

LEAD
13000 OF THEM
MERCURY
CADMIUM
BISPHENOLS (BPA)
PHTHALATES
PERC AND TCE
PESTICIDES
PFAS, PFOS
FLAME RETARDANTS
PLASTICISERS

ALERT AFRICA (CAA)

Situation Analysis of Endocrine Disrupting Chemicals in South Africa: Legislation, Policies and Programmes

2024



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Kevin Dornbrack carried out the analysis for the report, developed the structure and was the principal author, with inputs from Llewellyn Botha, Jane Ferguson and Bruce Dick.

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A Situational Analysis of Endocrine Disrupting Chemicals and Emerging Contaminants of Concern in South Africa

2024

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Executive

SUMMARY



With the increasing recognition of Endocrine Disrupting Chemicals (EDCs) in South Africa, this report provides a comprehensive review of the country's national regulatory frameworks for the control and mitigation of potentially harmful chemicals, including EDCs, and an overview of work currently being carried out by organisations that pertain to Endocrine Disrupting Chemicals .

Although EDCs are infrequently named as such in the regulatory activities of South Africa, Part 1 of this report lists and reviews all the Acts that have implications for the control of EDCs and outlines the relevant laws, regulations, policies, strategies, implementation plans and amendments, often the responsibility of a number of different government departments. The review of government documents is supplemented by news articles and commentaries on contemporary activities and the levels of implementation of these government directives, as illustrated by the challenges facing the National Committee on Chemical Management (NCCM), which includes representation from 17 government departments.

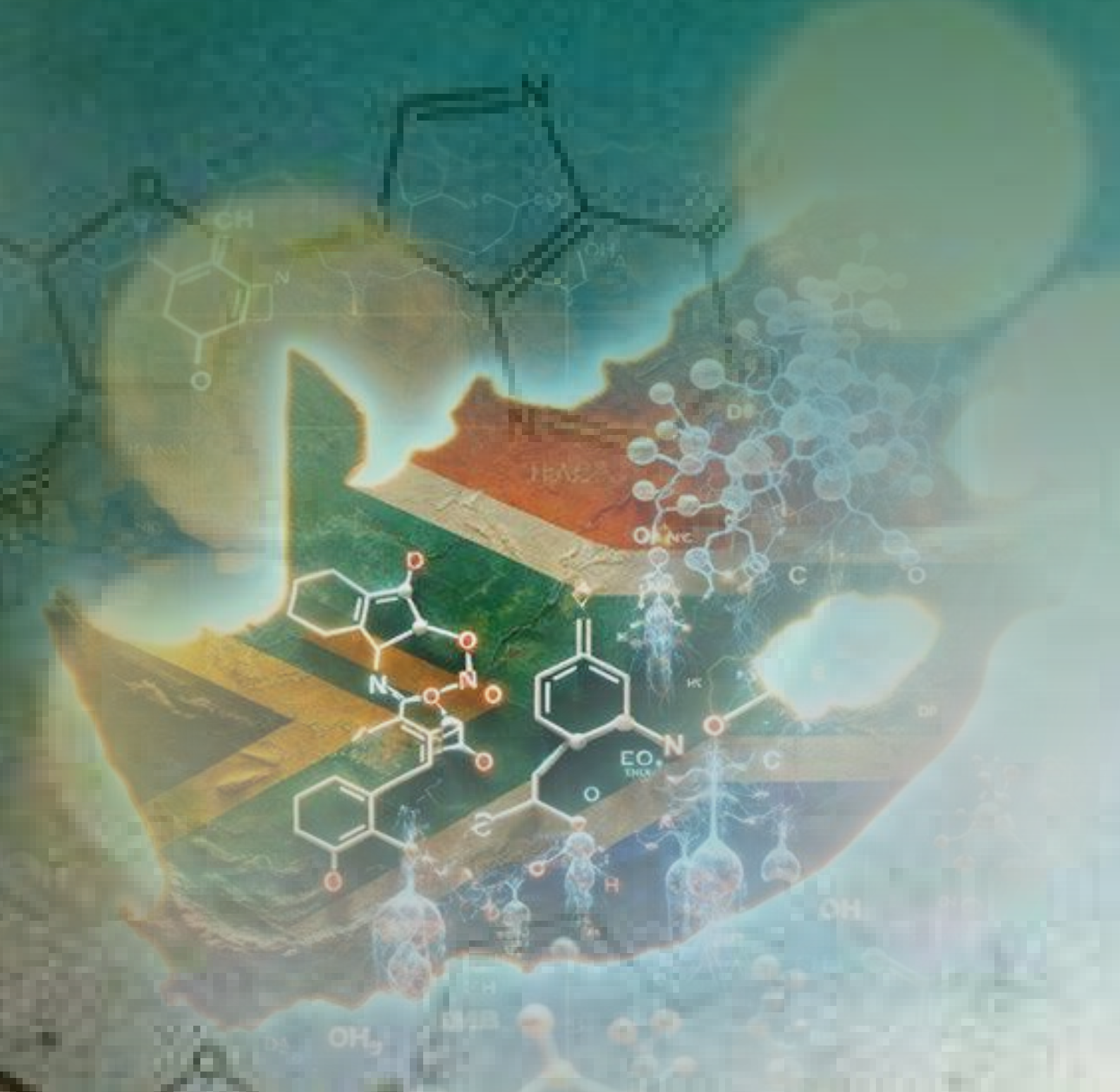
Part 1 of the report additionally provides a brief review of international conventions, regulations and protocols pertaining to EDCs, how South Africa has responded to them in terms of integration and implementation, and commentary on the effectiveness of these agreements. This section provides a broader context and potential guidance for South Africa's regulatory frameworks, and includes two case studies that highlight the influence of political-economic factors.

Part 2 of the report provides an overview of the important work that a number of non-governmental organisations in South Africa are doing in the fields of research, strategy development, activism and advocacy, largely aimed at the prevention of hazardous pesticide use and exposure - EDCs other than pesticides, have received relatively little attention. It also highlights opportunities for fostering collaboration between organisations in South Africa around a common goal of reducing the impacts of hazardous substances. Relevant work from international organisations that focus on South Africa has also been included, which additionally illustrates global trends.

The conclusions section discusses the gaps and weaknesses in South Africa's regulatory framework. It summarizes the problems with existing legislation and makes a case for EDC-specific legislation: although South Africa's legislation for protection of health and the environment is well formed, it generally lacks specific reference to EDCs. While certain Acts are comprehensive, the Constitution for example, others such as the Fertilisers, Farm Feeds, and Agricultural Remedies and Stock Remedies Act (1947) are outdated and inadequate to deal with the scale of contemporary hazardous chemicals. At the same time, a number well-researched policies and draft regulations have not been implemented. Finally, the report provides recommendations for the implementation of existing regulations, the incorporation of new ideas, suggestions for raising public awareness and collaboration between existing organisations.

List of

ABBREVIATIONS



Abbreviation	Definition
BPA	Bisphenol A
BPF	Bisphenol F
BPS	Bisphenol S
BRICS	Chlorofluorocarbons
CFCs	Chlorofluorocarbons
CILSS	Permanent Interstate Committee for drought control in the Sahel
DBP	Dibutyl phthalate
DDT	Dichloro-diphenyl-trichloroethane
DFFE	Department of Forestry Fisheries and Environment
DHEP	Di(2-ethylhexyl) phthalate
EDCs	Endocrine Disrupting Chemicals
EU	European Union
GEF	Global Environment Facility
NGOs	Non-Governmental Organizations
PAIA	Promotion of Access to Information Act 2 of 2000
PBES	Polybrominated Diphenyl Ethers
PCBs	Polychlorinated Biphenyls
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PFOA	Perfluoro-Octanoic Acid,
PFOS	Perfluoro-Octanesulfonic Acid
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
SA	South Africa
OEL-TWA	Occupation Exposure Limit (eight-hour) Time Weighted Average
UNEP	United National Environmental Programme
WFP	Women on Farms Project
WHO	World Health Organization
WRC	Water Research Commission
WWTW	Waste Water Treatment Works

The scale and severity of chemical pollution is an increasingly serious contemporary issue. With potentially hazardous chemicals being produced faster than they can be tested, regulations globally are struggling to keep up. A widely cited article has argued that the scale of chemical pollution is so serious that the fifth of nine 'planetary boundaries,' has been exceeded as a result of anthropogenic activity (Persson et al., 2022)¹. This should serve as motivation to further understand and contend with the proliferating nature of hazardous chemicals. Chemical pollutants are categorised in multiple, often intersecting ways that classify them as hazardous based on their specific potential dangers. One such category that is attracting increased attention in Africa is Endocrine Disrupting Chemicals (EDCs).

The endocrine system is a series of glands that regulate the distribution and levels of hormones in the body. Thus, an Endocrine Disrupting Chemical is defined as "an exogenous [non-natural] chemical, or mixture of chemicals, that interferes with any aspect of hormone action" (Gore et al., 2014: 10). The effects of EDCs can include: changes in nervous and immune systems function, diabetes, alterations in sexual maturation, reduced fertility, certain cancers, respiratory problems, cardiovascular problems, growth, neurological and learning disabilities, with effects sometimes only manifesting in future generations (Eskenazi et al., 2013; Patrick et al., 2016 Bornehag et al., 2021). The notion of endocrine disruption from chemical substances entered the public discourse in 1962 with Rachel Carson's book *Silent Spring*, which described the health effects of the pesticide, dichloro-diphenyl-trichloroethane (DDT).²

One of the difficulties in regulating EDCs is that they are found in such a wide range of publicly available and widely used products including, but not limited to: pesticides, anti-bacterial substances, insulation materials, food packaging, cookware, clothing, cosmetics, and electronics. A 2015 study by the European Commission summarized the evidence for 320 commonly used chemicals being proven or potential endocrine disruptors (Kahn et al., 2020).

In addition to the products in which they are found, EDCs have been detected in drinking water, ground water, marine environments, soils, air; in most living organisms and from densely populated areas to remote regions of the Arctic Circle (Blévin, et al., 2020). Certain EDCs have a molecular structure that resists degradation and causes them to remain in the environment for long periods of time, known as persistence. Some EDCs also bioaccumulate – a process whereby chemicals accumulate, generally in fatty tissue, and thus chemical concentration increases at higher trophic levels⁴.

Given the wide-ranging negative impacts of EDCs as well as their contested and sometimes unpredictable nature, there have been increasing global pressures to regulate EDCs, with regions such as the European Union setting regulations specifically designed to manage EDCs more effectively. In South Africa, there is no regulatory framework specifically dedicated to EDCs. There is a patchwork of Acts, regulations, policies, strategies, and implementation plans which deal directly or indirectly with EDCs.

There are a number of organisations in South Africa doing notable work to prevent and mitigate against the negative impacts of certain EDCs. This report hopes to add to this work, providing reviews, analyses, conclusions and recommendations,⁵ and will hopefully contribute to greater understanding about the regulatory frameworks and work being undertaken in South Africa in relation to EDCs.

¹ Planetary boundaries' is a concept that proposes environmental limits within which humans can safely live.

² Endocrine Disruptors and Health Effects in Africa: A Call for Action - PMC.

³ Methods to curb endocrine disrupting chemicals in Africa - ScienceDirect.

⁴ The trophic levels refer to the position of a group of organisms in the food chain, food web, or ecological pyramid based on their feeding pattern. They are shown in a series or a succession to represent energy flow from one trophic level to another. The position of the trophic level depends upon the number of steps the organism takes from the start of the food chain until its consumption" www.sciencefacts.net/trophic

⁵ Further details on the presence and impact of EDCs in South Africa can be found in the CAA report by Sean Patrick: CAA (2024) A Situational Analysis of Endocrine Disrupting Chemicals and Emerging Contaminants of Concern in South Africa.



Part 1

The Regulatory Framework

The research for Part 1 of this report included the identification and review of a combination of academic literature, reports by local and international organisations, reports commissioned by government departments, news articles and investigative reports, government documents including: legislation, regulations, policies, strategies, and notices.



Government Regulations, Policies, Strategies and National

The following government documents were sourced through searches of departmental websites, the parliamentary website, Centre for Environmental Humanities <https://acdi.uct.ac.za/environmental-humanities-south>, reference lists from reports and academic publications, referencing from articles appearing in public media, and Google searches for particular chemicals and categories of chemicals.

Table 1 provides a list of South African legislation pertaining in any way to EDCs, the department from which they emanate, a brief overview of relevant sections, and associated regulations, policies and strategies. Subsequent sections of this report discuss the associated documents only.

South African Acts pertaining to EDCs

Act	Government department	Overview of relevant section(s)	Relevant regulations, policies and strategies
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 36 of 1947	Department of Agriculture, Land Reform and Rural Development	Registrar responsible of the registration and regulation of pesticides in terms of import, sale, acquisition and disposal. Section 23 – Centres around the power to issue regulations.	Pesticide Management Policy for South Africa (2010)
Customs and Excise Act, 91 of 1964	Department of Transport	Prohibition and control of the export and manufacture of certain goods.	

