



Herbicides, Government and People

How do we make it work?

AIS, Stakeholder Engagements, Stellenbosch, 2021

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Environmental Programmes

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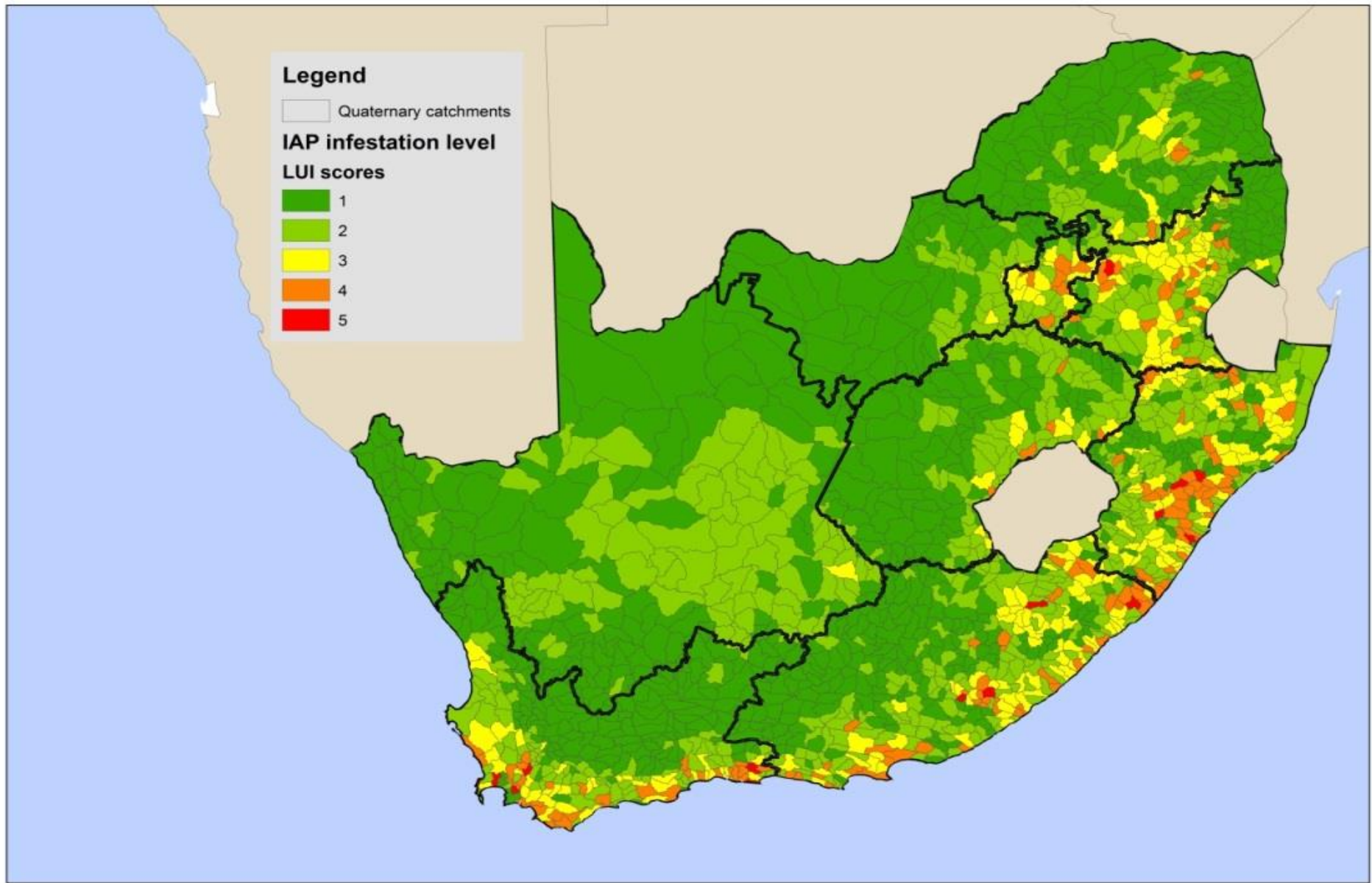
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Department:
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NRM Background

- Working for Water
 - Terrestrial projects – R 1b
 - Aquatic weed projects – R 42m
 - Rope access projects – R 65m
 - Emerging species projects – R21m
- Working on Fire – R556m
- Working for Wetlands – R135m
- Working for Ecosystem services – R80m
- Working for Forests – R10m



International legislation

- Rotterdam convention (PICs) Annexure III
- PICS – Prior informed consent
 - Help countries make informed decisions re: import of banned or restricted pesticides
- Stockholm convention (POPs) – illuminate and restrict use and manufacturing of POPs

