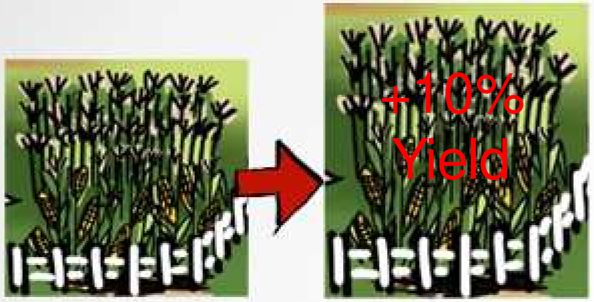
UKaid

Biochar Applications

Method

Agricultural Yield (esp. maize)



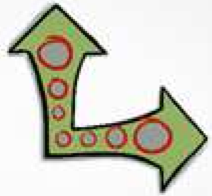
Fertiliser Replacement &
Soil Amendment

Restoration Effectiveness

Additive & Soil Amendment

Carbon Sequestration

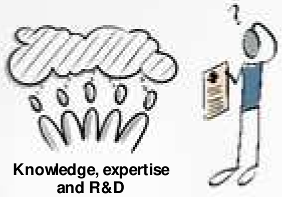
Short-Cycle Carbon Sump



Six
Blockages

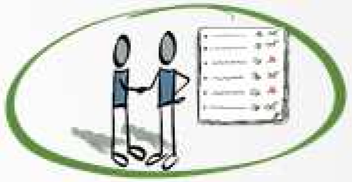
The Way Foward

1. “Science to Soil”

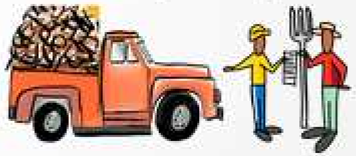


2. Practical & Financial Proof

3. Legal & Policy Framework



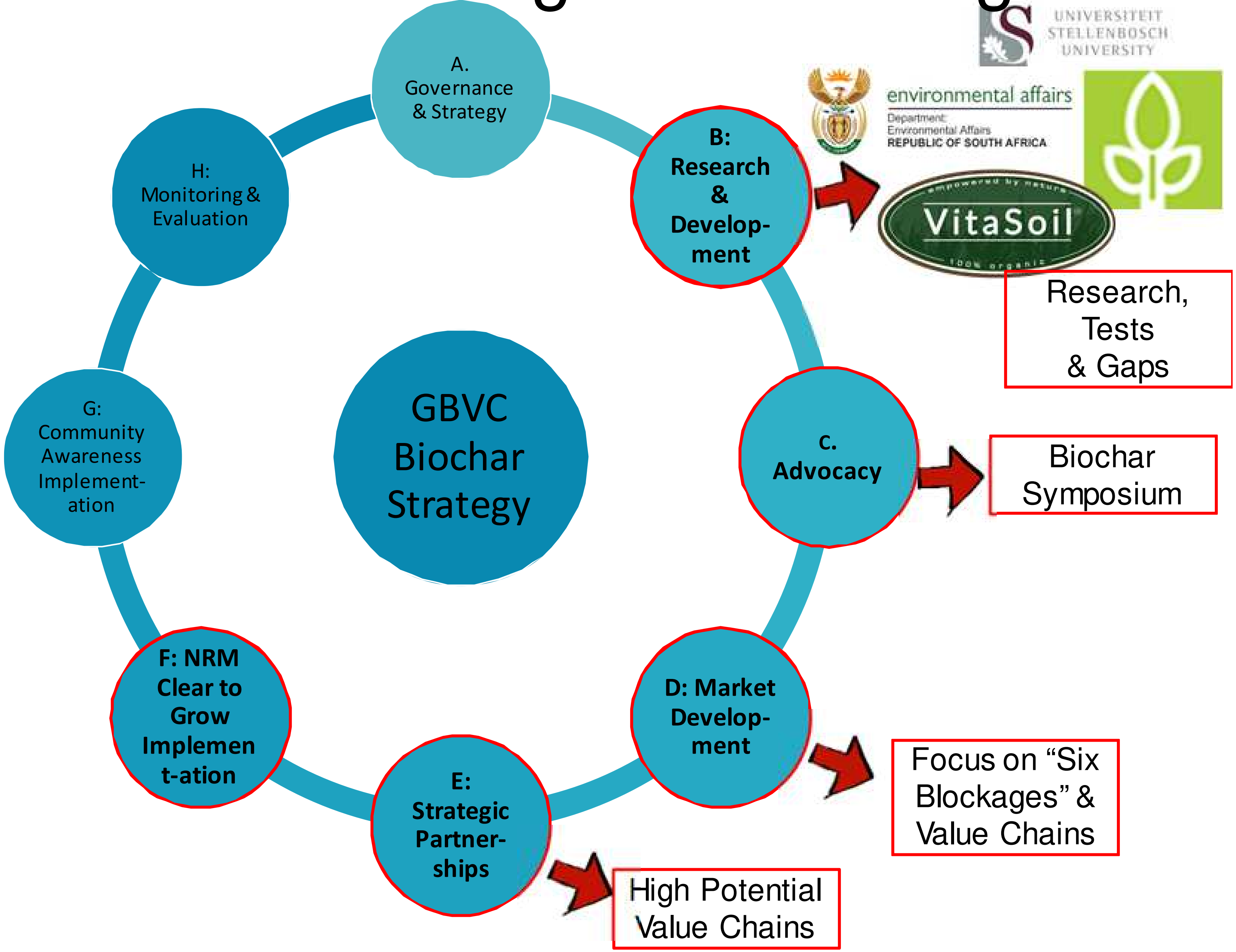
4. Industry Acceptance



5. Standards & Provenance

6. Common Vision & Platform

Biochar: Strategic Positioning



Soil Augmentation & Composting Value Chain

Soil Augmentation Products: Agriculture

- SSA Agricultural production increasing: 70% due to increased land under cultivation (additional labour inputs), 17% due to increasing yields thru better inputs (IFAD, 2016).
- Increasing agricultural output in this way cannot continue indefinitely and there is evidence that this limit is near (AGRA, 2016)
- Africa uses 3% of world's fertiliser at application rate 1/10 of global averages… "Significant long-term potential to develop SSA agri-inputs value chain" (TIPS, 2017)
- Fertiliser is ~35% of farmers' variable input costs (maize)
- Local maize sector imports 70%+ of its annual fertiliser requirement (FW, 2016).
- Transport comprises ~40% of fertiliser cost (ABSA Agric, 2018)

What if… we could increase profitability and increase soil longevity?