Foodstuffs, Cosmetics and Disinfectants Act, 54 of 1972	Department of Health	Section 2 – Capacity to regulate permitted concentrations and prohibit the manufacture, sale and import of particular substances. Section 15 – Includes power to determine which products fall within regulatory bounds and determine the required concentrations, quality or other attributes of particular substances.	Regulations Relating to the Labelling, Advertising, and Composition of Cosmetics (2017)
Hazardous Substances Act, 15 of 1973	Department of Health	Prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of substances and products. Section 8 & 9 – appointment of inspector to carry out inspections on Group I and Group II substances.	Declaration of Leaded Paint as Group I Hazardous Substances (2009)
Conservation of Agricultural Resources Act, 43 of 1983	Department of Agriculture, Land Reform and Rural Development	Promote conservation of soil, water and vegetation Section 18 – member of the department may conduct an inspection to ascertain whether water sources and soil have been polluted as a result of agricultural activity.	
Occupational Health and Safety Act, 85 of 1993	Department of Labour	Section 8 – Provide a safe workplace, including necessary protective equipment. Section 17 – Employers with more than 20 staff obliged to appoint Health and safety representative. Section 26 – Any form of victimisation of employees reporting potential health and safety violations is prohibited. Section 29 & 30 – Functions and powers of inspectors.	Regulations for Hazardous Chemical Agents 2021 SANS 10234: 2019 (edition 2) https://www.gov.za/sites/default/files/gcis_document/202002/43035gen105.pdf Globally Harmonised System of Labelling and Classification of Chemicals (2021) document/202002/43035gen105.pdf

The Constitution of South Africa, 1996		Section 24 – The government is responsible for promulgating legislation that ensure that the environment is not harmful to the health or wellbeing of current occupants and for future generations. Section 33 – Grants the right to lawful, reasonable and procedurally fair administrative action. Where this action has adversely affected rights, a written explanation must be provided.	
Water Services Act, 108 of 1997	Department of Water and Sanitation	Section 9 (1) – Minister has authority to determine water quality standards of water taken from or inserted into waterways. Water service institutions should prevent ‘objectional substances’ from entering waterways. Section 27 (a to d) – Monitor performance of water service providers and subsidiaries. Water service authorities have jurisdiction to prohibit substances from being released into stormwater drains	

National Water Act, 36 of 1998	Department of Water and Sanitation	Includes establishment and determination of resource water quality objects which do not currently include EDCs. Section 6 – Development of National Water Resource Strategy (NWRS) which pertains to management, protection and control of water resources. This is a legally binding document for all authorities and institutions functioning under its jurisdiction. Chapter 3 relates specifically to management of water resources, prevention of pollution and remedying pollution. Section 19 – pollution prevention and responding to acts of pollution. Section 21 – regulating water use, including waste discharge. Section 26 – defines opportunities for water regulation.	South African Water Quality Guidelines (1996): Domestic Water Use (Volume 1) Recreational Water Use (Volume 2) Industrial Water Use (Volume 3) Irrigation Water Use (Volume 4) Livestock Watering (Volume 5) Aquacultural Water Use (Volume 6) Aquatic Ecosystem (Volume 7) Summarised Target Water Quality Range (Volume 8) South African National Standards on Drinking Water (SANS 241-1) (2015) South African National Standards on Drinking Water (SANS 241-2) (2015) Blue Drop National Report (2023) Green Drop National Report (2023)
National Environmental Management Act, 107 of 1998	Department of Forestry Fisheries and the Environment	Section 23 (2)(b) – Predict and identify actual and potential impact of activities on the environment. Take steps to mitigate impacts. Section 24 (2) and (7) – Specific procedures to be followed when assessing impacts.	National Environmental Management Act: Regulations to phase-out the use of polychlorinated biphenyls (PCSBs) Materials and polychlorinated Biphenyls (PCBs) Contaminated Materials Chemicals Management Bill – Concept Document

International Trade Administration Act, 71 of 2002	Department of Trade, Industry and Competition		
National Health Act, 61 of 2003	Department of Health	Section 70 (1) – Identify health-research priorities. Section 81 and 82 (1) – Routine inspections by health officers required, including sampling. The health research and sampling are not aimed at EDCs but can be used to facilitate work on EDCs.	
National Environmental Management: Air Quality Act, 39 of 2004	Department of Forestry Fisheries and the Environment		
National Environmental Management: Integrated Coastal Management Act, 24 of 2008	Department of Forestry Fisheries and the Environment		Coastal Water Discharge Permit Regulations (2019)
National Environmental Management: Waste Act, 59 of 2008	Department of Forestry Fisheries and the Environment		Regulations regarding the planning and management of residue stockpiles and residue deposits (2015) https://www.gov.za/sites/default/files/gov-za/2017/05/List-of-waste-management-activities-that-have-or-are-likely-to-have-a-detrimental-effect-on-the-environment-2017 National Policy on Thermal Treatment of General and Hazardous Waste (2009)



South African Regulations, Policies, strategies and National Standards Pertaining to EDCs

The following sections include a review of regulations, policies, strategies, national standards and any relevant subsequent amendments associated with the legislation indicated in Table 1. Each document is primarily analysed in terms of its inclusion or exclusion of EDCs. Reference is made to evidence related to implementation, when available and comments are made by the author.

Pesticide Management Policy for South Africa (2010)

The adoption of this policy was notified in 2010 with reference to the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No. 36 of 1947) by the then Department of Agriculture, Forestry and Fisheries.

It notes the potential of pesticides to pollute groundwater and surface water, cause health impacts including endocrine disruption for farmworkers, consumers, and wildlife and as well cause damage to ecological systems. The policy calls on the overhaul of the 1947 Act, warning that with over 300 pesticides registered for use in the country, the lack of systemic revision is problematic. Referring to the increasing number of scientific studies demonstrating negative health impacts caused by pesticides in South Africa, the policy raises concern about the lack of effective pesticide management. It argues that the context in which pesticides are used have significantly changed in the then 63 years (now 74 years) since the Act was released, requiring substantial change for effective and efficient management. The policy refers to the existing Act (No.36 of 1947) and the regulations it confers as outdated and in need of revision or repeal highlighting the following major issues with the current Act (2010: 41-42):

- * The Act does not adequately address Constitutional requirements in relation to Bill of Rights (Le. right of environment which is not harmful to health), Access to Information, openness, transparency and participate in decision- making and also just administration action;
- * The Act does not adequately incorporate international obligations and agreements to which South Africa is a Party;
- * Under the current Act, anyone contravening a provision of the Act or the regulations is guilty of an offence and will be summarily convicted and liable to **a fine not exceeding R1000** [emphasis added], and such penalties have limited deterrent effect;
- * There is **no requirement for review of registered pesticides or re-evaluation of old chemicals** [emphasis added];
- * *Lack of establishment of pesticide use surveillance and monitoring systems to gather information on common conditions of use and their impact on health and environment;*

- ✱ *The act does not adequately protect non-target areas (e.g. residential areas, schools, hospitals, etc) from exposure to activities spraying activities;*
- ✱ *The act does not require prior training and certification to use/apply the most toxic pesticides (e.g. WHO hazard class I and II) [this has been updated in the Regulation of Hazardous Substances but implementation remains problematic];*
- ✱ *Lack of capacity for research on alternative pest control and crop production measures*
- ✱ *Lack of awareness raising, education and training appropriate to the public and the user*
- ✱ *Does not adequately encourage registration that favours lower risk products and reduced reliance on pesticides overall;*
- ✱ *The Act does not adequately address the problem of obsolete stockpile pesticides and their disposal;*
- ✱ *The Act does not adequately address the issue of pesticide container management; and*
- ✱ *Inadequate integration across government departments and complementing other legislations.*

The policy makes the following recommendations:

1

Increased transparency with the public as there is no publicly available registry of registered pesticides in South Africa. It proposes public consultation for pesticide registration in collaboration with farmers, community organisations, labourers, and NGOs. It also argues for the need for additional research to find alternatives to the use of Dichlorodiphenyltrichloroethane (DDT) for vector control.

2

The introduction of re-evaluation of registered pesticides informed by long-term monitoring programmes and socio-economic research.,

3

Introduction of a levy on pesticide registration, with the amount proportional to its potential to cause damage to human and environmental health in support of alternatives to (potentially) hazardous pesticides It proposes a lower amount or waiver of the registration fee for biopesticides and non-toxic alternatives.

The policy lists requirements for new legislation, prioritising proactive, protective, and precautionary measures under three headings (2010: 50-51):

1. Strengthen health and environmental protection by:

- ★ Introducing special protection for vulnerable populations (e.g. children, women,)
- ★ Taking into account pesticide exposure from all sources, including, food and water;
- ★ Consider cumulative effects of pesticides that act in the same way;
- ★ Support sustainable pest management;
- ★ Prohibiting registration of products that poses unacceptable risk to people's health or the environment;
- ★ Expediting the registration of lower-risk products;
- ★ Mandate buffer zones for pesticides use areas; and
- ★ Mandate disclosure of hazardous formulants (inerts).

2. Make the registration system more transparent and participatory by the public:

- ★ By establishing a public register containing information about permits. applications. re-evaluations and special reviews; and
- ★ The legislation will establish conditions that will allow for pre and post- decision access to health, safety and environmental data. The conditions will include provisions that will ensure confidential business information.

3. Strengthen post-registration control of pesticides by:

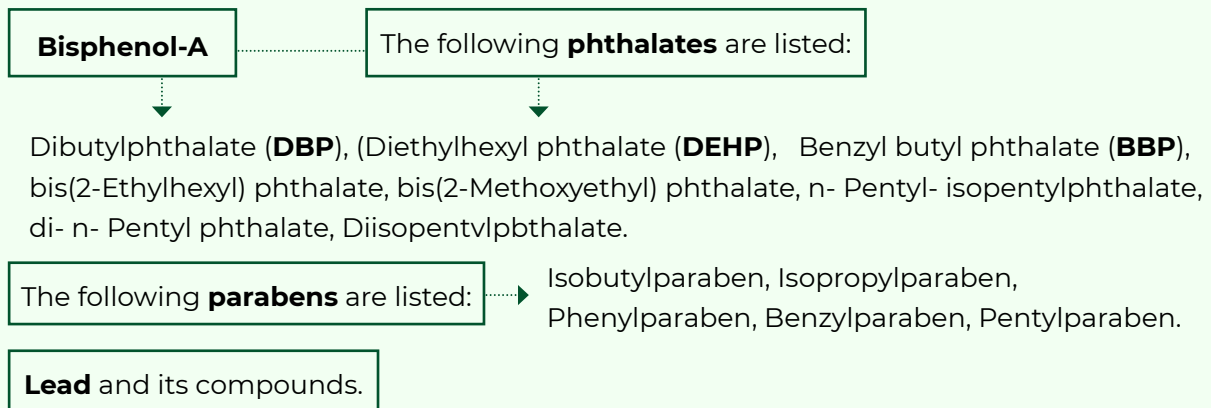
- ★ Requiring pesticide companies to report adverse effects;
- ★ Requiring pesticide companies to report sales data;
- ★ Requiring re-evaluation of older pesticide or special reviews of registered pesticides;
- ★ Providing a comprehensive compliance strategy, with appropriate enforcement provisions.

This policy is an honest review of existing legislation of pesticides, with clear and insightful direction on ways to reform it. The policy appears to be guided by the precautionary principle, democratic values and an understanding of the urgency and importance of human and ecological health, while maintaining the development of the agricultural sector. It is unknown to the author to what extent its recommendations have been acted on by the subsequent Department of Agriculture, Land Reform and Rural Development (DALRRD).

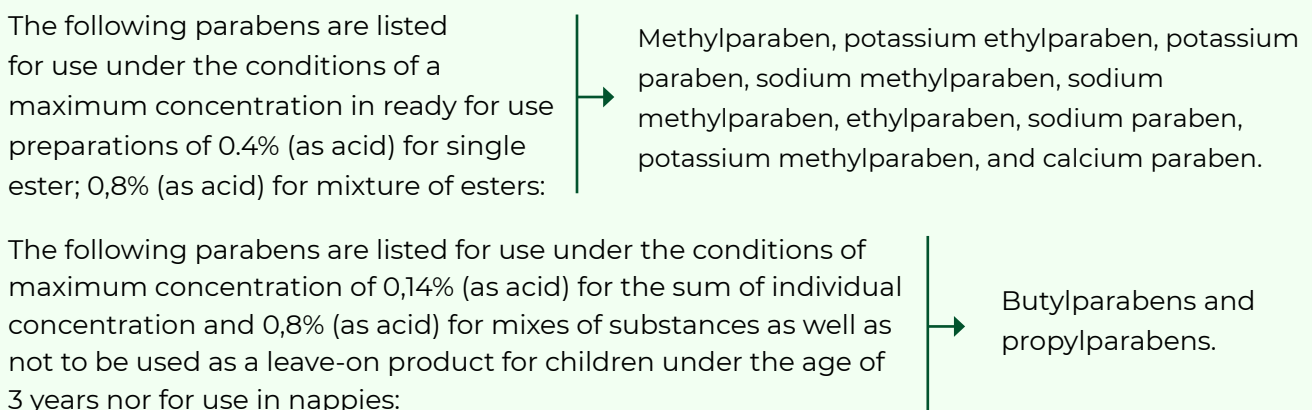
Regulations Relating to the Labelling, Advertising, and Composition of Cosmetics (2017)

The document lists substances prohibited for use in cosmetic products (Annex I) and substances that may be used with certain restrictions (Annex II).