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WHO* Class		LD ₅₀ for rat (mg/kg body weight)		*IARC Classification system			
		Oral	Dermal	Group 1:	Carcinogenic to humans		
Ia	Extremely hazardous	< 5	< 50	Group 2A:	Probably carcinogenic to humans		
				Group 2B:	Possibly carcinogenic to humans		
				Group 3:	Not classifiable as to its carcinogenicity to humans		
				Group 4:	Probably not carcinogenic to humans		
Ib	Highly hazardous	5-50	50-200	* Internation al Agency for Research on Cancer			
II	Moderately hazardous	50-2000	200-2000				
III	Slightly hazardous	Over 2000	Over 2000				
U	Unlikely to present acute Hazard	5000 or higher					
* World Health Organisation					//monographs.iarc.fr		
					www.unece.org/		

www.who.int/classifications

GHS* category	LD50 (mg/kg body weight)	Classification criteria		
		Oral	Dermal	
		Hazard statement	LD50 (mg/kg body weight)	Hazard statement
Category 1	<5	Fatal if swallowed	<50	Fatal in contact with skin
Category 2	5-50	Fatal if swallowed	50-200	Fatal in contact with skin
Category 3	50-300	Toxic if swallowed	200-1000	Toxic in contact with skin
Category 4	300-2000	Harmful if swallowed	1000-2000	Harmful in contact with skin
Category 5	2000-5000	May be harmful if swallowed	2000-5000	May be harmful in contact with skin
* Globally Harmonised System of Classification and Labelling of Chemicals				

Trade Name	Chemical Family	Active ingredient	HRAC herbicide group code	WHO class
EXTREME 50 WP	Sulfonylurea	Chlorimuron ethyl (sulfonyl urea) 500g/L	B	III
CLIMAX	Sulfonylurea	Metsulfuron methyl (sulfonyl urea) 600g/L	B	IV
CHOPPER	Imidazolinone	Imazapyr (imidazolinone) 100 g/L	B	IV
HATCHET	Imidazolinone	Imazapyr (Imidazolinone) 100g/L	B	III
STARKEM 600 WG	Sulfonylurea	Metsulfuron methyl 600 g/kg	B	III
BRUSH-OFF	Sulfonylurea	Metsulfuron methyl (sulfonyl urea) 600g/kg	B	IV
Forester	Sulfonylurea	Metsulfuron methyl (sulfonyl urea) 600g/kg	B	IV
SPEAR 240 SL	Imizadolinone	Imazapyr (imizadolinone) 240g/L	B	IV
BUNDU SC	Uracil + Urea (inhibition of photosynthesis at photosystem II)	Bromacil(substituted uracil) 250g/L + Tebuthiuron (urea compound) 250g/L	C1+C2	II
LIMPOPO SC	Urea (inhibition of photosynthesis at photosystem II)	Tebuthiuron (urea compound) 500g/L	C2	II

Act 36

Fertilizers, farms feeds, Agricultural remedies and stock remedies Act, 1947

- Governs all registrations of fertilizers or pesticides (section 3)
- Governs registrations of PCO's (section 11)
- Regulates/prohibits importation, sale, acquisition, disposal or use (Sections 15, 7, 4 resp)

- Registrar can cancel registration (Section 4) under certain conditions or make unscheduled visits (section 15)
- Demand paperwork for herbicides in your possession
- Grant import permits (section 16)
- Appeals (section 6)

Pesticide Management Policy

Notice 1120 of 2010

- Improve legislative framework
- Encourage development and use of alternative products and techniques
- Integrate relevant international agreements and initiatives
- Increase transparency, access to information and public participation

- Pesticides with unmanageable risk
 - Endocrine disrupting properties (EDP)
 - Persistent organic pollutants (POP)
 - Carcinogenic & immunotoxic potential (class 1a)
 - Highly hazardous (class 1b)
 - Pesticides with frequent and severe poisoning incidents (arsenic, 2a)

- NEMA encourages
 - Implementation comprehensive pesticide reduction strategies
 - Substitution principles – promote pesticides with lesser toxic ones & non chemical alternatives
 - Review of existing registrations
 - Waste management incl empty containers & obsolete chemicals (Basel)
- DAFF responsible for herbicide container management (section 4(v))(Basel)

NRM Pesticide Policy

- Updated in 2012, continuously under review
- Covers all herbicides used
- Certain herbicides not covered by our policy
 - E.g. MSMA
- Biopesticides preferred
 - *Cylindrobasidium laeve* – wood rotting fungus – Acacias
- Agreed control measures

Muir, 2012

Herbicide species spreadsheet

- One stop shop for IAP control
- CARA, NEM:BA species
- 424 species
- 14 treatment methods
- 31 formulations
- 53 herbicides
- 13 biopesticides
- 3 herbicide categories