- 12,5 T/Ha to 14,0 T/Ha (High efficiency commercial farmer) @ 2018 Maize price = ~50% increase in profit
- 8,0 T/Ha to 12,5 T/Ha (Single Case) @ 2018 Maize price turns farm profitable…

http://www.fertilizer.co.za/public-relations/news/2017/229-challenges-and-opportunities-in-maize-production

Conditions	Production costs	Yield	Maize price (R/t)								
	R/ha	(t/ha)	2 000	2 250	2 500	2 750	3 000	3 250	3 500	3 750	4 000
Dryland	5 000	2	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0
	6 000	3	0,0	12,5	25,0	37,5	50,0	62,5	75,0	87,5	100,0
	7 000	4	14,3	28,6	42,9	57,1	71,4	85,7	100,0	114,3	128,6
	8 000	5	25,0	40,6	56,3	71,9	87,5	103,1	118,8	134,4	150,0
	9 000	6	33,3	50,0	66,7						
	10 000	7	40,0	57,5	75,0						
	11 000	8	45,5	63,6	81,8						
	12 000	9	50,0	68,8	87,5						
	13 000	10	53,8	73,1	92,3						
Irrigated	18 000	11	22,2	37,5	52,8						
	20 000	13	30,0	46,3	62,5						
	22 000	15	36,4	53,4	70,5						
	25 000	16	28,0	44,0	60,0						

Source: Figures were compiled using own data as received from farmers in the North West. Costs can vary from farm to farm. Yields higher than 16 tonne/ha are often also achieved under irrigation.

TIPS Recommendations (2016)

- Supporting the development of regional output markets that will provide more and better market access opportunities for farmers.
- fertiliser harmonisation regulations in SADC need to be finalised and implemented with a sense of urgency non-negotiable foundation for developing regional markets in agri-inputs
- Regional coordination of extension services and delivery platforms
- Logistics and transport infrastructure problems must be addressed

How do we compete in and create the IAP Biomass Market?

IAP Biomass VC: Specification & Development

- **Value Chains & Supply Chains:** Decentralized harvesting, value added and clever logistics
- **Market Access:** Securing existing and creating new market access
- **Quality Production:** Producing quality (existing) products & Inputs
- **Market Niches:** Playing where there are biomass limitations /gaps
- **Innovation Potentials:** Innovating with biomass in new markets
- **Supply Chain Development:** Ensuring consistency of supply (over lifecycle of capex)
- **Price Competitiveness:** Meeting price points and logistics
- **Value of Provenance:** Finding value in other outcomes and augmenting extraction costs?

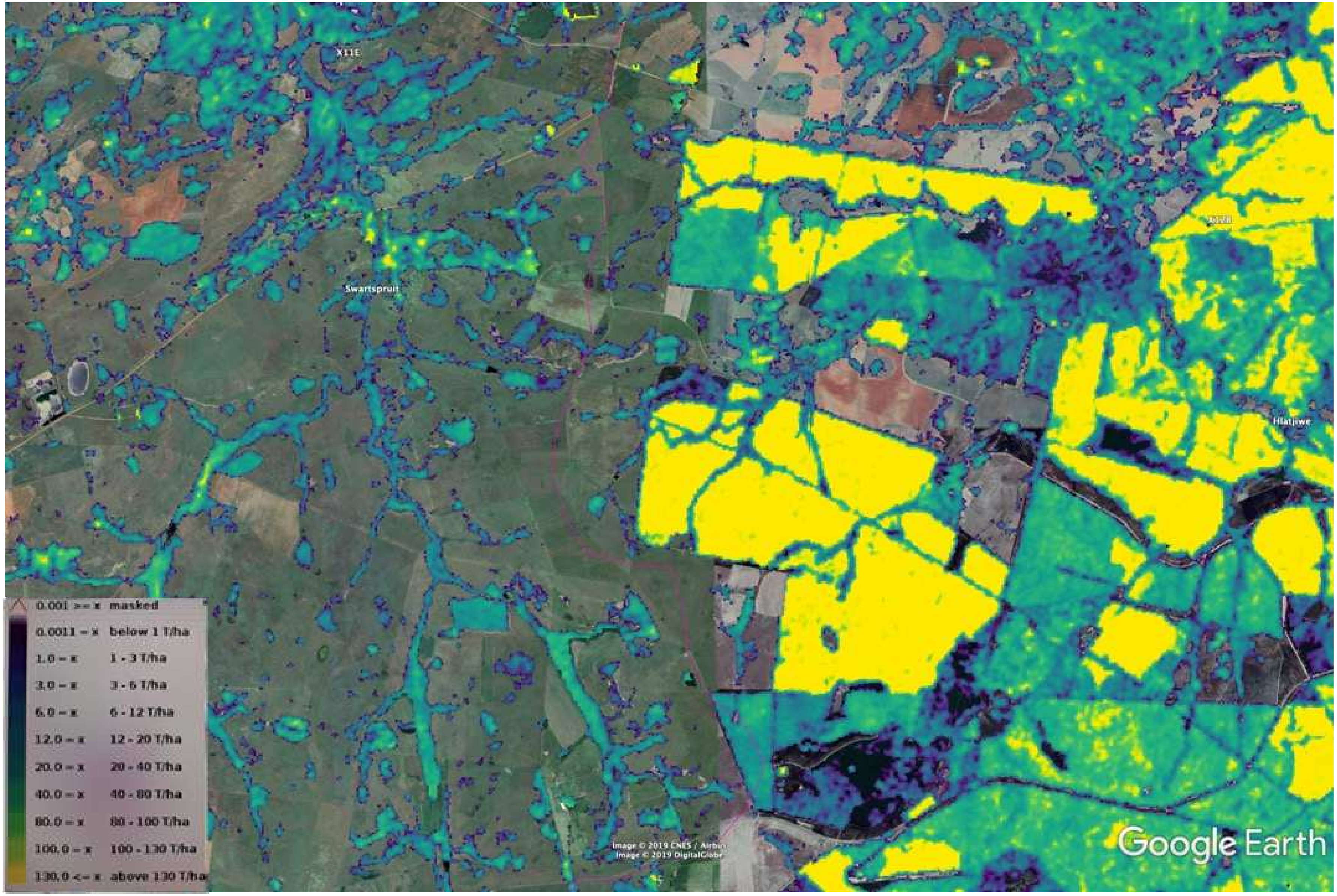
IAP Biomass VC: New Areas of Growth

- **Restoration:** Landscape clearing, restoration and restoration products
- **B2E (Clean) Energy**: Pellets / chips, heat & steam, biofuels
- **Pyrolised Biomass:** Charcoals, augmented and activated carbon products (water & air purification)
- **Agricultural Input Products:** Augmented Soils, soil additives, animal feeds. Agricultural feed:
- **Carbon Economy:** Sequestration & offsets & Virtuous Cycles
- **Niche Markets:** Aviation fuels, activated carbons, composites, chemicals

IAP-VC Industry Development: Way Forward

- **Identity:** Who is “the industry”?
- **Formality:** How do we formalize and grow new sectors?
- **Support & Protection:** How do we overcome market and legislative constraints?
- **Incentive and Innovation:** What do we do to stimulate innovation?
- **Value Chain Links:** How do we collaborate across jurisdictions and sectors?