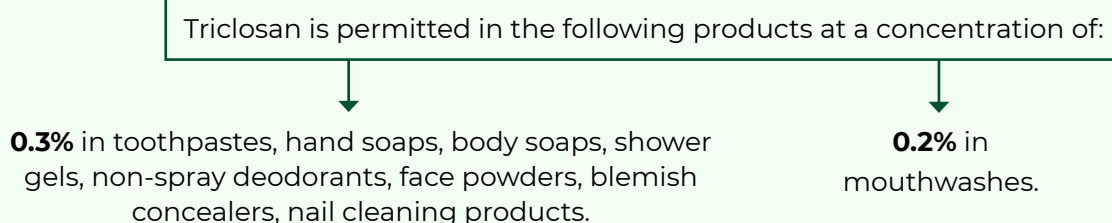
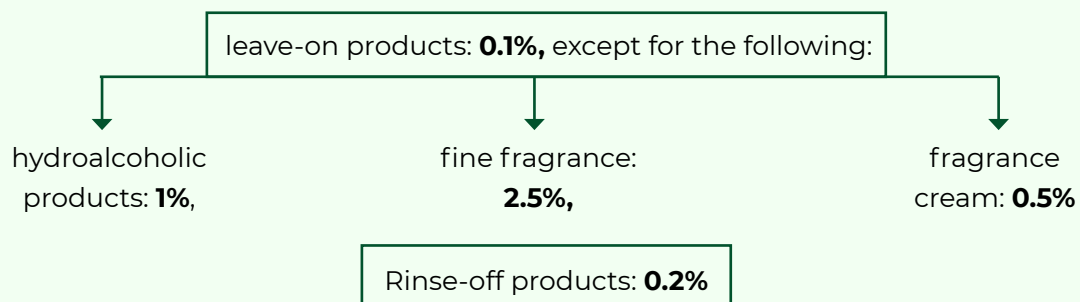
EDCs under the prohibited list of Annex I include:



EDCs under the restricted-use Annex II include:



- * Tonalide (acetyl hexamethyl tetralin) is permitted for use with the following concentrations in different types of products:



Of the categories of chemicals listed above, the most harmful EDCs likely to be used in cosmetic products include parabens, tonalide and triclosan.

The regulations for these substances and related compounds are identical in concentrations and wording to those included in two EU regulation amendments : Commission Regulation (EU) No 344/2013 of 4 April 2013 amending Annexes II, III, V and VI to Regulation (EC) No 1223/2009 of the European Parliament and of the Council on cosmetic products and Commission Regulation (EU) No 358/2014 of 9 April 2014 amending Annexes II and V to Regulation (EC) No 1223/2009 of the European Parliament and of the Council on cosmetic products.

While South Africa's regulations are in line with international standards, research should continue to test the potential health impacts of the parabens listed under Annex II of the regulation to ensure compliance.

Regulation on the Designation of Leaded Paint as Group I Hazardous Substances (2010)

This regulation, which came into force in July 2010, requires that any paint or leaded compounds used for decorating contain no more than 0.6% (600ppm) lead. International standards require leaded paints to contain a maximum of 0.009% (90ppm). While there is a draft regulation with this amendment, it has yet to be approved.

Regulations for Hazardous Chemical Agents 2021

These regulations set out detailed requirements for the handling, labelling, packaging, transport, and disposal of hazardous chemical agents (HCA). In its scope, it applies to manufacturers, importers, suppliers, retailers, employers, any person who carries out work or visits a site containing HCA. The document lists different hazardous categories under which every HCA is classified. There is no explicit mention of endocrine disruption chemicals rather, the classification of HCAs is by carcinogenicity, germ cell mutagenicity, reproductive toxicity, specific organ toxicity.

The list of prohibited agents includes the following EDCs:

✱ Polychlorinated biphenyls (PCBs).

The list of hazardous chemical agents with maximum exposure limits includes the following EDCs and potential EDCs:

- ✱ Phthalates – all of which listed below have a maximum 'occupational exposure limit eight-hour time-weighted average' (OEL-TWA) of 10mg/m³

**Dibutyl
phthalate**

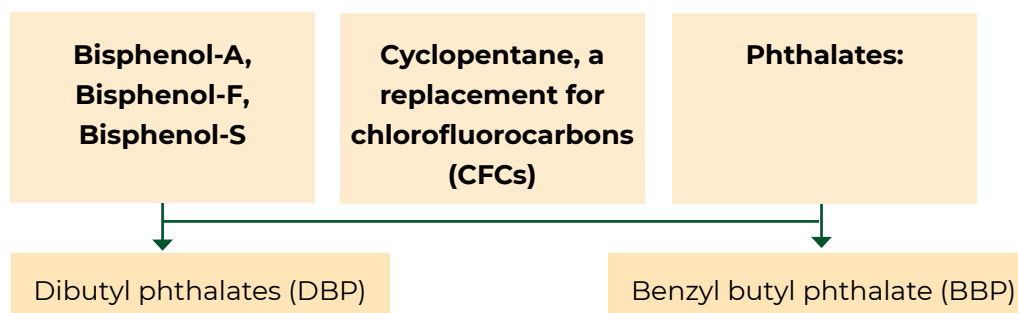
**Di-(2-ethylhexyl
phthalate)
(DEHP)**

**Diethyl
phthalate**

**Dimethyl
phthalate**

The OEL-TWA refers to “the maximum average airborne concentration of an HCA when calculated over an eight-hour working day, for a five-day working week” (p6). While, in theory, this metric might make sense, in a production setting, the concentration of airborne particles will continually vary as well as vary in different parts of the room. It is a metric that would require the application of rigorous methodology to render it valid. Given the concentration averages must be exceeded for eight hours over the course of five working days, high exposures may be offset very low exposures, obscuring acute events.

The list of hazardous chemical agents with maximum exposure limits does not include the following EDCs and potential EDCs:



Poly- or perfluorinated substances (PFAS).

Polybrominated diphenyl ethers (PBDEs) or any variant of -brominated diphenyl ethers. These are substances used as flame resistant coatings are furniture and other household items.

Not complying with the HCA regulations results in an unstipulated fine or imprisonment. For each following day of the offence, the guilty party is liable to a fine of R500 per day – potentially significant for a worker paid minimum wage, but inconsequential for any major company.

South African National Standard (SANS 10234: 2019); Globally Harmonised System of Classification and Labelling of Chemicals (GHS), and South African National Standard Supplement to SANS 10234 (2008)

These are national standards informed by the United Nation’s Purple Book on the Globally Harmonised System of Classification and Labelling of Chemicals (GHS). It is a comprehensive set of continually updating requirements for labelling of all hazardous substances. Target audiences for the GHS include consumers, employers and workers using and handling chemicals in the workplace, workers in waste handling facilities, workers in the transport sector and emergency responders.

In order to classify thousands of chemicals by their hazardous potential, many symbols and abbreviations are used. The documents include requirements for ‘training’ of workers in interpreting information sheets, safety data sheets (SDS), and GHS symbols⁶.

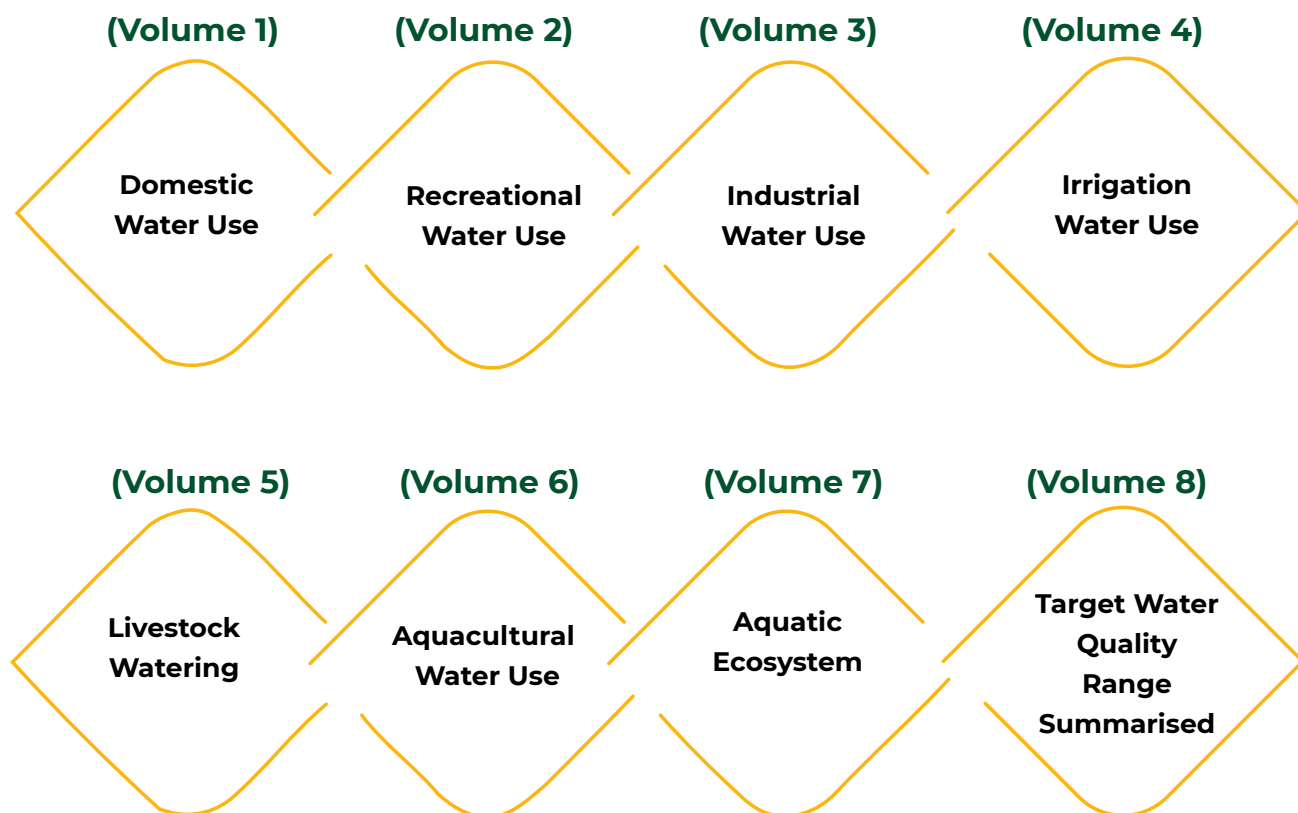
⁶A 2 day training course is available from a private company based in the USA <https://msc.ul.com/en/training/ghs-essentials/>

Implementation of this regulation in the agricultural sector has been inadequate. The report, *Ripe With Abuse* (Human Rights Watch, 2011) reported that farmworkers on different farms in the Western Cape, South Africa were denied training on working with pesticides and told they would have wages docked for receiving training. A study by Rother (2008) found that farmworkers had very low levels of comprehension of pictograms and other symbols indicating hazardous on pesticide containers. This has resulted in acute pesticide poisoning (Human Rights Watch, 2011) inadequate use of protective gear (gear has also been reported to have been withheld by farm managers), and returning to families in farm dwellings while wearing the same clothes used for spraying.

Work including the use of hazardous substances is precarious enough without there being a lack of training and understanding of what the substances are, and how to use them as safely as possible. This is an indictment on both the DALRRD, which claims insufficient funding to employ more auditors, and on the private sector that perpetuates unsafe labour practices. The labelling and safety details of hazardous substances in use, as laid out in SANS 10234, should be communicated to farm workers and farm dwellers in a language they understand before they are expected to use or encounter any hazardous substances.

South African Water Quality Guidelines

South Africa's Water Quality Guidelines http://www.waternet.co.za/policy/g_wq.html detail various limits and requirements for different uses of water. They comprise eight volumes:



In this report, only Volume 1 on Domestic Water Use is reviewed.

In terms of chemicals, it contains maximum limits and descriptions of various substances for domestic use which includes drinking water. It does not explicitly mention EDCs or endocrine disruption. Other than maximum limits stated for metals including mercury and lead, it does provide a maximum limit for the pesticide and the EDC, atrazine, which is effectively the same as recommended by the WHO.

South African National Standards on Drinking Water (SANS 241-1) (2015)

These standards provide maximum limits for substances in drinking water. 'Chemical Determinants' are included but only the metals mercury and lead from the perspective of EDCs.

It is noted that for those chemical determinants not listed, the WHO "Guidelines for Drinking-Water Quality shall be used for comparative purposes" (SANS 241-1, 2015: 10). It is not entirely clear what this means, as there are EDCs listed under the WHO Guidelines for drinking-water quality, 4th ed. 2017 which do not appear in either SANS 241 or South African Water Quality Guidelines such as Di(2-ethylhexyl)phthalate (DEHP).

Blue Drop Progress Report (2023)

The Blue Drop Progress Report provides details on the compliance, based on various metrics, of drinking water by municipalities in the country, for period 2021-2022. There is no mention of EDCs in their testing for chemicals. 'Chemical Compliance' is determined by compliance with the SANS 241 guidelines. Drinking Water Quality Chemical Compliance is categorised by Acute Health Chemical Compliance and Chronic Health Chemical Compliance. Of the 958 water supply systems, 44% were given an 'unacceptable' rating for Acute Health Chemical Compliance, while 24% were given an 'unacceptable' rating for Chronic Health Chemical Compliance.

While these results are already alarming, additional specific studies need to be conducted to assess the presence of EDCs in drinking water.

Green Drop Progress Report (2023)

The Green Drop Progress Report provides details on the compliance, based on various metrics, of waste water treatment works (WWTWs) by municipalities in the country, for the period 2021-2022. While there is no testing or mention of the category of EDCs, or of any specific EDCs, there is a limited measure of 'Chemical Compliance'. This is scored as a percentage and is a measure of "Chemical Oxygen Demand (COD), Ammonia as Nitrogen, Nitrate/Nitrite as Nitrogen, Ortho-Phosphate as Phosphorus" (Green Drop Progress Report, 2023: 10). The national average Chemical Compliance score was 36.6%. While this does not say much about EDCs specifically, it indicates dire infrastructural capacity in WWTWs to deal with chemical waste, without even factoring in the infrastructure needed to remove the variety of EDCs.

Regulations to phase-out the use of Polychlorinated Biphenyls (PCSBs) Materials and Polychlorinated Biphenyls (PCBs) Contaminated Materials (2014)

These regulations set out prohibitions and restrictions on all matters related to the presence of PCBs in South Africa.

Providing a nine-year phase-out period (from 2014), the regulations state that any use of PCBs or PCB-contaminated materials after the year 2023 is prohibited. While their use is now prohibited, only after the year 2026 will it be prohibited to store any PCBs, PCB-contaminated materials or PCB containing waste that has not been destroyed or irreversibly transformed.