Species	Genus	Size class	Treatment method	Herbicide	Dosage (mℓ / g)	Wetter/ Dye	a.i. (L/ kg)	Mix (L)	% mix	Estimated product (L/ha or kg/ha)	Volume of mix
ataxacantha	Acacia	Young	Foliar spray	Picloram (as potassium salt) 240g/L SL	35	0.50%	0.035	10	0.35	1.4	400
baileyana	Acacia	Seedling	Foliar spray	Clopyralid 90 + Triclopyr (as amine salt) 270 g/L SL	50	0.50%	0.05	10	0.5	1.5	300
				Triclopyr (as butoxy ethyl ester) 240 g/L + Aminopyralid 30 g/L	25	0.50%	0.025	10	0.25	0.75	300
		Young	Lopping / Pruning	Triclopyr (as amine salt) 360 g/L SL	300	0.50%	0.3	10	3	6	200
		Adult	Cut stump / Frill	Cylindrobasidium laeve	1 sachet / 400ml sunflower oil						200
Triclopyr (as amine salt) 360 g/L SL	300			0.50%	0.3	10	3	6	200		
borleae	Acacia			None							

Safety

- Health and safety Officer
- Toolbox talks
- Herbicide toxicity research – UCT
- PPE – updated policy in line with FAO
- Self assessment/ compliance auditing directorate

Challenges

- High rate of foliar applications
 - Labour intensive
 - Alternative
- Staff not wearing PPE correctly
- Incorrect PPE recommended
- Herbicide companies not disclosing adjuvants in aquatic registered herbicides

Way forward

- Measures to mitigate risk
- Research outcomes of herbicide toxicity exposure implemented
- Awareness of potential risks of herbicides
- Utilise alternate measures where possible (Biocontrol, brashing, fire etc.)

- HOC, engineering – encapsulation, biodegradable
- ESRA important per a.i.
- Biobeds, exclusion and buffer zones

- Case study.....



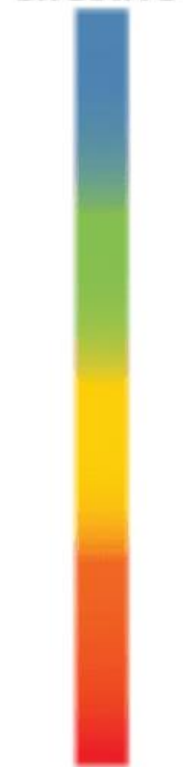
Background

- Embarked on elimination process in 2010
 - Eliminated 5 pesticides
- Substituted 6 pesticides since 2010 with safer ones (Impala (MSMA), Turbador (Garlon + Diesel), Sendero (glyphosate + POE-E aerial in NC), Kaput gel (paint on) and Seismic & Kilo max (POE-T GBH's for AW's)
- Currently working on engineering controls (formulation changes to ensure product is safe)

- Steps taken to mitigate risk and lessen impacts needed to implement new PPE policy and Biomonitoring to monitor human health risks in line with GHS and HCA regulations
- PPE is the LAST step to protect people from risk..... thus biomonitoring is also required is acute and chronic risk pesticides are used

Hierarchy of Controls

Most effective



Least effective



Source: NIOSH



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Food and Agriculture
Organization of the
United Nations



World Health
Organization

International Code of Conduct
on Pesticide Management

Guidelines for personal protection when handling and applying pesticides



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<http://www.fao.org/3/ca7430en/ca7430en.pdf>



Remember.....

- Look at the species spreadsheet and choose the species you want to control
- Look at the herbicides registered for that species and recommend the safest herbicide by:
- Ensuring you look at the HC for each pesticide, human health and environmental risks and ensure you can mitigate with engineering controls, behavioural protocols or PPE and,
- Do a risk assessment

Useful info for ESRA's : <https://sitem.herts.ac.uk/aeru/ppdb/en/atoz.htm>

Black wattle – cut stump

Hatchet	Plenum	Access	Confront	Timbrel
HC2 – acute tox mammals & birds. H319, H335, H315	HC2, - H302, H312, H319, H332 Harmful if swallowed, inhaled in contact skin	HC2 – H302, H312, H319, H332 Harmful if swallowed and inhaled	HC2 – H302, H315, H317, H318, H319, H335, H373 Harmful swallowed Damage kidneys & organs, allergic reaction	HC2 – H302, H317, H318, H315, H335, H336, H360 Eye and skin irritation, resp irrit.
HC 8 – persistence in soil/water. H412 – harmful to AL with LLE	HC3 – carcinogen H335 – respiratory irritation	HC3 – carcinogen H335	HC 5- develop & Reproduct tox H360 – damage unborn child	HC8 – soil resistance – H411
	HC6 – EDC H370 – damage to 9 organs – lungs	HC6 – EDC H370 – damage to lungs	HC 8-H411	
	HC7 – H400	HC7 – acute tox to aquatic orgs H400 – very toxic		
	HC8 – H410, H412	HC8 – H410, H412		



THANK YOU!

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Thank You



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