Local Value Chains:
Map Specific Value Chains per Target Area with High Potential



X11E
Swartspruit
Hlatjiwe
0.001 >= x masked
0.0011 – x below 1 T/ha
1.0 – x 1 - 3 T/ha
3.0 – x 3 - 6 T/ha
6.0 – x 6 - 12 T/ha
12.0 – x 12 - 20 T/ha
20.0 – x 20 - 40 T/ha
40.0 – x 40 - 80 T/ha
80.0 – x 80 - 100 T/ha
100.0 – x 100 - 130 T/ha
130.0 <= x above 130 T/ha
Image © 2019 CNES / Airbus
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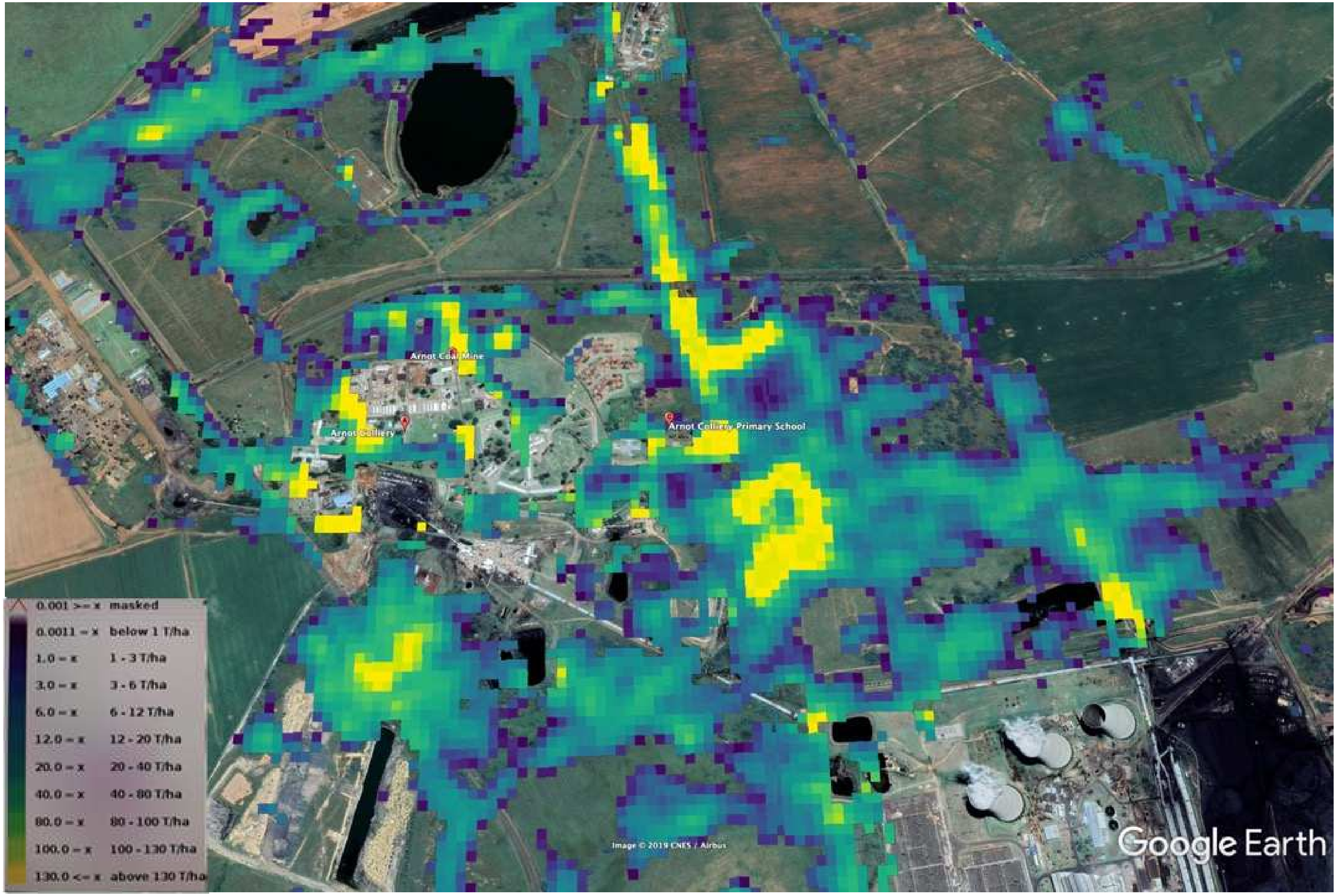
Arnot Coal Mine
Arnot Colliery
Arnot Colliery Primary School
Image © 2019 CNES / Airbus
Google Earth



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Arnot Colliery
Arnot Colliery Primary School
Image © 2019 CNES / Airbus
Google Earth
0.001 >= x masked
0.0011 = x below 1 T/ha
1.0 = x 1 - 3 T/ha
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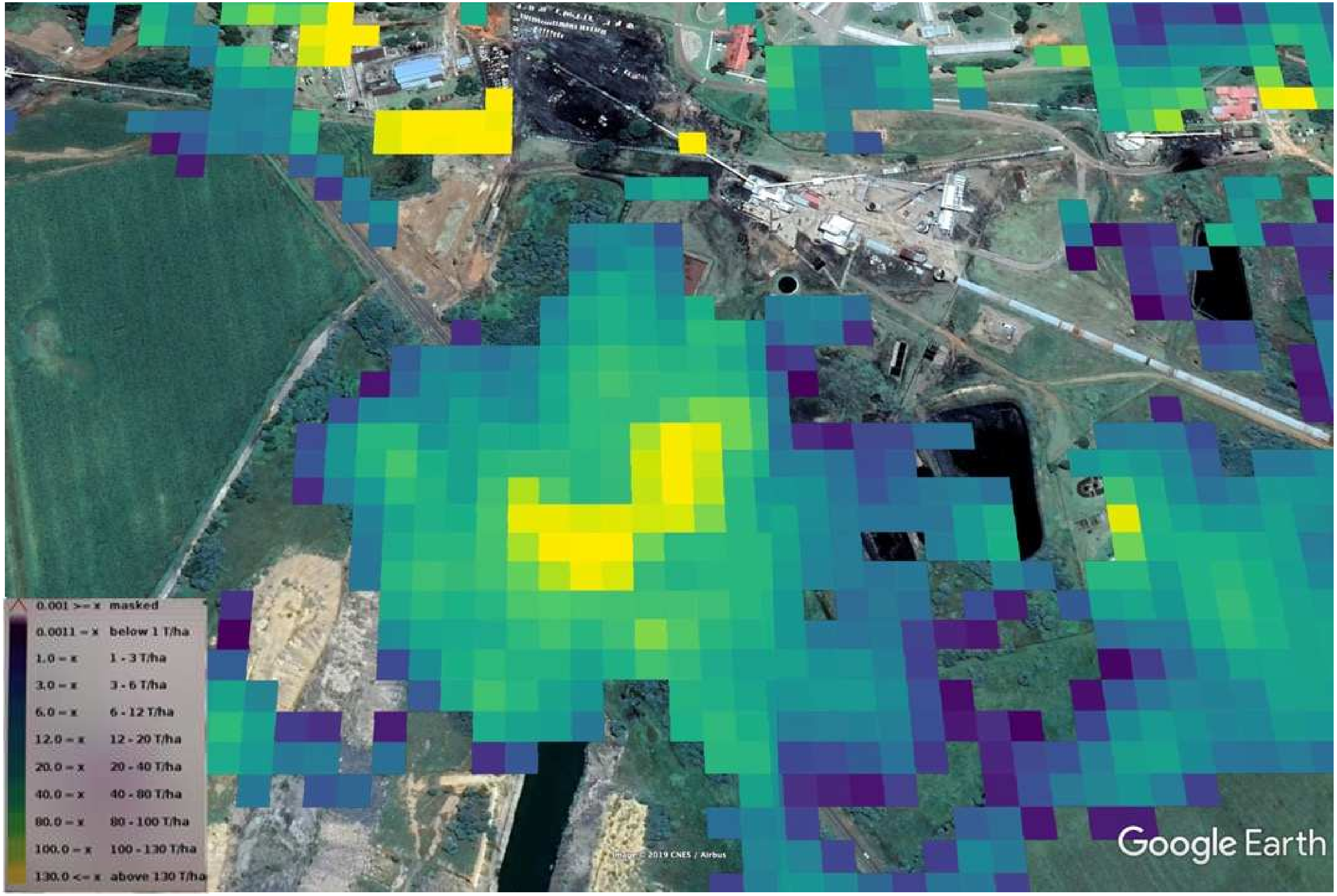
6.0 = x 6 - 12 T/ha
12.0 = x 12 - 20 T/ha
20.0 = x 20 - 40 T/ha
40.0 = x 40 - 80 T/ha
80.0 = x 80 - 100 T/ha
100.0 = x 100 - 130 T/ha
130.0 <= x above 130 T/ha