The major use of PCBs in South Africa has been and is in the generation of power by the electricity utility, Eskom, for the insulation for transformers and capacitors, as well as in lubricants. Eskom's Integrated Report for the year ending 31 March 2023 noted that compliance with the regulations to phase-out PCB-containing substances was completed and that "Eskom Rotek Industries has been PCB free since 2011" (Eskom Holding, 2023: 116).

It is, however, noted in the same document that between 10.3 and 238.3 tonnes of PCB-containing materials were thermally destroyed each year between 2014 and 2023 (except 2015). While this is ambiguous, if not contradictory, it may mean that Eskom has phased out the use of PCBs but may still hold an undisclosed amount of PCB-containing or PCB-contaminated materials.

Coastal Water Discharge Permit Regulations

While these regulations do not explicitly mention EDCs, the granting of coastal water discharge permits is relevant to EDCs and is currently a contentious issue. For example, Cape Town has three coastal water discharge outlets where untreated sewage is discharged. The permits for these outlets have been opposed and alternatives are currently being considered. Importantly, untreated sewage discharge is not subject to chemical testing as the effluent from WTWs are (Kretzmann, 2024). Given the lack of regular chemical testing from these discharges, it is largely unknown what scale of potentially hazardous chemicals exists in such marine environments.

Regulations regarding the planning and management of residue stockpiles and residue deposits

These regulations do not explicitly reference EDCs but do apply to the storing of EDC residues, with particular importance to those that are molecularly persistent and used in South Africa, such as DDT and PFAS.

National Policy on Thermal Treatment of General and Hazardous Waste

These regulations do not mention EDCs specifically; however they include the handling of Persistent Organic Pollutants (POPs). In terms of their disposal, the policy states that, pertaining to the Stockholm Convention on Persistent Organic Pollutants, POPs are required to be destroyed or irreversibly transformed. Furthermore, on the disposal of POPs, section 11.4.14 states:

"Treatment of High Level POPs Containing Waste (as defined by the Stockholm and Basel Conventions) are to be preceded by an independently monitored Performance Verification Test to determine the Destruction Efficiency (DE) and Destruction and Removal Efficiency (DRE) of principal organic hazardous compounds (POHC) using a suitable verification compound (e.g. trichloroethane)⁷. (p20)"

The Performance Verification Test must be submitted to the relevant government department detailing the capability of the plant to appropriately dispose of the POPs. Furthermore, any facility disposing of waste containing POPs is required to keep a record of its disposal, known as a Certificate of Destruction.



Strategies and Draft Documents not under existing Acts

There are a number of documents that do not pertain to particular Acts listed in Table 1. Some of them are explicit about EDCs, while others deal more broadly with chemical management. However, these documents provide additional information to previous sections and important analyses with perspectives for the future.

Chemicals Management Bill – Concept Document (2015)

This document is a brief presentation aimed at noting South Africa's legislation related to chemical management as well as certain significant issues within the country's chemical management frameworks.

It notes that there is no regulatory framework that facilitates the banning of hazardous substances. The Regulations for Hazardous Chemical Agents (2021) has since prohibited the use and trade of certain substances. However, there are no regulations which are explicitly aimed at reviewing substances to determine whether they are hazardous. South Africa's chemical regulations have tended to be responsive to international conventions rather than using a proactive approach or applying the precautionary principle which is embedded in the European Union's approach to chemical regulation.

The Chemical Management Bill – Concept Document also notes that there is no process for the registration of industrial chemicals, unless they fall within the scope of particular international conventions. The document highlights the problematic nature of this by noting that there is little knowledge of the scale of industrial chemicals used in the country.

Furthermore, the document highlights the issues of having no Act regulating chemicals, as well as the fragmented nature of South Africa's chemical regulatory framework. The bureaucratic complexity of chemical regulation frequently makes decision-making very difficult and slow.

Development of Inventory of Endocrine Disrupting Compounds and its Management Action Plans in South Africa (2020)

This is an unpublished draft document commissioned by the DFFE and produced by the consulting firm Mamadi and Company in 2020. It is not available on government websites and it is unclear whether it is being used as a reference document or being further developed. It does, however, have one of the most recent and comprehensive reviews of the scope of EDCs in South Africa. It notes a large degree of uncertainty around the scale of risk to humans and wildlife from exposure to EDCs. Referencing

⁷Trichloroethane is listed under the Montreal Protocol as an ozone depleting substance, requiring it to be phased out of use. A different verification compound should be suggested.

South Africa's 1996 Bill of Rights, it highlights that South Africa has a constitutional mandate to ensure that the environment is not harmful to the population's health and well-being. As part of dealing with the issue of EDCs which do threaten the population's health and well-being, the document notes that the Department of Environmental Affairs (now the Department of Forestry, Fisheries and Environment) "plans to develop a national inventory database of EDCs as well as associated action plans for the sound management of EDCs in South Africa. This is of critical importance for the long-term protection of human and environmental health."

Its scope of work is as follows:



1. Chemical Industry Assessment:

- ☆ Identify chemical companies and assess the influence of unregistered operators.
- ☆ Compile detailed information on companies, including location, chemical names, trade names, applications, and toxicity.



2. Data Collection and Policy Position:

- ☆ Gather data on EDCs, including volumes used, applications, and sources.
- ☆ Identify EDC hotspots and contaminated sites.
- ☆ Assess storage, treatment, and disposal facilities.
- ☆ Formulate a policy position based on collected information.



3. Risk Management Approaches:

- ☆ Develop risk management strategies to minimize environmental exposure to EDCs.



4. Alternatives Identification:

- ☆ Recommend safer, affordable, effective, and technologically relevant alternatives.
- ☆ Consider socio-economic impacts and South Africa's development challenges.



5. Management Instruments:

- ☆ Develop instruments, like a National Action Plan, for the environmentally sound management of EDCs.



6. Alternatives for Emerging Contaminants:

- ☆ Identify alternatives for chemicals recognized as emerging contaminants under the United Nations Environment Assembly (UNEA) and SAICM.
- ☆ Consider industrial processes, socio-economic impacts, and South Africa's status.



7. Baseline Information:

- ☆ Establish baseline data on EDCs in various environmental mediums.
- ☆ Track quantities of manufactured, formulated, imported, and exported chemicals.
- ☆ Evaluate the status of chemicals in the country of origin and their impact on industrial processes and employment.

In terms of regulatory, private sector and municipal interventions, the document lists relevant government departments, producers of plastics, pharmaceutical companies, Waste Water Treatment Works (WWTWs) and hospitals, but does not provide further information on details of regulations, regulatory compliance, specific molecules produced by companies or details of the efficacy of WWTWs in removing EDCs. It suggests models for Life Cycle Analyses (LCAs) of EDCs and strategies for prioritising decision making on dealing with EDCs. A table summarizes studies indicating the presence of potential EDCs in various media including tap water, groundwater, surface water, and WWTW effluent with an indicative level of concern. Furthermore, it provides sound management procedures for upstream users, midstream and supply-chain and downstream users. In terms of legislation, the document lists suggestions and best practices from various international regions. Usefully, it also provides a list of known EDCs, and the broad sectors from which they come.

Even in its draft form, this is an extremely useful document, particularly for a broad overview of the scope of EDC movements in the environment and as a strategic advisory document for highlighting the role of relevant stakeholders in South Africa. Beyond stating potentially relevant government departments and international legislation, it provides little analysis of South Africa's current regulatory apparatus for EDCs. It may well be a useful document in some respects for discussing and developing ideas for preventing and mitigating the effects of EDCs in the country.

National Waste Management Strategy (2020)

The National Waste Management Strategy⁸ was released by the DFFE in 2020. There is no mention of EDCs as a category nor of any specific EDC compounds. There are, however, noteworthy figures provided on the scale of hazardous waste production in South Africa, including POPs as a category.

The document notes that South Africa produced 67 million tonnes of hazardous waste in 2017, the majority of which are byproducts from the generation of electricity from coal. Of the total volume of waste, 0.001% is reported to be POP waste - 67 000 tonnes of POP waste in total. This information is referenced in the State of Waste Report of 2018, which provides slightly different figures.

State of Waste Report 2018

This report details categories of waste and their disposal for the year, 2017.

It is noted that 570 tonnes of POP-containing waste were produced and fully disposed of in South Africa. It is also noted that no POP waste was imported, but this does not account for the import of POPs (not in waste form) such as DDT, which South Africa does import. However, the report also provides a colour-graded scale in shades of green indicating 'Level of Confidence' (LOC) in the data, for which POP waste is graded neither dark nor light green (medium confidence?)⁹.

⁹The according of a 'medium' LOC is an educated guess based on the relative shades of colour for which other data has been accorded an LOC shade of green as there is no scale provided to indicate what the intensity of the shades of green relate to (e.g. Low, medium, high).

⁸National Waste Management Strategy 2020 – Published with immediate effect – Environment Projects; National Waste Management Strategy 2020. | UNEP Law and Environment Assistance Platform

Although not included in the tables on volumes and success rate of POP waste disposal, the report provides an estimation on figures from 2012, indicating that about 600 tonnes of obsolete pesticides are being stored in the country, with between 3 and 12 tonnes being POPs.

It also noted that, while South Africa never produced PCBs, the majority of PCB-containing materials were imported for, and in use by Eskom, South Africa's major electricity producing company. As of 2012 data, there was no inventory of PCB-containing materials from Eskom. However, it is noted that in 2017/2018, Eskom thermally disposed of 26,3 tonnes of PCBs.

Given the discrepancies in volumes reported as well as a lack of LOC in the data, compounded by examples of lack of industry reporting on PFOA and PFOS containing materials (as described below under South Africa's responses to the Stockholm Convention), the scale of POPs both in use and in the environment is hard to gauge.

Review of the interdepartmental co-ordination of chemicals management in South Africa (2013)

This is a review¹⁰ undertaken by KemI, a Swedish Chemicals Agency with the intention of describing the current processes of interdepartmental management of chemicals in South Africa, and providing recommendation for better practices. It deals in part with the National Committee on Chemicals Management (NCCM), highlighting a range of issues and providing recommendations. The report has a strong emphasis on the importance of coordination between government departments as well as different levels of government.

The National Committee on Chemical Management (NCCM) comprises members from 17 different government departments. Quoting the NCCM's Terms of Reference (ToR), the committee aims to:

"facilitate a co-operative approach for the implementation of safe management of hazardous chemicals with a view to promoting sustainable development and covering chemicals at all stages of their lifecycle by various Departments as mandated by their specific legislation. It will deal with relevant national legislation and regional and international obligations (NCCM ToR, undated)."

In addition to this, the ToR list 13 functions including coordinating interdepartmental reviews, reviewing legislation and policy documents, addressing issues as they arise, raising awareness and developing action plans, among others. The Kemi review suggests that NCCM is far too broad and ambitious in scope to produce effective results. Furthermore, the number of different departments involved can make important decision-making a tediously bureaucratic process.

The review goes on to provide strategy suggestions aimed at making coordination and communication more effective and efficient.

¹⁰<https://www.dffe.gov.za/chemicals-management-environment-sector>



International Conventions Legislation, and Regulations

This section provides an overview of documents emanating external to South Africa but from which useful information and strategies can be drawn. Of significance, the international conventions to which South Africa is a party entail legal and non-legally binding responsibilities to which the country is expected to conform.

All international legislation and regulations listed were identified from the 2019 DFFE-commissioned report draft entitled 'Development of Inventory of Endocrine Disrupting Compounds and its Management Action Plans in South Africa'. Strategies and approaches relevant to South Africa's situation and landscape are listed by region.

European Union

The European Union (EU) has the strictest set of regulations governing the use of harmful and potentially harmful substances. Regulations in the chemical sector are informed by the 'precautionary principle,' a legal philosophy that emphasises a cautionary approach to innovations (chemical or otherwise) where uncertainty exists about their harmful impacts. Thus, in most cases, for a chemical to be approved for use, the responsibility is placed on the proponent to provide sufficient evidence demonstrating a lack of harmful impacts.

- ✱ In the EU, a standardised system of regulatory frameworks has been developed which applies to all EU member states. EDCs are explicitly addressed in regulations under the following categories:
- ✱ Industrial chemicals: Regulation (EC) 1907/2006, concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- ✱ Plant protection products: Regulation (EC) 1107/2009, concerning the placing of plant protection products on the market
- ✱ Biocidal products: Regulation (EU) 528/2012, concerning the making available on the market and use of biocidal products
- ✱ Water pollutants: Directive 2000/60/EC, establishing a framework for Community action in the field of water policy.

While the EU has been at forefront of regulating harmful chemicals for use within the region, industries located in member countries of the EU have continued, for decades, to export the same substances which have been banned for use in the EU. The largest export of EDCs occurs in agrichemical sector. France and Belgium have been the only EU member nations to ban the export of pesticides which are banned for use in the EU – a law which finalised in 2022. In France, however, the law does not cover the export of the chemicals in 'pure' form which can then be mixed into the final products in the destination country. After the law in France came into effect, agrochemical company, Syngenta, shifted the export business to Germany, where the export of banned pesticides doubled from 2021 to 2022. The only effective solution, according to Laurent

Gaberell from the Swiss activist NGO, Public Eye, is for the EU to implement a region-wide ban on the export of pesticide banned for use within the region.

United States of America

The USA also contains regulations specifically aimed at EDCs but are overall less strict than those of the EU. Additional exploration of the regulations may be warranted as it would for regulations related to EDCs in countries in the global south

Basel Convention

In 1989, the Basel Convention on the Control of Trans-boundary Movements of Hazardous Waste and their Disposal was established to regulate the cross-border transportation of hazardous wastes. South Africa officially endorsed this convention in 1994 and actively adheres to its stipulations. As a party to the Convention, South Africa is committed to the following obligations:

- ✱ Minimise the generation of hazardous waste.
- ✱ Guarantee the availability of adequate waste disposal facilities.
- ✱ Regulate and reduce the international movements of hazardous waste.
- ✱ Ensure environmentally appropriate management of waste.
- ✱ Prevent and penalise illegal transport of hazardous waste.

Annexes I and VIII of the Basel Convention provide guidelines for the disposal of POPs.

South Africa does not have a specific regulation or policy dedicated to the implementation of the Basel Convention but its requirements are included within other regulations.

Minamata Convention

The Minamata Convention on Mercury came into effect in 2017 in order to reduce the presence of mercury globally.

In 2022, the DFFE released the Consultation on the Draft National Regulations for the Management of Mercury in South Africa. This regulation has set limits for mercury import and use in various sectors in line with the Minamata Convention.

Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer came into effect in 1989 to phase out the use of chemical that degraded the ozone layer. One of the major substances and related compounds banned were Chloroflourocarbons (CFCs).

While this has been beneficial, a common replacement in insulation like those used in refrigerators is **cyclopentane** and its related compounds. Cyclopentane has been described as a potential endocrine disruptor (Zhang et al., 2016).

Rotterdam Convention

In 2004, the Rotterdam Convention was published including a list of 52 chemicals, including 33 pesticides, which have been banned or severely restricted in the EU. A Prior Informed Consent (PIC) procedure was set up to ensure that importing countries are aware of the potentially harmful nature of traded chemicals.

Despite South Africa having been party to the Rotterdam Convention since 2002, it was only in May of 2021 that a government notice was gazetted to amend the National Environmental Management Act to take the chemicals listed into account (DFFE, 2021: 1). The amendment did not ban any of the chemicals, but required a PIC notification to apply to relevant chemicals upon import and export. Less than two months after the notice was issued, the UPL chemical plant on the east coast of South Africa burned down with at least three of the listed chemicals in the Rotterdam Convention in storage at the time. These were released into the environment, causing substantial ecosystem damage. Four months later, the Minister of the DFFE issued a notice suspending the implementation of the Rotterdam Convention for 12 months to “allow sufficient time to ensure compliance” (DFFE, 2021a: 1). The slowness and opacity with which the DFFE has responded to the trade of hazardous chemicals even when provided with the regulatory framework seems to suggest a combination of lack of political will and possibly strong chemical industry opposition to such regulatory reform¹¹.

Stockholm Convention on Persistent Organic Pollutants

The Stockholm Convention is a binding international environmental treaty that was designed as a response to the growing number of persistent organic pollutants (POPs). It contains three annexes – Annex A lists chemicals to be eliminated entirely, Annex B lists chemicals to be restricted in use, and Annex C lists chemicals released or produced unintentionally that should be minimised. It was signed in 2001 and came into effect in 2004. POPs are molecularly persistent in structure – their rate of degradation is extremely low such that they persist for decades, allowing their potential impacts to be widespread and long lasting. They also bioaccumulate i.e., the concentrations of the substance accumulates to higher levels than the surrounding environment. This is especially apparent in food chains where species in higher trophic levels demonstrate higher concentrations than species in lower trophic levels (e.g., a fish will have higher concentration than a mussel). Many POPs also cause endocrine disruption.

Under Article 15 of the convention, each state which is party to the convention is required to submit figures at the Conference of Parties (COP) detailing the total quantities of production, import and export of each of the chemicals listed under Annex A and Annex B. From the latest COP on POPs (COP 11), a date of 28 February 2026 was determined as the deadline for submission of this data. The report detailing the total quantities however is not required to be complete in order to encourage parties to submit incomplete reports rather than no reports.

¹¹The influence of the agrochemical industry in regulatory actions is expanded upon under the section entitled ‘Review of Political Economic Factors’

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (2012)

South Africa's implementation plan was produced in 2012. The document lists relevant government departments and their roles in implementing the proposed plan. Although the principles remain the same, the jurisdiction and responsibility has been somewhat complicated by a significant cabinet reshuffle since 2012.

The chemicals listed include:

- ✱ Polychlorinated Bisphenols (PCBs) – PCBs are listed under both Annex A and Annex C. In the implementation plan, it is noted that all PCB-containing substances will be phased out by 2025. This is elaborated on in the 2013 Regulations to phase-out the use of polychlorinated biphenyls (PCSBs) Materials and polychlorinated Biphenyls (PCBs) Contaminated Materials.
- ✱ Dichloro-diphenyl-trichloroethane (DDT) – Listed under Annex B, DDT is permitted for use in South Africa for indoor vector control only. This implementation plan notes that between 2003 and 2009, roughly 75 tons of DDT were imported each year.

Regarding Per- and Polyflouroakyl substances (PFAS), two regulations have been published to update the amended Stockholm Convention POPs lists. They are the 2019 Regulation to phase-out the use of Persistent Organic Pollutants and the 2021 Regulations to prohibit the production, import, export, sale and use of Persistent Organic Pollutants that are listed by the Stockholm Convention on Persistent Organic Pollutants. The regulations required the phase-out of perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA) respectively. The regulations provided 30 days for producers and sellers to notify the government and provide a one year plan for subsequent phase-out. According to a series of Daily Maverick articles, only two companies responded, noting the presence of PFOS in their mining and petroleum industries. However, they were not required to provide a phase-out plan as they did not produce or sell the substances. No companies responded within the allocated period for presence of PFOA. This is highly problematic as several studies (Ojemaye et al., 2019; Ojemaye et al., 2021) have found PFOA and PFOS in Cape Town's marine environments.



Part 2 Organisations involved with EDC-related work in South Africa

Relevant organisations were identified for Part 2 through a variety of methods. Several of them came from previous research or knowledge, predominantly related to pesticides. A few of their websites list partner organisations which provided another source. In addition, organisations were found through reading news articles and Google searches of relevant chemicals. The inclusion criteria were: statements of work being done by the organisation to identify or prevent the use of EDCs; mitigate against their impact; or support alternative practices/substances where EDCs are commonly used. The majority of organisations listed are involved with work in South Africa, with a few included that do global work of relevance. The only exclusion criterion was a website that indicated no activity within the past three years.

Information about organizations involved with EDCs

Table 2 Organizations involved with EDC-related work in South Africa

Organisa- tion	Role/Aim	Location	Chemicals within purview	Relevant Reports/ Documents	Existing Pro- grammes
BizNGO	Promote the creation and use of safer chemicals	US-based, global resource	Broadly defined 'hazardous chemicals'	BizNGO Chemical Alternatives Assessment Protocol The Guide to Safer Chemicals	The Chemical Footprint Project
Cancer Association of South Africa (CANSAs)	Provide research education and support to reduce cases of cancer	South Africa	Bisphenol-A Bisphenol-S Phthalates Acrolein Personal-care products	Use plasticiser-free clingwrap ' Plastic Identification Codes ' list Bisphenol A (BPA) Fact Sheet Bisphenol S (BPS) Fact Sheet Personal Care Products – Possible Harmful Chemicals Fact Sheet	

Centre for Environmental Rights (CER)	Legal support	South Africa	Non-specific hazardous substances	CER-comments-on-Draft-Waste-Stream-Regulations-12-2-18.pdf	Pollution & Climate Change – Centre for Environmental Rights
Centre for Global Development	Research Centre of Development	Global	Includes Lead	A Call to Action to End Childhood Lead Poisoning Worldwide	
Environmental Working Group	General environmental advocacy	USA & global	Includes PFAS	Interactive Map - Global danger: Threatened and endangered species at risk from PFAS exposure	
FedHealth			Acrolein in e-cigarettes	The effects of vaping on the lungs Fedhealth Medical Aid	
Groundwork	Legal support and advocacy	South Africa			
Heinrich Böll Stiftung		Global	Pesticides	Pesticide Atlas 2022: Facts and figures about toxic chemicals in agriculture Heinrich Böll Stiftung Brussels office	
Pesticide Action Network (PAN)	Advocacy, research, education and awareness programmes.	Global, including branch in Africa	Pesticides		https://pan-afrique.org/wps/our-projects-and-programs/
The Global Environment Facility (GEF)			Polychlorinated Biphenyls (PCBs)	Environmentally Sound Management and Disposal of PolyChlorinated Biphenyls[PCBS] in the Republic of South Africa GEF	

United Nations Environmental Programme (UNEP)	Advocacy, strategic support, policy recommendations	Global	Includes classes of hazardous substances	Endocrine Disrupting Chemicals UNEP - UN Environment Programme Global Chemicals Outlook II: From Legacies to Innovative Solutions UNEP - UN Environment Programme An Assessment Report on Issues of Concern: Chemicals and Waste Issues Posing Risks to Human Health and the Environment UNEP Strategic Approach to International Chemical Management	
Unpoison	Advocacy and activism. Coordinates a network of civil society organisations	South Africa	Pesticides	List of Highly Hazardous Pesticides in SA	

Water Research Commission (WRC)	Government linked research organisation	South Africa	Water Contaminants including EDCs	Volume I: Introduction to the Management of EDCs (2013) Volume II: Endocrine Disrupting Compounds - Sample Guide (2013) Volume III: The Compilation of a Toolbox of Bio-assays for Detection of Estrogenic Activity in Water (2011) Volume IV: Monitoring and Assessment of EDCs (2014) Volume V: Guidelines for the Management of EDCs in a Catchment (2013) Emerging Contaminants In Wastewater Treated For Direct Potable Re-use: The Human Health Risk Priorities In South Africa Detection and Quantification of Emerging Organic Pollutants in the Umgeni and Msunduzi Rivers	
World Health Organisation (WHO)		Global		Drinking Water Quality Guidelines	
Women on Farms Project (WFP)	Supporting and upholding the rights of farmworkers through activism, educational programmes, and legal support.	Western Cape & Northern Cape	Pesticides		Labour Programme Land Programme Health and Empowerment Programme

Summary of Organisations' activities

BizNGO

BizNGO is a US-based organization providing resources and guidelines on safer alternatives to EDCs. Their resources are quite corporate focused but provide a useful illustration and potential framework of a thorough set of guidelines, strategies and inventories aimed at making the chemical production and use in industries safer.

The organisation's Alternative Chemical Assessment protocol could be particularly useful in South Africa to identify viable alternatives to existing EDCs. A common argument resisting a transition away from harmful chemicals is that there are no viable alternatives. A resource like this could prove very useful in assisting the transition away from EDC-use. Within this project, a set of documents is provided as a guide to be used to identify harmful chemicals, work through processes of identifying alternatives and implementing their use.

The Guide to Safer Chemicals provides organisations or government with a template of a strategic plan with which to approach the production, trade and use of EDCs. It includes a set of four principles, including:

Principle #1a – Know Chemicals across the Life Cycle of Products,

Principle #1b – Disclose Chemicals across the Life Cycle of Products,

Principle #2 – Assess & Avoid Hazards,

Principle #3 – Commit to Continuous Improvement,

Principle #4 – Support Public Policies & Voluntary Initiatives.

Following this, there is a guide based on identifying pathways to safer chemical use and holding businesses accountable.

The Chemical Footprint project is an ongoing programme which seeks to provide open access inventories of existing chemical use as well as potential alternatives.

Cancer Association of South Africa (CANSA)

CANSA is an organisation established in 1931 with its primary goal being to produce research and educational resources and current news aimed at raising awareness around ways to reduce the chances of getting cancer. The organisation produces fact sheets and latest research on particular chemicals and locally used products with a focus on carcinogenicity. One of the main sources of their value in relation to building an inventory of products containing EDCs in South Africa, is their research on the chemical composition of particular products sold in the country such as forms of food packaging and personal care and cosmetic products. While the organisation has a wide range of resources, many of their facts are not back by authoritative references.

On human-made substances which may be both endocrine disrupting and carcinogenic, CANSA provides information on, and further links to identifying products with and without plasticisers and BPA:

- * Plasticisers – Use plasticiser-free clingwrap

With regards to cling-wrap, EDCs such as certain plasticisers in cling-wrap may leach into food with which it is in contact. Under this link, Use plasticiser-free clingwrap , CANSA lists the following brands which have been certified as safe to use:



- * Bisphenol A – avoid plastic that has a triangle with a number 7 in the centre and a PC indicated at the bottom, especially for baby feeding bottles – download the ‘Plastic Identification Codes’ list (supplied by Plastics|SA)

Many people do not know that there are plastic identifiers or what they mean. The ‘Plastic Identification Codes’ list is a useful document to promote public awareness and safer decision-making.

Centre for Environmental Rights (CER)

The Centre for Environmental Rights is an organisation providing activist legal support focused on environmental issues in South Africa. Their most relevant running programme is entitled Pollution and Climate Change. This programme includes a number of documents of draft legislation, policy guidelines and strategies with the majority focused on climate change. They do not have any explicit focus on EDCs but may be a useful partner in terms of legal resources and advice.

One relevant document includes a comment on the draft regulation (linked in Table 1) under the National Environmental Management Waste Act (No. 59 of 2008) which seeks to allow the exclusion of certain streams or forms of waste under the definition of ‘waste’. The CER’s response (linked in Table 2) opposes this regulation stating that it would allow for abusive declassification of toxic substances as waste, allowing them to bypass official acknowledgement and necessary procedures for their disposal.