Google Earth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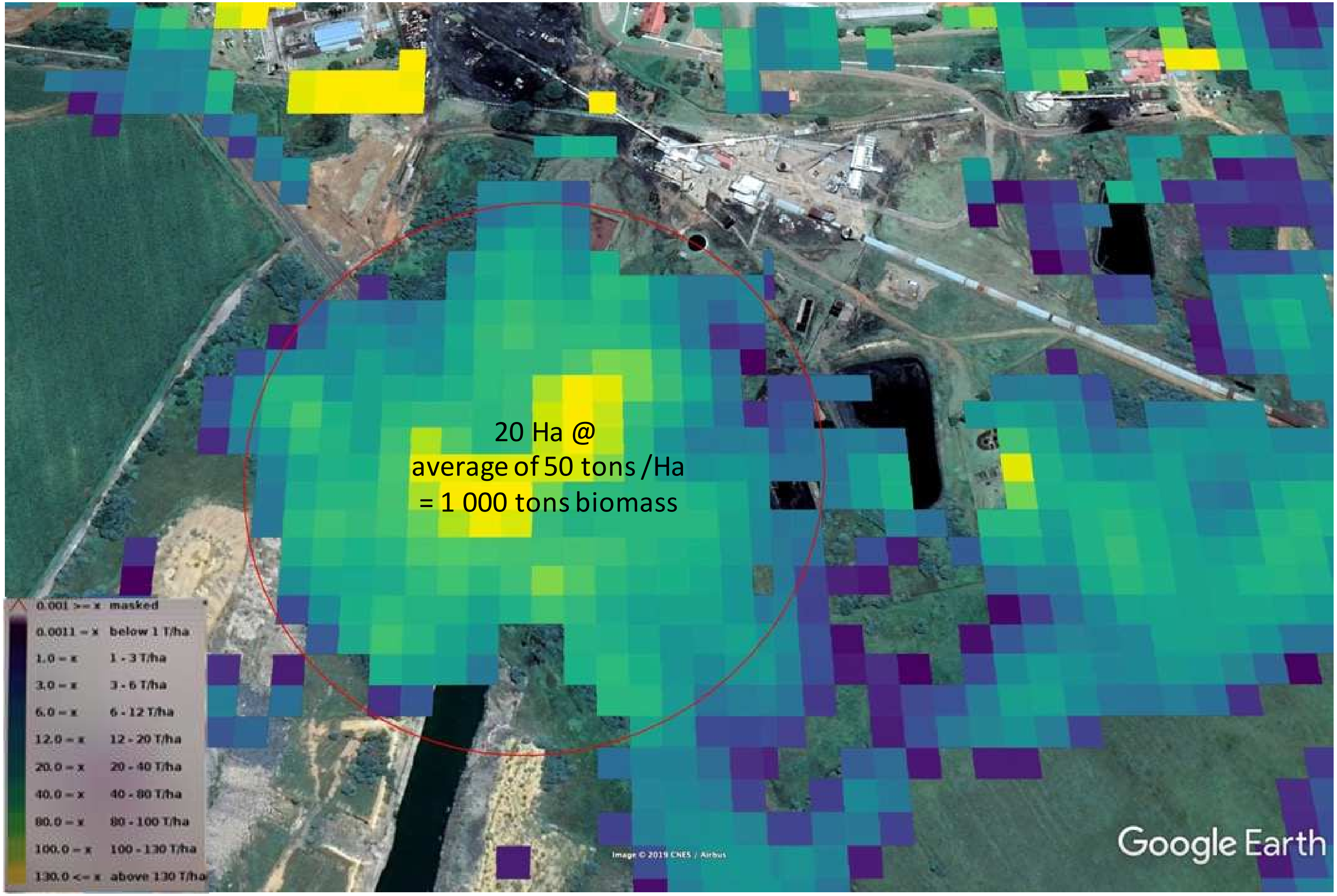