Environmental Working Group (EWG)

The Environmental Working Group is largely based in the USA and much of their information is not necessarily relevant to a South African context. However, they have produced a global interactive map showing studies around the world which indicated the presence of per- and poly-fluorinated substances (PFAS) in the environment. Interactive Map - Global danger: Threatened and endangered species at risk from PFAS exposure

Four studies are recorded within South Africa’s borders. Two of the study sites show PFAS presence in crocodiles in the north-eastern part of the country. The other two study sites show

PFAS found in fish of the coast of Cape Town and in a dam in Mpumalanga. Three additional study sites off the countries coastline, (western, southern and south-eastern respectively) demonstrate PFAS presence in oceanic plankton.

The study conducted on fish off the coast of Kalk Bay in Cape Town, (Ojemaye et al., 2020), showed high levels of risk associated with the PFAS and pesticide ingestion from regular consumption of the fish tested (Bonito, Snoek, Panga and Hottentot), which themselves are commonly eaten in the area.

United Nations Environmental Programme (UNEP)

Strategic Approach to International Chemical Management (SAICM) is a jointly produced document which acknowledging that insufficient work has been done globally to prevent exposure to hazardous chemicals, provides institutional and policy guidance on dealing with hazardous chemicals. It includes mention of endocrine disruption as an effect of certain classes of chemicals without mentioning many particular compounds. The document is primarily organised into five tables providing strategic guidance organised through the objectives of:



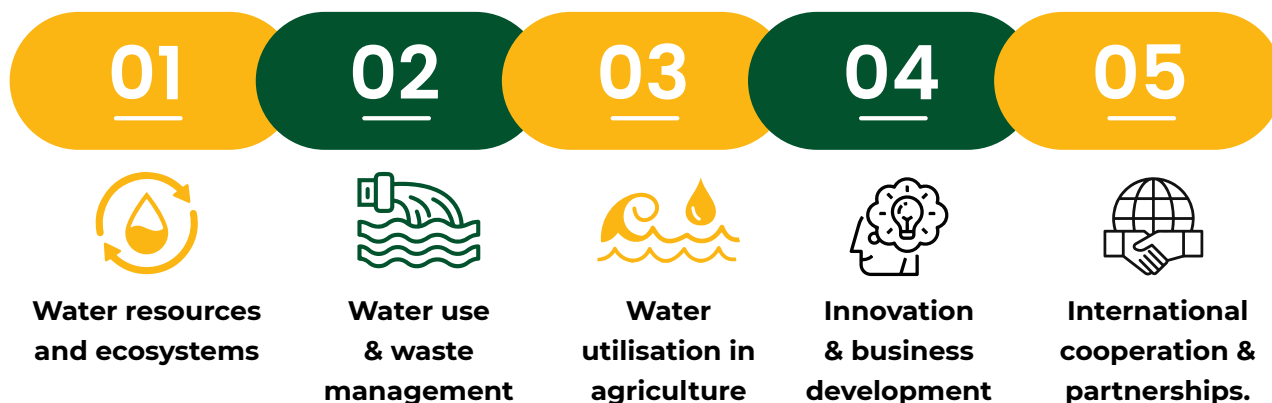
Each table contains headings including:

- ✱ Work areas (e.g. waste management)
- ✱ Activities (e.g. develop local capacities to monitor dumping of hazardous substances)
- ✱ Actors (e.g. national government, local government, NGOs)
- ✱ Targets/timeframe
- ✱ Indicators of progress (e.g. essential skills training)
- ✱ Implementation aspects (e.g. provision of necessary equipment)

SAICM is a document of considerable benefit for institutional planning and support. While it might not prove useful for a situation analysis on EDCs in South Africa, it could be of use for exploring strategic approaches to dealing with particular sectors of chemical pollution. Because the presence of EDCs are so widespread industrially, geographically, and regulatorily, SAICM may be a useful framework for compiling sector-specific approaches.

Water Research Commission (WRC)

The Water Research Commission was established in terms of the Water Research Act (No. 34 of 1971) as an institution to identify relevant areas for research, conduct research, promote coordination on related issues, and provide reports, implementation plans, and strategy documents. Its current focus points are:



For matters directly related to EDCs it released a set of documents from 2011 to 2014:

- ✱ Volume I: Introduction to the Management of EDCs (2013)
- ✱ Volume II: Endocrine Disrupting Compounds - Sample Guide (2013)
- ✱ Volume III: The Compilation of a Toolbox of Bio-assays for Detection of Estrogenic Activity in Water (2011)
- ✱ Volume IV: Monitoring and Assessment of EDCs (2014)
- ✱ Volume V: Guidelines for the Management of EDCs in a Catchment (2013)

In Volume I, an overview is provided of the products in which EDCs can be found (“pesticides, fertilisers, pharmaceuticals such as birth-control pills, personal care products such as medicines, lotions, cosmetics and sun-blocks, and industrial substances including plasticisers, fabric softeners, fire retardants and cooling agents”). The report suggests that through ingestion, skin contact and inhalation, it is likely that every person in the country, and beyond, has been exposed to EDCs. It is relevant to mention that even when exposure is halted, certain EDCs remain in human tissue for decades. This volume also includes brief summaries of legislative acts in South Africa relevant to EDCs which has been summarised in Table 1.

It provides descriptions of the South African Water Quality Guidelines for different sectors of use as well as details of the WRC-published Domestic Wastewater Sludge Disposal and Usage Guidelines (Snyman and Herselman, 2006), listed below:

Volume 1	Volume 2	Volume 3	Volume 4	Volume 5
Selection of management options	Requirements for the agricultural use of sludge	Requirements for the on-site and off-site disposal of sludge	Requirements for the beneficial use of sludge	Requirements for thermal sludge management practices and for commercial products containing sludge

It notes that these guidelines need to be updated to account for the presence of EDCs in WWTW sludge, especially in the context of agricultural use.

The report concludes, noting general guidelines for alertness to the impacts of EDCs and a comment on the uncertainty regarding toxicological data, exposure, and compounding impacts of multiple chemicals.

Unpoison

Unpoison convenes a network of civil society organisations, educational institutions and citizens that promote agricultural legislative reform, the implementation of existing regulations, public access to information and conduct related research. Coordinating a network of people and institutions, they organise and support initiatives aimed at reducing human and environmental exposure to hazardous pesticides. Included in their work is the only publicly available list of Highly Hazardous Pesticides (HHPs) in South Africa.

Women on Farms Project (WFP)

WFP is an organisation primarily aimed at supporting and upholding the rights of women-farmworkers in the Western Cape and Northern Cape provinces. It started in 1996 and plays an important role in activist work for labourers in the agricultural sector. While their focus is not explicitly aimed at EDCs, they are one of the most publicly active voices resisting the use of harmful pesticides in South Africa. They have, on several occasions, staged public protests demanding a ban on the import of pesticides banned in and imported from the EU region which numbers more than 60. The exact number is not publicly known because the pesticide lobby, Croplife SA, has the only registry of agricultural products used in the country which is behind a paywall.

WFP is one of the very few organisations in South Africa whose scope of work includes EDCs with an activist orientation at a grassroots level. By doing this work, WFP is an important ally in understanding and reducing exposure to agricultural-based EDCs in the country. Their website includes statistics of their role in court cases, disputes, educational workshops and nutrition empowerment, and current programmes. Their social media accounts on Facebook (Women on Farms Project), X, formerly Twitter, (@Women_on_Farms) and Instagram (@womenonfarms), provide informative infographics, updates on recent activist activity and other organisation doing related work.

Their current programmes include:



Labour – This programme focusses on advocacy and lobbying for appropriate labour rights for farmworkers including non-compliance of farm managers and owners. Through ensuring the application of necessary labour rights, this programme also intersects with reducing pesticide-exposure through the appropriate provision of Protective equipment. The inadequate supply of protective equipment has been flagged in an independent report by Public Eye (REF).



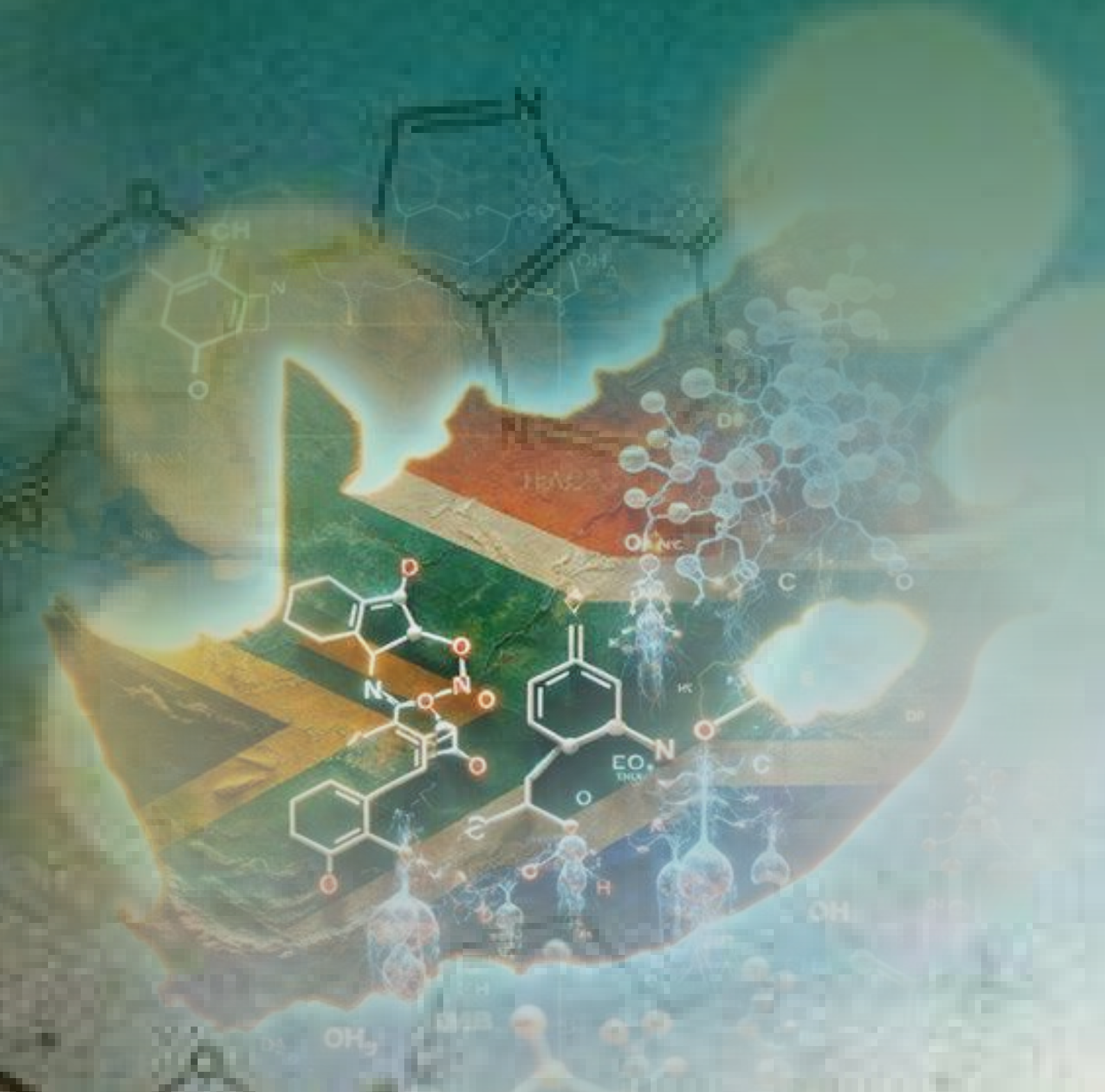
Land – This programme is primarily aimed at preventing and dealing with illegal evictions of farmworkers through educational programmes and legal support. The programme has also included agroecology courses for farmers which focus on sustainable farming without the use of harmful pesticides.



Health and Employment – Most notably, this campaign included pressure on government to ban hazardous pesticides, at least in part, resulting in a commitment from the Department of Agriculture, Land Reform and Rural Development to ban ‘highly hazardous pesticides’ by June 2024. The original notice published by the department in 2023 is no longer available on their government website so no reference can be provided, however, it was report on by news agencies including the Mail & Guardian and IOL.

Conclusions and

RECOMMENDATIONS



Conclusions

- * The existing national legislative framework protecting health and the environment is significantly lacking specific reference to EDCs. Certain critical regulations, such as the 2021 Regulations for Hazardous Chemical Agents, are far from comprehensive in their listing of EDCs. For example, many chemicals listed under the Stockholm Convention for Persistent Organic Pollutants are not included in the Regulations for Hazardous Chemical Agents. Many similar regulatory documents do not mention EDCs at all.
- * As highlighted by the 2010 Adoption of Pesticide Management Policy in its critique of the antiquated Fertilisers, Farm Feeds, and Agricultural Remedies Act of 1947, many of the suggested penalties for contravening regulations are inadequate.
- * While there is a core group of organisations working towards reducing pesticide use in South Africa, there are very few organisations or civic movements that deal with other, lesser-known EDCs.
- * As reflected in the lack of response to the 2019 and 2021 PFOS and PFOA regulation amendments on POPs, as well as the role played by CroplifeSA in the pesticide regulatory landscape, and the incidents around the United Phosphorous Limited fire in July 2021, it is difficult to make a case for South Africa's private sector to be trusted with a self-regulating role.
- * From documents such as the Development of Inventory of Endocrine Disrupting Compounds and its Management Action Plans in South Africa and Adoption of Pesticide Management Policy, there are instances of excellent work. However, in the case of these documents, the prior is incomplete and not available online and the latter was not implemented.
- * There is significant anecdotal information that there is a serious lack of awareness and understanding of EDCs in South Africa. Through exposure to news articles, podcasts, social media accounts, and protests, there has been an increasing, although limited, understanding of hazardous pesticides, but little progress with raising awareness about other EDCs.

Recommendations

- * Development of monitoring systems is crucial. This is occurring at national and municipal level with documents such as the Blue Drop and Green Drop reports. It is also happening through research undertaken at universities. However, there is a need for collaborative monitoring systems dedicated to EDCs, although this is likely to be complex because EDCs span multiple sectors within different stakeholder politics and bureaucracy. Monitoring systems will thus need to be tailored to different sectors while falling under the banner of EDCs.
 - ☆ In the agriculture sector, for example, there needs to be routine monitoring of concentrations of hazardous pesticides. This needs to happen, not only in the form of maximum residue limits of crop produce, but in surrounding environments such as waterways, and for farmworkers.
 - ☆ Additionally, there should be over-arching monitoring systems that track how regulations are being implemented and whether the private sector is compliant.

- ✱ Further development of reports such as the Development of Inventory of Endocrine Disrupting Compounds and its Management Action Plans in South Africa and Adoption of Pesticide Management Policy should be followed up on with government officials and made public to put pressure on government officials to institute such plans.
- ✱ Strict market-based restrictions and requirements for notification of certain chemical presence and compliance is essential. Lack of compliance should incur significant penalties that can act as deterrent.
- ✱ More public participation processes for regulations governing EDCs should be undertaken to involve people actually affected by the chemicals.
- ✱ Collaboration between organisations to facilitate public awareness of EDCs, discussing effective strategies for interventions and suggest policy recommendations.
- ✱ Any strategies that are discussed or developed should be cognisant of an intersectional approach to managing EDCs, noting how complex and intersected the issue is with race, gender, labour, etc.
- ✱ There is an urgent need to raise public awareness. This can include speaking on a radio talk show, a television talk show, writing op-ed articles to newspapers such as Groundup, Amabhungane, Daily Maverick, Mail & Guardian. Social media accounts. Commission graffiti artists to produce aesthetically attractive and informative/shocking public murals about EDCs – to capture people's attention and share widely on social media.

Annex 1:

ADDITIONAL CHEMICALS FOR CONSIDERATION



These are chemicals that may fall outside of the scope of what the listed organisations are doing on EDCs in South Africa but are, however, worth reviewing for their harmful impacts and presence in the country. The information is compiled from a combination of academic research conducted in South Africa, investigative reports, reports by international organisations, not based in but relevant to the country, news articles and government regulations.

Lead

The Centre for Global Development produced a document on lead poisoning, focussing on children in middle-and low-income countries. The report states that this preventable form of poisoning affects up to 815 million children worldwide and yet is largely unacknowledged by global health, education and development agendas.

A study by Larsen and Sanchez-Triana (2023) estimate that 5,5 million people die per year from cardiovascular disease as a result of lead poisoning.

A study by Mathee, Lenton and Street (2023) studied 44 ceramic bowls in South Africa, finding the majority containing higher than the global maximum limit of 90 ppm lead. While there is a draft regulation under the Hazardous Substances Act (No. 15 of 1973), 'Regulations Relating to Lead in Paint or Coating Materials' from 2021 proposing the limit of 90 ppm, it has yet to be approved. Therefore, the current legal limit in South Africa remains at 600ppm based on previous regulations.

A Call to Action to End Childhood Lead Poisoning Worldwide

Acrolein

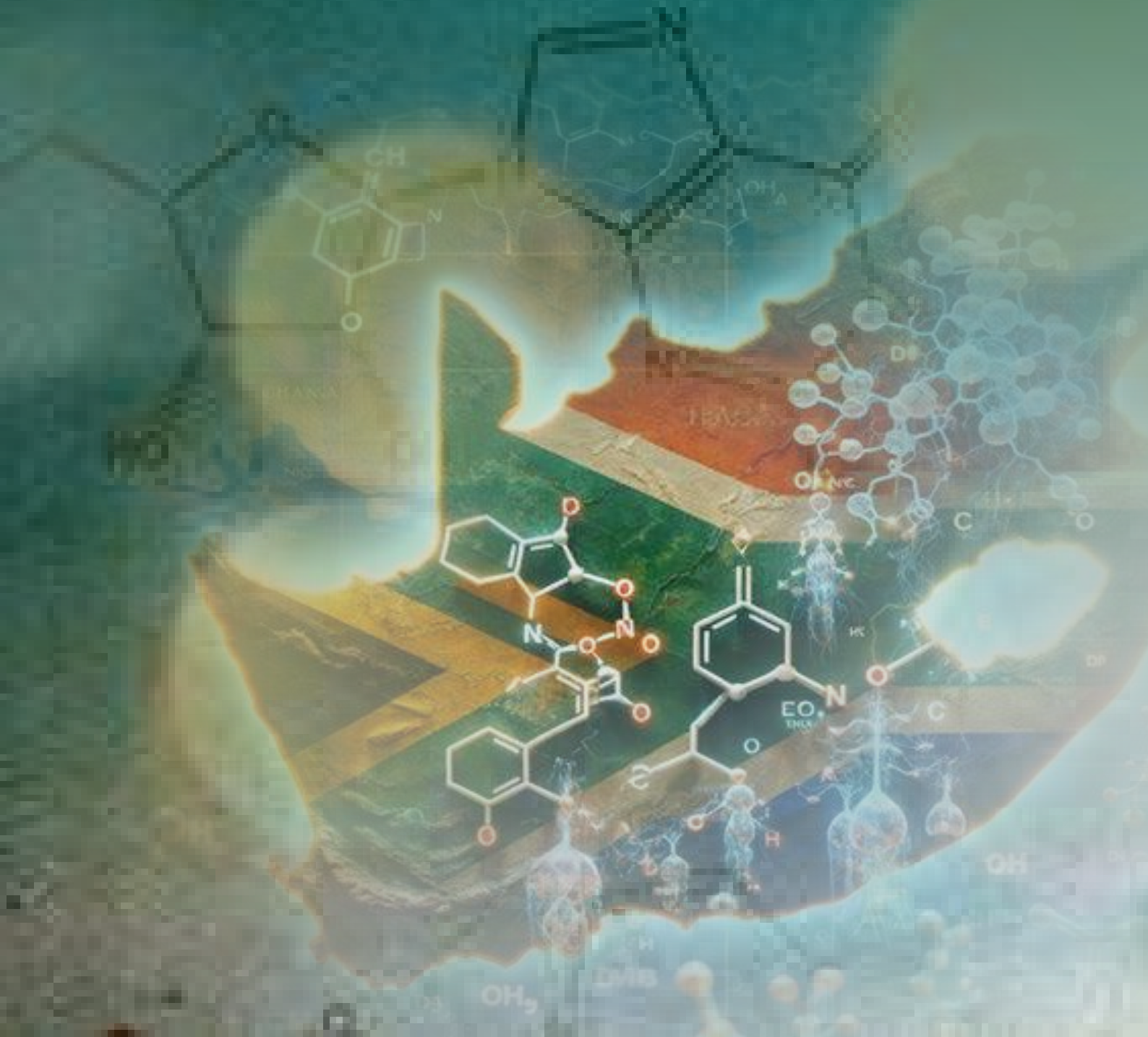
An article by FedHealth (Effects of Vaping) notes that the presence of the herbicide, acrolein, is common in e-cigarettes. While e-cigarettes are poorly regulated in South Africa, The Tobacco Products And Electronic Delivery Systems Control Bill is currently in draft phase. The draft bill, however, is aimed predominantly at control of sales and levels of permissible nicotine, and does not contain mention of the EDC, Acrolein.

The only regulation pertaining to acrolein is an Occupational Exposure Limit (OEL) under the Regulations for Hazardous Chemical Agents where it is listed at 0,2 ppm and danger is noted when acrolein is in contact with skin as cutaneous absorption may occur.

According to a 2023 Daily Maverick article (linked here), Debbie Muir, specialist programme manager in the Department of Forestry, Fisheries and the Environment, is quoted as saying that acrolein is the Department of Water and Sanitation's most used pesticide in canals to control algae, fungi and submerged weeds.

Annex 2:

EXAMPLES OF POLITICAL AND ECONOMIC FACTORS AFFECTING THE PREVENTION AND MITIGATION OF EDCS



It has been increasingly clear since Rachel Carson's seminal book *Silent Spring*, that science illustrating the hazardous nature of a chemical substance will not necessarily result in its prohibition. There are multiple additional political-economic factors which affect the distribution of hazardous substances, their regulation and the enforcement of regulations. The two examples that follow illustrate the influence of factors outside of scientific research.

Influence of regional alliances

Regionally, there are significant discrepancies in the chemicals used in the agricultural sector. Other than the EU which exports dozens of chemicals banned for use in the EU due to their toxicity, there are other regional factors worth noting.

The BRICS coalition of Brazil, Russia, India, China, and South Africa, (as well as Argentina, Egypt, Ethiopia, Iran, Saudi Arabia, and the UAE as of 1 January 2024) exerts political influence over trade and regulations. Although the member nations vary greatly in their political structures and orientations, they do share the goal of promoting development. In the June 2022 BRICS summit, they "emphasise" their support of "agriculture inputs, including, inter alia, fertilizers, on ensuring global food security." (XIV BRICS Summit Beijing Declaration, 2022: point 54). While the EU is rapidly making stricter legalisation for environmental and health protection, BRICS countries have had significant recent developments of their agricultural and agrochemical sectors. From 1990 to 2017, South Africa's pesticide use increased by 62%, with China and Brazil increasing by 659% and 129% respectively (Roser, 2019). The rising numbers of pesticide use in BRICS countries along with a pro-agricultural development agenda suggests a reinforcing of the agrochemical status quo.

Notably, there have been successful sectors of pesticide regulation in developing economies. The Permanent Interstate Committee for Drought Control in the Sahel (CILSS), comprising 13 west African countries, has implemented stricter pesticide regulations. Including a mandate to improve food security in the region, the Sahelian Pesticide Committee (CSP) was formed as a regulatory authority for all 13 countries. In 2014, the CSP banned atrazine use for the region. The committee have banned several other harmful pesticides including paraquat and acetochlor, all still registered for use in South Africa.

Of the European countries, France has led the way in 2022 with a ban on the import and export of all pesticides banned in the EU for environmental and health protection (European Parliament, 2020). The EU has also recently proposed new regulations to enact broad scale chemical bans. While regulations typically ban individual chemicals, the proposed set of regulations will ban groups of chemicals. This does not allow industries to find molecular loopholes to circumvent individual bans as they have done in the past (The Guardian, 2022). In June 2022, the European Commission adopted a new Nature Restoration proposal with one of its primary goals to increase biodiversity. It includes "Legally binding targets at EU and national level to reduce by 50% the use and the risk of chemical pesticides and the use of the more hazardous pesticides by 2030." (European Commission, 2022). The proposal will also ban the use of pesticides in 'ecologically sensitive' zones.

It appears that without the influence and accountability of strong regional regulatory alliances such as the CILSS and EU, individual nations are not able or willing to resist industry pressures for a deregulated environment. Furthermore, with a development-oriented alliance such as BRICS, agricultural output appears to receive significantly more attention than environmental protection and health matters.

Croplife

Croplife is a global 'crop solution' industry association that produces data on products and interfaces with government. It has six agrochemical companies as its members with its board comprised of the represented companies' executives and Syngenta's CEO as its chairperson. The South African branch Croplife SA, led by someone previously responsible for DuPont's crop protection business, claims to be "the voice of and leading advocate for the South African plant science industry." (Croplife SA Association Profile). In 2020, the Mail & Guardian and Unearthed investigated Croplife SA's involvement with South Africa's pesticide regulation (Dowler, 2020). When determining the registration and regulations of a pesticide, the Pesticide Registrar, under the DALRRD, is responsible for reviewing field studies, consulting other relevant entities such as the DFFE, and making the final decision. In 2020, new regulations were being drafted to stipulate that studies used for pesticide registration and regulation would be required to be conducted by researchers accredited by a scientific body. The legislated regulatory body in South Africa is the South African Council for Natural Scientific Professions (SACNASP).

The investigation found leaked minutes and emails from Croplife SA meetings in which their strategy had been to influence the new regulations to allow Croplife SA to be considered an independent scientific body (Dowler, 2020). A month later, the Pesticide Registrar released a draft regulation stating that studies be conducted by members of SACNASP "or equivalent" (Dowler, 2020), essentially allowing Croplife SA to be included as a scientific body. The chief executive of SACNASP responded by stating that if the 'or equivalent' was not removed they may be required to prosecute non-registered members claiming professional independent research. In response, the 'or equivalent' was removed which reportedly drew angry responses from Croplife SA frustrated with their lack of recognition as an independent scientific body (Dowler, 2020). While that regulation appeared to be momentarily resolved, the pesticide industry's involvement in the regulatory sphere remains present and opaque. Furthermore, the industry appears to receive a questionable level of acknowledgment from the DALRRD with regards to regulation.

Croplife SA's asserts that it fulfils a regulatory role, claiming "CropLife SA acts as liaison between the Department of Agriculture, Forestry and Fisheries [now the Department of Agriculture, Land Reform and Rural Development] and the plant science industry" (Croplife SA Association Profile). This seems to be accepted and even encouraged by the government department. A protocol document published by the DALRRD in 2018 notes that in the case of an emergency registration of a pesticide, the pesticide registrar will consult "government departments and agencies and Croplife SA" (DALRRD, 2018: 6). In May 2020, it was confirmed by Croplife SA and the Pesticide Registrar that Croplife SA had its members working in the registrar's office to deal with the 'backlog of applications' (Dowler, 2020). The involvement of a pesticide lobby group in the office responsible for registering pesticides is an unacceptable contravention of both democratic and scientific integrity. South Africa is already behind necessary chemical regulatory practices when compared to the EU and appears to be increasingly influenced by corporate interests.