20 Ha @
average of 50 tons /Ha
= 1 000 tons biomass
0.001 >= x masked
0.0011 = x below 1 T/ha
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Image © 2019 CNES / Airbus
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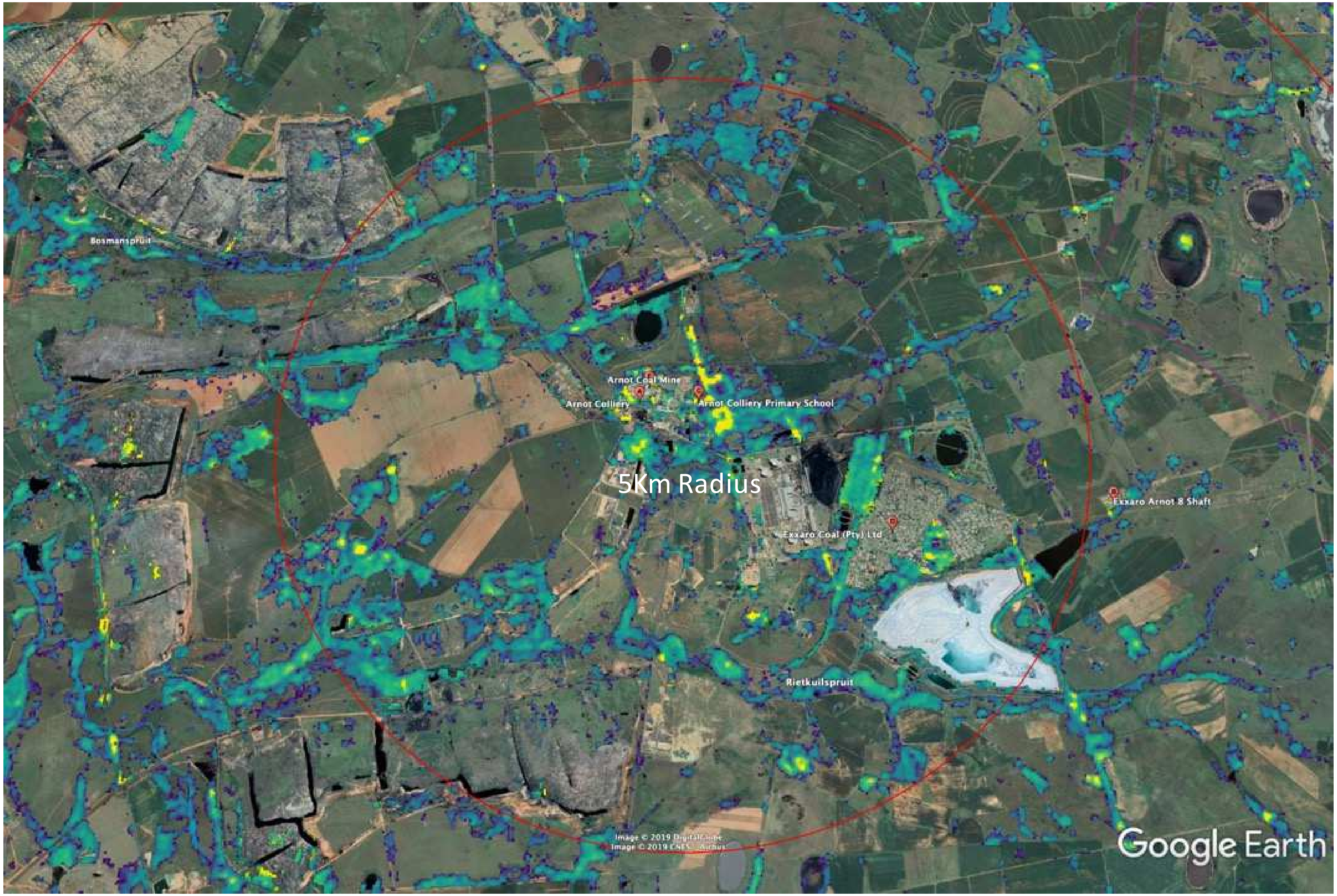
Bosmanspruit
Arnot Coal Mine
Arnot Colliery
Arnot Colliery Primary School
5Km Radius
Exxaro Arnot 8 Shaft
Exxaro Coal (Pty) Ltd
Rietkuilspruit
Image © 2019 DigitalGlobe
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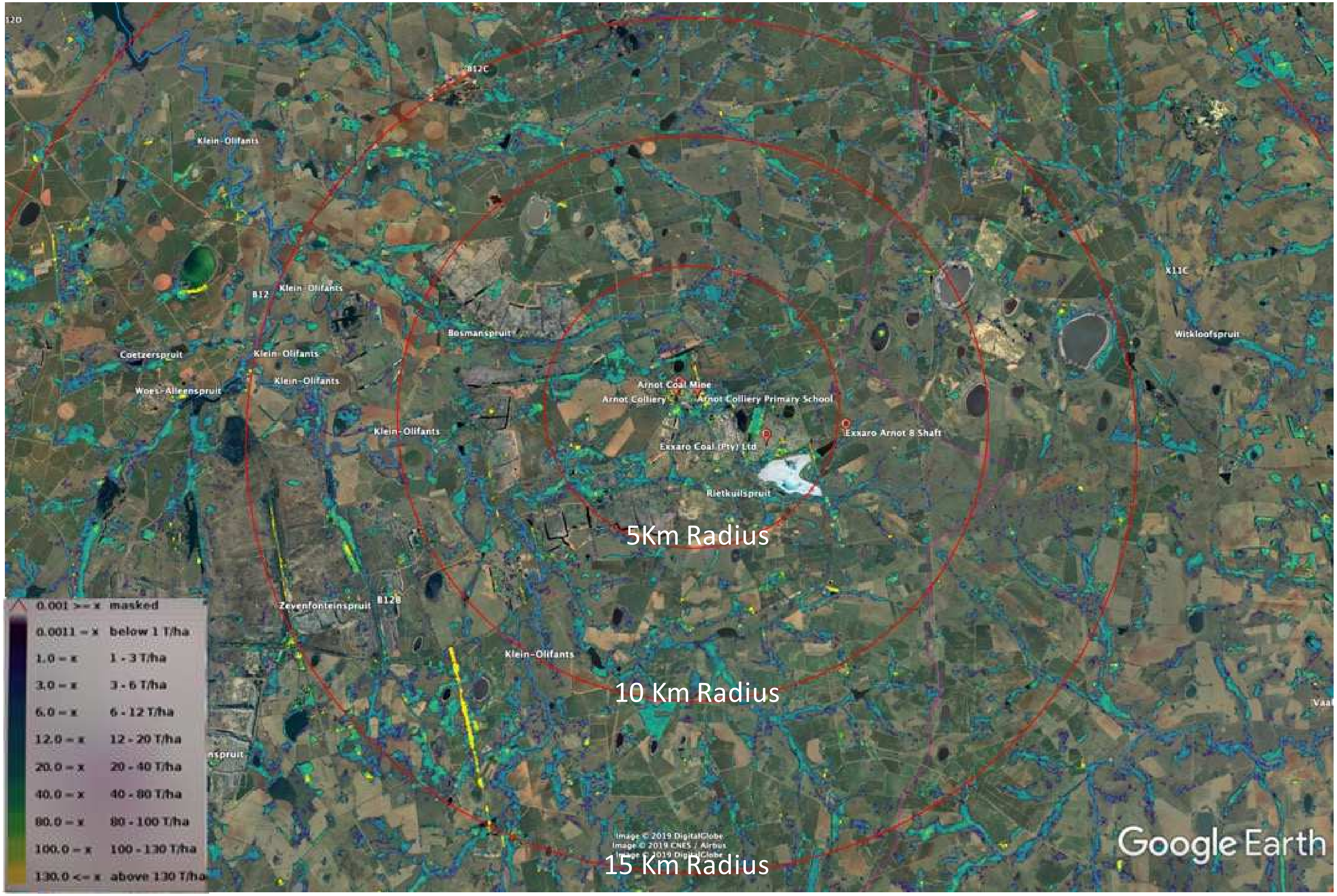
Klein-Olifants
B12C
Klein-Olifants
B12
Bosmanspruit
Coetzerspruit
Klein-Olifants
Klein-Olifants
Woes-Alleenspruit
Klein-Olifants
Arnot Coal Mine
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Exxaro Arnot 8 Shaft
Rietkuilspruit
X11C
Witkloofspruit
5Km Radius
Zevenfonteinspruit
B12B
Klein-Olifants
10 Km Radius
15 Km Radius
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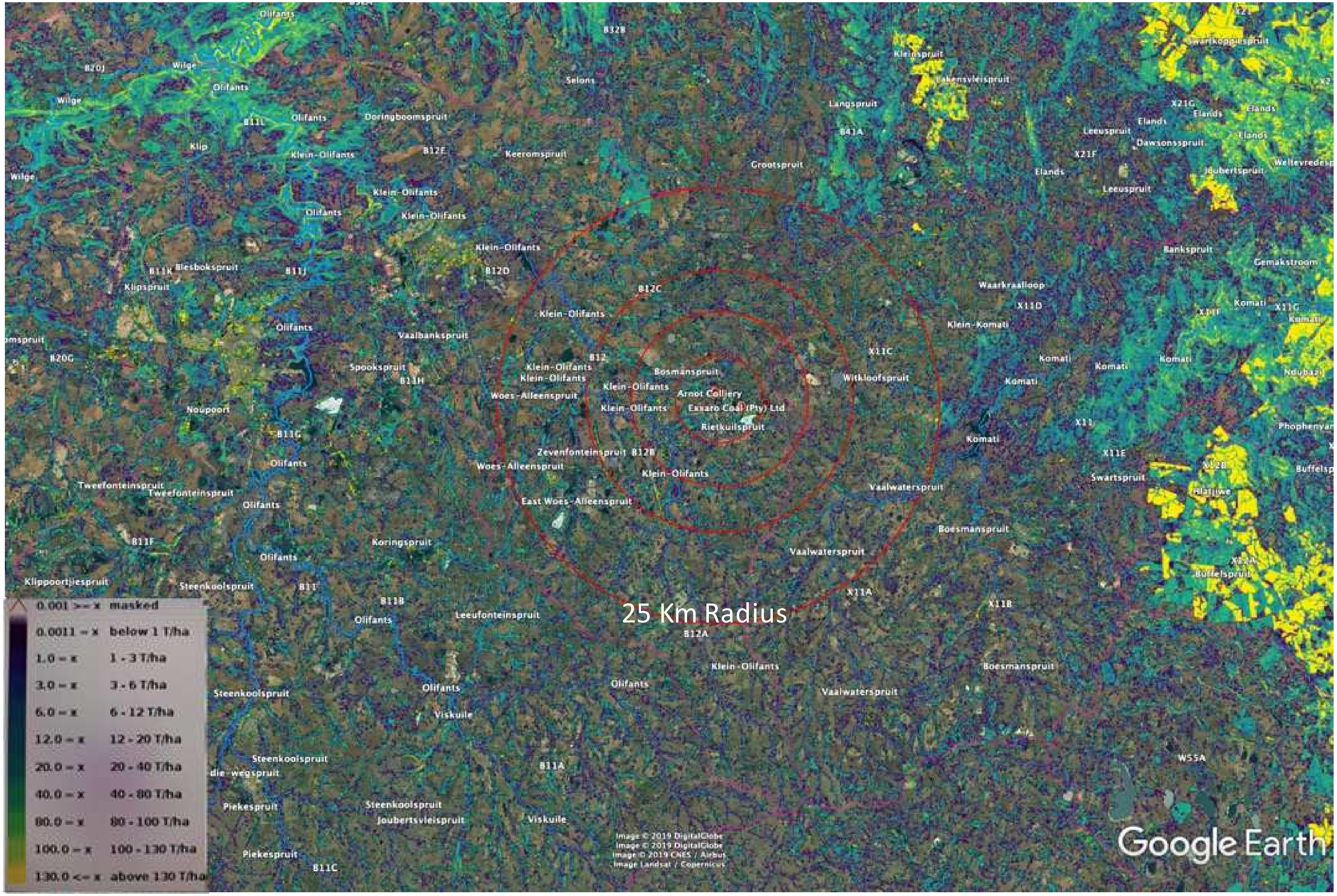
25 Km Radius
Arnot Colliery
Exxaro Coal (Pty) Ltd
Rietkuilspruit
Bosmanspruit
Klein-Olifants
Witkloofspruit
Zevenfonteinspruit
B12B
B12C
B12D
B12A
Woes-Alleenspruit
East Woes-Alleenspruit
Vaalwaterspruit
Boesmanspruit
Komati
Klein-Komati
Waarkraalloop
X11C
X11D
X11A
X11B
Grootspruit
Keeromspruit
Doringboomspruit
Selons
Langspruit
Olifants
Wilge
Klip
Blesbokspruit
Klipspruit
Noupoort
Spookspruit
Vaalbankspruit
Tweefonteinspruit
Koringspruit
Klippoortjiespruit
Steenkoolspruit
Leeufonteinspruit
Viskuile
Piekespruit
Joubertsvleispruit
Elands
Leeuspruit
Dawsonsspruit
Joubertspruit
Bankspruit
Gemakstroom
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Buffelspruit
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130.0 <= x above 130 T/ha
Image © 2019 DigitalGlobe
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Image Landsat / Copernicus
Google Earth

Engagement Process

Phase 1: SCOPING: Data Collection
- Actors Assessment
- Spatial Data
- Biomass Characterisation
- General Biomass Market Assessment
- Site Visit (Atlantis & Riviersonderend)

OUTPUT: Information
- Social Engagement Session Outcomes
- GIS Mapping: Priority Catchments, landowners, LUIs
- Biomass Value Potential Calculation: Species, Density & Access
- Biomass Value Chain: Mapping Potential Routes to Market
- Partner Scoping

Phase 2: CONCEPTUALISATION
- Consultants Workshop
- Partner Meetings and Engagements
- Draft Concept Note
- Go / No Go Decision

OUTPUT: Concept Note (max 10 pages with Annexes)
- Project Objectives
- Biomass Value Chain: Priority Routes to Market
- Social Facilitation
- Clearing & Rehabilitation Approach
- SMME Development Approach
- Monitoring & Evaluation: Framework

Phase 3: FEASIBILITY
- Detailed Modelling & Design
- Securing Partners
- MoU & Partner Agreements
- Approval & Implementation

OUTPUT: Feasibility, Implmnt Plan & Budget
- Institutional Structure & Roles
- Feasibility Model
- Implementation Plan
- Implementation Budget & Funders
- Monitoring & Evaluation Reporting

The Umzinvubu: Value Chain 'Hit-List'

Clearing Site Level:
- Rehabilitation

Community-Level
- Fuel: Firewood & Pellets
- Materials: Building & Fencing

Local Level
- Fuel: Firewood & Charcoal
- Energy Generation

Regional Level
- Biomass for Wood Products
- Fuels (Firewood, charcoal)
- Energy Generation
- Animal Feed
- Biochar

International level
- Pulp, chips
- Energy products

IMMEDIATE CONSIDERATION

Clearing Site Level:
- Rehabilitation

Community-Level
- Fuel: Firewood
- Building & Fencing materials

Local Level
- Fuel: Firewood
- Fuel: Charcoal & Pellets

Regional Level
- Biomass for wood products
- Fuels: Charcoal
- Energy Generation: Biomass and pellets
- Animal feed
- Biochar Pilot?