In January 2021 newsletter, the DALRRD welcomed the latest industry-led regulatory player, the Strategic Agricultural Inputs Forum (SAIF) to shape regulatory changes in the agricultural sector. The forum "will primarily work alongside the Registrar of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) in a public-private partnership (PPP)" (DALRRD, 2021: 10). The SAIF is led by the Animal Feed Manufacturer's Association's (AFMA) CEO with Croplife SA's regulatory and governance manager as the forum's secretary. The DALRRD's article quotes the SAIF's chairperson,

“The forum will be represented mainly by the CEOs of the different organisations and their regulatory and technical experts. We want expertise at the table as well as the authority to engage with government at the most senior level. However, this will not just be a piece of paper...It will be a [Public Private Partnership] with government, and it must be signed off by government. There must be timeframes and deliverables linked to it.” (DALRRD, 2021: 10).

In November 2021, AFMA released an article further describing the actions and goals of the SAIF. It quotes the chairperson saying, “The forum developed a new regulatory environment and strategy...The immediate actions we want to take must ensure that the resources at the [DALRRD] are sufficient to service these industries” (Human, 2021: 1). The article notes that the SAIF are in the process of signing a memorandum of understanding with the department. No further communications or details have been released on the scope of the SAIF's involvement with regulatory activity. That the DALRRD announced the establishment of an industry-led association to partner with government on regulatory matters is concerning. Communications between Croplife SA, the SAIF and the department are not public and therefore, there is no form of accountability.

In the past three years, there appears to have been a significant wave of corporate stakeholders in the agricultural sector embedding themselves within government regulatory procedures. The backlog of administrative processing during the COVID-19 pandemic and associated lockdowns opened the door for associations such as Croplife SA and the SAIF to present themselves as administrative resource support. That, however, has quickly shifted to claiming responsibility and the necessity for their involvement in shaping a new regulatory landscape. This is a concerning trend and needs to be investigated further.

Reported Criminal Cases and The Green Scorpions

The Green Scorpions were constituted as a task force across sectors to enforce environmental laws and rights.

The following is an excerpt from a 14 November 2022 Media Statement from the DFFE:

“Criminal investigation of environmental crimes has increased by 7.6% in the year under review, with 952 criminal dockets registered. A total of 1091 admission of guilt fines to the value of R408 730.00 were paid – an increase of 6.6% -- while 838 people were arrested. There was an increase of 262.5% in the number of convictions for environmental crimes, showing a hike from 16 to 58 in the past financial year. Six plea agreements were entered, and 129 warning letters were issued. The total Rand amount of Section 24G administrative fines related to the commencement of an unlawful activity decreased to R11 274 319 from R18 154 666 in the previous year.

In 2021/22, 4 171 facilities were inspected as part of the compliance monitoring function of the Green Scorpions. Of the 4 171 inspections, 2 918 were to check compliance with environmental authorisations and/or permits, strategic and routine inspections, and 1 253 were reactive probes triggered by complaints. A total of 1 123 inspections related to Section 30 incidents, including toxic spills and illegal dumping.”

Further details of these cases, and whether or not they pertain any way to EDCs would require further research to ascertain.

1. Burger, A.E.C. (2010). WRC PROGRAMME ON ENDOCRINE DISRUPTING COMPOUNDS (EDCS) Volume 4: Implementation of the Extended Research Plan on Endocrine Disruptor Chemicals in Water Resources. WRC Report No KV 234/09 (ISBN 978-1-77005-949-8), Water Research Commission, Pretoria, South Africa.
2. BRICS Summit Beijing Declaration. 2022. Minister of Foreign Affairs of the People's Republic of China. https://www.fmprc.gov.cn/eng/zxxx_662805/202206/t20220623_10709037.html (accessed 29 February, 2024).
3. EC, Common Implementation Strategy for the WFD, Guidance Document No. 27 - Technical Guidance For Deriving Environmental Quality Standards, Brussels, Belgium, 2011. doi:10.2779/43816.
4. EC, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, 2000. doi:2004R0726 - v.7 of 05.06.2013
5. EC, Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, Off. J. Eur. Union. L 309 (2009) 1–50.
6. EC, Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Off. J. Eur. Communities. L 396 (2006) 1–849.
7. ECHA, Evaluation process for active substances, (2016). <https://echa.europa.eu/regulations/biocidal-products-regulation/approval-of-active-substances/approval-of-active-substances/evaluation-process-for-active-substances> (accessed November 29, 2016).
8. ECHA, Understanding the BPR, (2016). <https://echa.europa.eu/regulations/biocidal-products-regulation/understanding-bpr> (accessed November 28, 2016).
9. Eskenazi, B., et al (2009). The Pine River statement: human health consequences of DDT use. *Environ Health Perspect* 117(9):1359-67
10. Gore, A.C., Crews, D., Doan, L.L., La Merrill, M., Patisaul, H. and Zota, A., 2014. Introduction to endocrine disrupting chemicals (EDCs). A guide for public interest organizations and policy-makers, pp.21-22.
11. Human Rights Watch., 2011. Ripe with abuse: human rights conditions in South Africa's fruit and wine industries. <http://www.hrw.org> (accessed 27 July, 2022).
12. Mathee A, Renton L, Street R. Concentrations of lead in ceramic tableware in South Africa. *S Afr J Sci*. 2023;119(9/10), Art. #13853. <https://doi.org/10.17159/sajs.2023/13853>
13. Montreal Protocol on Substances That Deplete the Ozone Layer, 1987
14. National Environmental Management Act, 1998 (Act No. 107 of 1998)
15. Larsen B, Sánchez-Triana E. Global health burden and cost of lead exposure in children and adults: a health impact and economic modelling analysis. *Lancet Planet Health*. 2023 Oct;7(10):e831-e840. doi: 10.1016/S2542-5196(23)00166-3. Epub 2023 Sep 12. PMID: 37714172.

16. London, L., 1999. The dop'system, alcohol abuse and social control amongst farm workers in South Africa: a public health challenge. *Social Science & Medicine*, 48(10), pp.1407-1414.
17. London, L., 2003. Human rights, environmental justice, and the health of farm workers in South Africa. *International journal of occupational and environmental health*, 9(1), pp.59-68.
18. London, L., 2021. Memorandum: Repeal of Colonial and Apartheid Legislation (SALRC Project 149): The Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947). Unpoison. 3 June, 2021.
19. Ojemaye, C.Y., Onwordi, C.T., Pampanin, D.M., Sydnes, M.O. and Petrik, L., 2020. Presence and risk assessment of herbicides in the marine environment of Camps Bay (Cape Town, South Africa). *Science of The Total Environment*, 738, p.140346.
20. Ojemaye, C.Y., Onwordi, C.T. and Petrik, L., 2021. Herbicides in the tissues and organs of different fish species (Kalk Bay harbour, South Africa): occurrence, levels and risk assessment. *International Journal of Environmental Science and Technology*, 17(3), pp.1637-1648.
21. Olujimi, O. O., et al. (2012). Chemical monitoring and temporal variation in levels of endocrine disrupting chemicals (priority phenols and phthalate esters) from selected wastewater treatment plant and freshwater systems in Republic of South Africa. *Microchemical Journal* 101: 11-23.
22. Patrick, S. M., Bornman, M. S., Joubert, A. M., Pitts, N., Naidoo, V and C. De Jager (2016). Effects of environmental endocrine disruptors, including insecticides used for malaria vector control on reproductive parameters of male rats. *Reproductive Toxicology*, 61, 19-27.
23. Persson, L., Carney Almroth, B.M., Collins, C.D., Cornell, S., de Wit, C.A., Diamond, M.L., Fantke, P., Hassellöv, M., MacLeod, M., Ryberg, M.W. and Søgaaard Jørgensen, P., 2022. Outside the safe operating space of the planetary boundary for novel entities. *Environmental science & technology*, 56(3), pp.1510-1521.
24. Rohr, J.R. and McCoy, K.A., 2010. A qualitative meta-analysis reveals consistent effects of atrazine on freshwater fish and amphibians. *Environmental health perspectives*, 118(1), pp.20-32.
25. Rother, H.A., 2005. Risk perception, risk communication, and the effectiveness of pesticide labels in communicating hazards to South African farm workers. Michigan State University.
26. Rother, H.A., 2008. South African farm workers' interpretation of risk assessment data expressed as pictograms on pesticide labels. *Environmental research*, 108(3), pp.419-427.
27. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticide In international trade, 1998.
28. SAICM, Report of the International Conference on Chemicals Management on the work of its fourth session, 2015. http://www.saicm.org/Portals/12/documents/meetings/ICCM4/doc/K1606013_e.pdf.

29. South Africa. Department of Agriculture, Forestry and Fisheries. 1947. Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No. 36 of 1947).
30. South Africa. Department of Agriculture, Land Reform and Rural Development. 2010. Pesticide Management Policy for South Africa. (Government Gazette no. 33899 notice no. 1120/2010).
31. South Africa. Department of Health. 2017. Foodstuffs, Cosmetics and Disinfectants Act (54/1972): Regulations relating to the labelling, advertising and composition of cosmetics (Government Gazette no. 41351 notice no. R.1469/2017). https://www.gov.za/sites/default/files/gcis_document/201712/41351rg10790gon1469s.pdf
32. South Africa. Department of Health. 2009. Hazardous Substances Act: Declaration of Leaded Paint as Group 1 Hazardous Substance. (Government Gazette no. 32455 notice no. 801/2009). https://www.gov.za/sites/default/files/gcis_document/201409/32455801.pdf
33. South Africa. Department of Employment and Labour. 2021. Occupational Health and Safety Act, 1993: Regulations for Hazardous Chemical Agents. (Government Gazette no. 44348 notice no. R.280/2021). https://www.gov.za/sites/default/files/gcis_document/202103/44348rg11263gon280.pdf
34. South Africa. South African Bureau of Standards. 2008. SANS 10234-A: List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS). SABS Standards Division.
35. South Africa. South African Bureau of Standards. 2008. Supplement to SANS 10234-A: List of classification and labelling of chemicals in accordance with the Globally Harmonized System (GHS). SABS Standards Division. <https://archive.org/details/za.sans.10234.a.2008/page/n1/mode/2up>
36. South Africa. Department of Water Affairs and Forestry. 1996. South African Water Quality Guidelines (second edition). Volume 1: Domestic Use. https://www.dws.gov.za/Groundwater/documents/Pol_saWQguideFRESHDomesticusevol1.pdf
37. South Africa. South African Bureau of Standards. 2015. SANS 241-1:2015 Drinking Water Specification. SABS Standards Division.
38. South Africa. Department of Water and Sanitation. 2023. Blue Drop Report National 2023. https://ws.dws.gov.za/IRIS/releases/BDN_2023_Report.pdf
39. South Africa. Department of Water and Sanitation. 2023 Green Drop Report National 2023.
40. South Africa. Department of Environmental Affairs. 2014. National Environmental Management Act (107/1998): Regulations to phase-out the use of Polychlorinated Biphenyls (PCSBs) Materials and Polychlorinated Biphenyls (PCBs) Contaminated Materials. (Government Gazette no. 37818 notice no R.549/2014). https://www.gov.za/sites/default/files/gcis_document/201409/37818rg10232gon549.pdf
41. South Africa. Department of Environmental Affairs. 2019. National Environmental Management: Integrated Coastal Management Act (24/2008): Coastal Waters Discharge Permit Regulations. (Government Gazette no. 42304 notice no. 382/2019). https://www.gov.za/sites/default/files/gcis_document/201903/42304gon382.pdf

42. South Africa. Department of Environmental Affairs. 2015. National Environmental Management: Waste Act (59/2008): Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits from Prospecting, Mining, Exploration or Production Operation. (Government Gazette no. 39020 notice no. 632/2015). https://www.gov.za/sites/default/files/gcis_document/201507/39020rg10473gon632.pdf
43. South Africa. Department of Environmental Affairs. 2009. National Environmental Management: Waste Act (59/2008): National Policy on Thermal Treatment of General and Hazardous Waste. (Government Gazette no. 32439 notice no. 777/2009). https://www.gov.za/sites/default/files/gcis_document/201409/32439777.pdf
44. South Africa. Department of Environmental Affairs. 2015. Chemicals Management Bill – Concept Document. Presentation at Chemicals Management and Land Remediation Summit. <https://sawic.environment.gov.za/documents/4714.pdf>
45. South Africa. Department of Environment. Forestry and Fisheries. 2020. National Waste Management Strategy. https://www.dffe.gov.za/sites/default/files/docs/nationalwaste_management_strategy.pdf
46. South Africa. Department of Environmental Affairs. 2018. South Africa: State of Waste Report. https://soer.environment.gov.za/soer/UploadLibraryImages/UploadDocuments/141119143510_state%20of%20Waste%20Report_2018.pdf
47. Stockholm Convention on Persistent Organic Pollutants, 2001
48. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
49. The Strategic Plan for South African Agriculture, 2001
50. Water Research Commission, 2018. Emerging contaminants in wastewater treated for directpotable re-use: The human health risk priorities in South Africa - A prioritization framework for monitoring contaminants of emerging concern in reclaimed water for potable use. Volume 2. Report No. TT 742/2/17 of March 2018.
51. World Bank, 2016. Africa Stockpiles Program: Project Performance Assessment Report. World Bank Group
52. World Health Organization, Global Assessment of the State-of-the-Science of Endocrine Disruptors, 2002. http://www.who.int/ipcs/publications/new_issues/endocrine_disruptors/en/
53. Zander, J., 2010. The Application of the Precautionary Principle in Practice. Cambridge, UK: CUP.
54. Zhang, C., Li, Y., Wang, C., Niu, L. and Cai, W., 2016. Occurrence of endocrine disrupting compounds in aqueous environment and their bacterial degradation: A review. Critical Reviews in Environmental Science and Technology, 46(1), pp.1-59.