B.3. VC Specification & Development: Analysing the Value Chains and Supply Chains - Overall Value Pathway

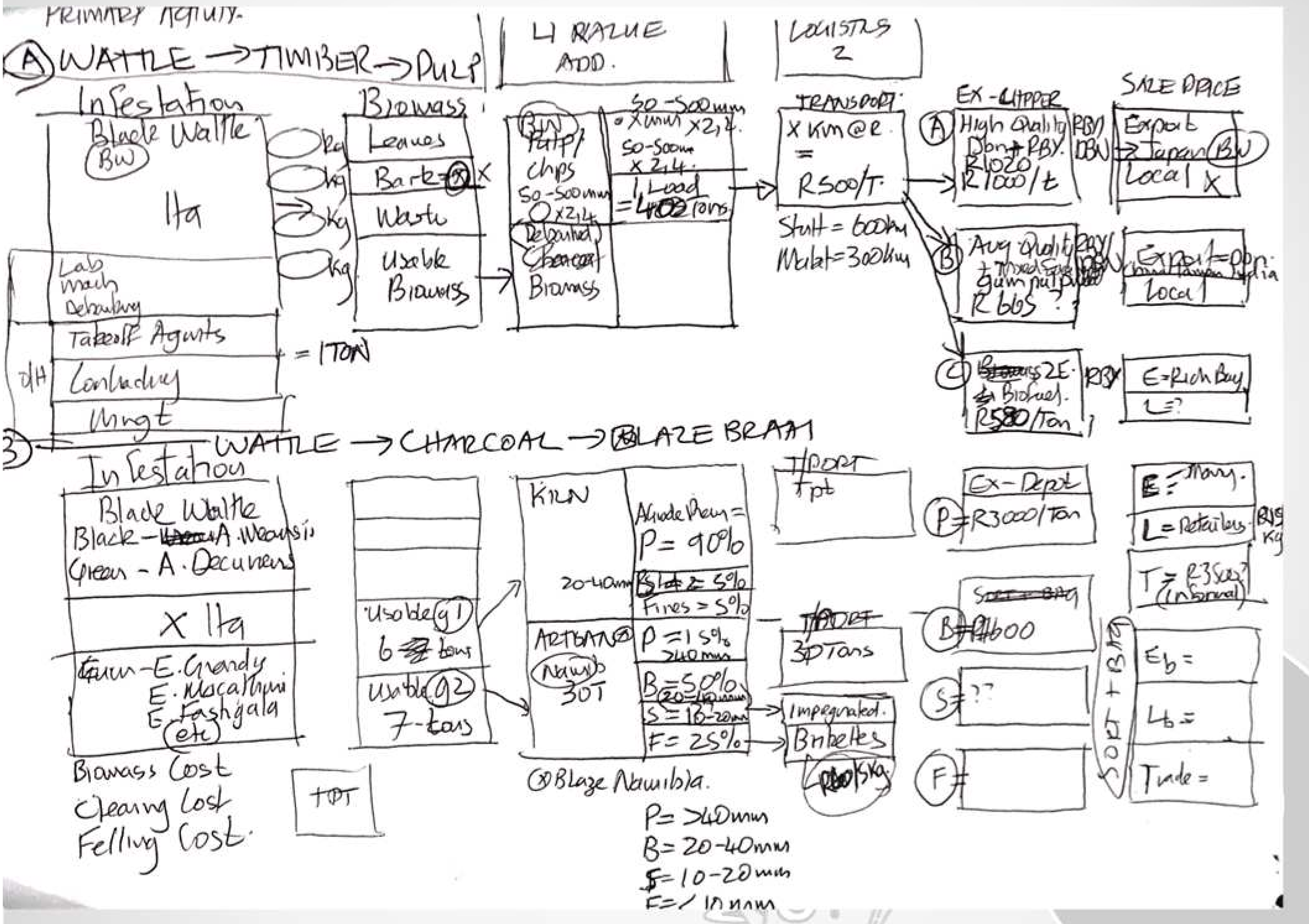
Analysing the Value Chain and Supply Chains Working for Water to Harvest

A. ASSESS BIOMASS VALUE (Mensuration)	B. SECURE BIOMASS SUPPLY (Offtake Agreements)	C. CONTRACTING (Clearing Contracts)	D. CLEAR & ERADICATE (Invasive Clearing)	E. REHABILITATE (Ecology Restoration)	F. SILVICULTURE (Reforestation)	G. HARVEST (Capture Value)
A.1. PRIORITY CATCHMENTS 4 Target Catchments	B.1. OFFTAKE 1 DEA Working for Water	C.1. Public Contract Clearing (Working for Water, Fire)	D.1. Cut & Clear Bush & Scrub	E.1. Erosion Prevention & Control Primary & Secondary	F.1. De-Stump X	G.1. Cut & Clear X
A.2. CLEARING LOCATIONS Map Infestations	B.2. OFFTAKE 2 Private Farm Land	C.2. Community Clearing Traditional Authority	D.2. Felling Woody Biomass	E.2. Mulching / Biochar X	F.2. Mulch X	G.2. Felling X
A.3. SPECIES IDENTIFICATION Value Chain Potential	B.3. OFFTAKE 3 Commercial Forest	C.3. Private Contract Clearing Private Land	D.3. Poisoning Initial & follow-on	E.3. Working for Wetlands X	F.3. Pitting X	G.3 Skidding / Moving X
A.4. VALUE CHARACTERISATION Form & Density	B.4. OFFTAKE 4 Other Government Land	C.4. Private Harvesting Biomass Harvesting	D.4. Repeat Cycles Clear &	E.4. Trees for Africa X	F.4. Plant & Fertilise X	G.4. Sorting X
A.5. VALUE CHAIN POTENTIAL Best Value Opportunity	B.5. OFFTAKE 5 Other Private Land	C.5. Implementing Agents X	C.2. X	E.5. Sustainable Forests X	F.5. Weed Control X	G.5. Preparation X
	Communal Land	C.6. SMME Contractors X		E.6. Rangeland Rehabilitation X		G.6 Informal Firewood Collection

B.3. VC Specification & Development: Analysing the Value Chains and Supply Chains - Overall Value Pathway

Analysing the Value Chain & Supply Chains: Harvest to Market

G. HARVEST (Capture Value)	H. ON-SITE VALUE ADD (Mobile Activities)	I. LOGISTICS (Transport & Store)	J. OFF-SITE VALUE ADD Energy / Fuel Products	K. OFF-SITE VALUE ADD Wood Products	L. OFF-SITE VALUE ADD Pulp & Fibre	M. OFF-SITE VALUE ADD Compost & Nutrients	N. MARKETS Guaranteed Offtakes
G.1. Cut & Clear X	H.1. Shearing Mobile Leaves & Bark	I.1. On-site Storage X				M.1. Animal Feeds X	H.1. Agriculture Sector
G.2. Felling X	H.2. Chipping Mobile Chipper	I.2. On-Site Loading X	J.? Pelletisation Pellet Production	K.1. Agriculture Products Chips & Mulch	L.1 Building Materials Lighthouse Product	M.2. Tannin Distillation x	H.2. Chemical Sector
G.3 Skidding / Moving X	H.3. Lats & Poles X	I.3. SMME Transport SMME		K.1. Garden & Home Products Ornamentals			H.3. Construction Sector
G.4. Sorting X	H.4. Raw Biomass Harvest Lignocellulose Biomass	I.4. Specialist Transport Contract Transport	J.4. Biomass to Energy Ethanol B2E Furnace/ Generator		L.2. Pulp & Paper		H.4. Pulp & Paper Sector
G.5. Preparation X	H.5. Logging Timber / Poles Mobile Logger / Canter	I.5. Offload & Store X	J.6 Biomass to Fuel Biodiesel to BioAvgas				H.5. Manufacturing Sector
G.6 Informal Firewood Collection	H.5. Firewood Preparation Cut (& Bag)	I.6. Other? X	J.5. Firewood Production Cut (& Bundle / Bag)	K.2. Wet Milling Planks			H.5. Education
	H.6. Charcoal Production Mobile Charcoal Plant		J.7. Charcoal Production Furnace, Brickette, Bag	K.3 Dry Milling Machining			H.6. Other
	H.7. Canting Mobile Milling			K.4 Furniture Manufacture Desks, Bookcases, Etc		M.3. Biochar Production Pyrolysis	H.7. Other
	H.8. Other			K.5. Coffin Manufacture x			H.8. Other


PRIMARY ACTIVITY.
(A) WATTLE → TIMBER → PULP
4 VALUE ADD.
LOGISTICS 2
Infestation
Black Wattle (BW)
1Ha
Lab
mech
Debarking
Takeoff Agents
Contracting
Mngt
O/H
= 1TON
Kg
Kg
Kg
Kg
Biomass
Leaves
Bark
Waste
Usable Biomass
BW Pulp/ chips 50-500mm x2,4
Debarked Charcoal Biomass
50-500mm x2,4.
50-500mm x2,4.
1 Load = 40 tons
TRANSPORT
X km @ R = R500/T.
Stutt = 600km
Mielat = 300km
EX-CHIPPER
(A) High Quality Don + RBY. R1020 R1000/t
(B) Avg Quality + Mixed gum pulp R 665?
(C) 2E. Biofuel. R580/Ton
RBY DBN
SALE PRICE
Export → Japan (BW)
Local X
Export = Japan India
Local
E = Rich Bay
L = ?
(B) WATTLE → CHARCOAL → BLAZE BRAND
Infestation
Black Wattle
Black - A. Mearnsii
Green - A. Decurrens
X Ha
Gum - E. Grandis
E. Macarthuri
E. Fastigiata
etc
Biomass Cost
Clearing Cost
Felling Cost.
TPT
Usable (g1) 6 tons
Usable (g2) 7-tons
KILN
Artisanal (Namib) 30T
Anode Plenty = P = 90%
20-40mm B = 5%
Fines > 5%
P = 15% >40mm
B = 50% 20-40mm
S = 10-20mm
F = 25%
Blaze Namibia.
P = >40mm
B = 20-40mm
S = 10-20mm
F = < 10mm
T/port Tpt
30 Tons
Impregnated.
Briquettes
Ex-Depot
P = R3000/Ton
B = R1600
S = ?
F =
E = Many.
L = Retailers R15 Kg
T = R350? (informal)
50T + BRB
Eb =
Lb =
Trade =

PRIMARY ACTIVITY.

(A) WATTLE → TIMBER → PULP

4 VALUE ADD.

LOGISTICS 2

Infestation

Black Wattle (BW)

1Ha

Lab
Mach
Debarking

Takeoff Agents

O/H Contracting

Mngt

= 1TON

kg
kg
kg
kg

Biomass:

Leaves

Bark = X

Waste

Usable Biomass

BW Pulp/chips
50-500mm
x2,4

Debarked Charcoal Biomass

50-500mm
• X mm x2,4.
50-500mm
x 2,4.
1 Load
= ~~4~~ 40 Tons

TRANSPORT
X Km @ R
=
R500/T.

Stutt = 600km
Mutat = 300km

EX-CHIPPER

(A) High Quality
Don+ RBY.
R1020
R1000/t
RBY DBN

(B) Avg Quality
+ Mixed
gum pulp
R 605 ?
RBY DBN

(C) ~~Biomass~~ 2E
Biofuel.
R580/Ton
RBY

SALE PRICE

Export → Japan (BW)
Local X

Export = ...
Local

E = Rich Bay
L = ?

(B) WATTLE → CHARCOAL → (x) BLAZE BRAAI

Infestation

Black Wattle
Black – A. Mearnsii
Green – A. Decurrens

X Ha

Gum – E. Grandy
E. Macarthuri
E. Fastigiata
etc

Biomass Cost
Clearing Cost
Felling Cost.

TPT

Usable (g1)
6 tons

Usable (g2)
7-tons

KILN

Actual Recovery =
P = 90%
20-40mm ~~B~~ = 5%
Fines = 5%

ARTISAN (x)
(Namib)
30T

P = 15%
>40mm
B = 50%
20-40mm
S = 10-20mm
F = 25%

T/PORT
Tpt

~~T/PORT~~
30 Tons

Impregnated.
Briquettes
(500) 5kg

(x) Blaze Namibia.

P = >40mm
B = 20-40mm
S = 10-20mm
F = < 10mm

Ex-Depot
(P) = R3000/Ton

~~SOFT = BAG~~
(B) = R1600

(S) = ??

(F) =

E = Many.
L = Retailers
R15 kg
T = R35 ... ?
(informal)

Soft + BAG

E_b =
L_b =
Trade =


DEA
EPWP
DoA
NO GRAZING
LODGE
POLES
BUILDING MATERIALS
CHARCOAL
COMPOST
AUCTION
FARM FOR SALE cheap!
GOOD TIME SHEBEEN
WELFARE
SPAZA
CLINIC
Clean Water!
Better Services NOW