



The role of LCA in policy for enabling sustainable consumption and production: a case study from South Africa

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William Stafford¹ and Anton Nahman¹

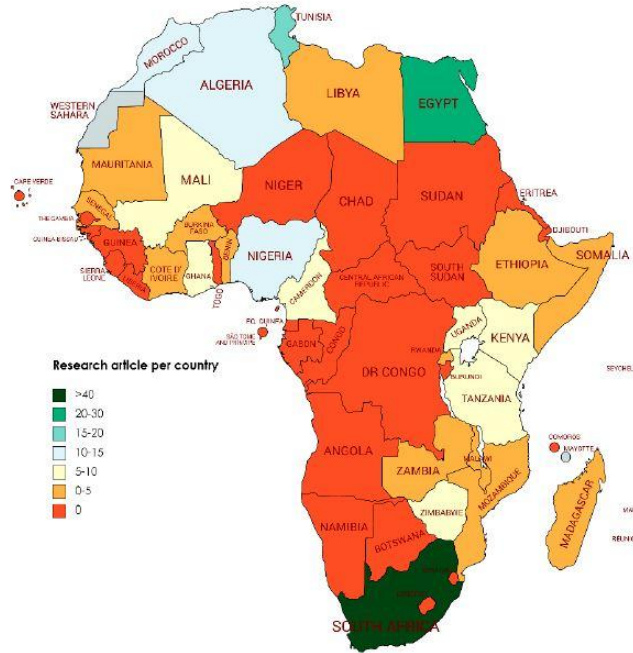
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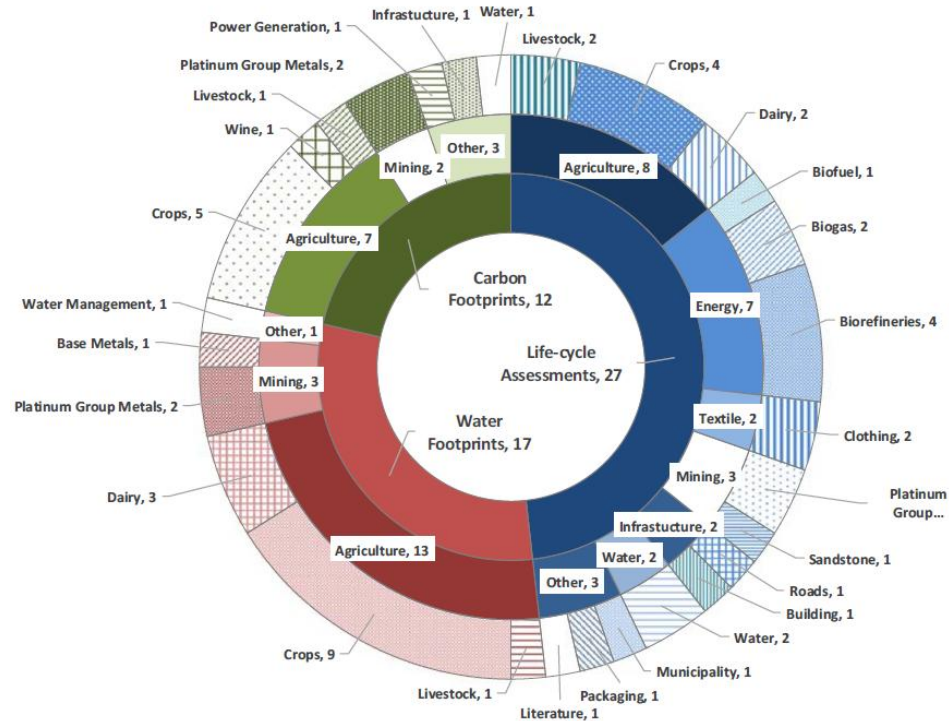
Agenda

- **The Global landscape:** LCA and policy at global level
- **Research goal:** how LCA is being mainstreamed within South African policy
- **Methodology:** focus on LCA research in South Africa which is having an impact by informing policy, action plans, and strategies in the last 5 years
- **Results:** Mainstreaming LCA policy in South Africa
- **Conclusion:** LCA increasingly recognized as a tool for evidence-base policy making, but challenges still remain for a broader adoption

LCA landscape in South Africa

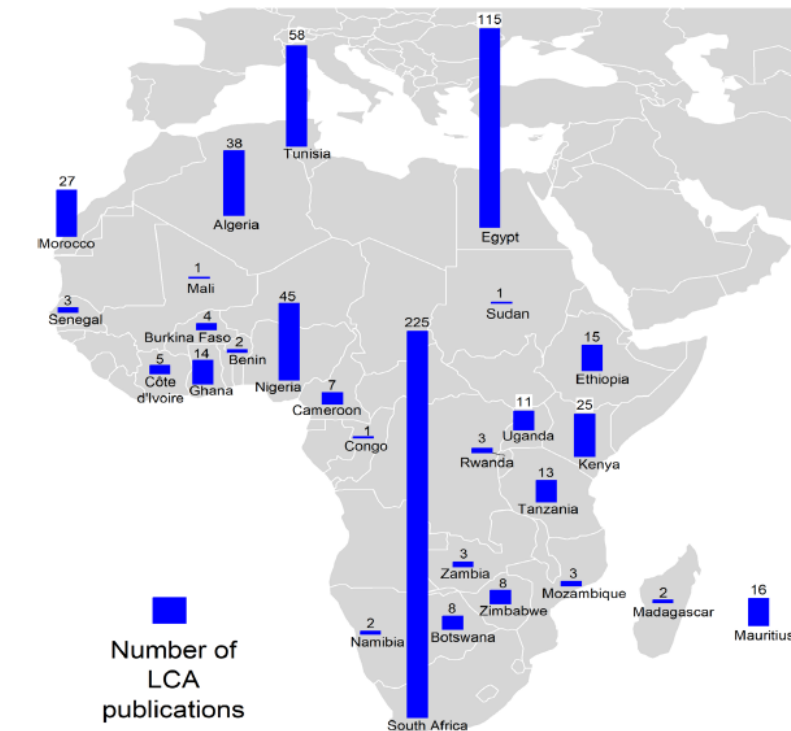


Status of LCA in Africa (2000-2020)
(Source: Karkom et al. (2021))

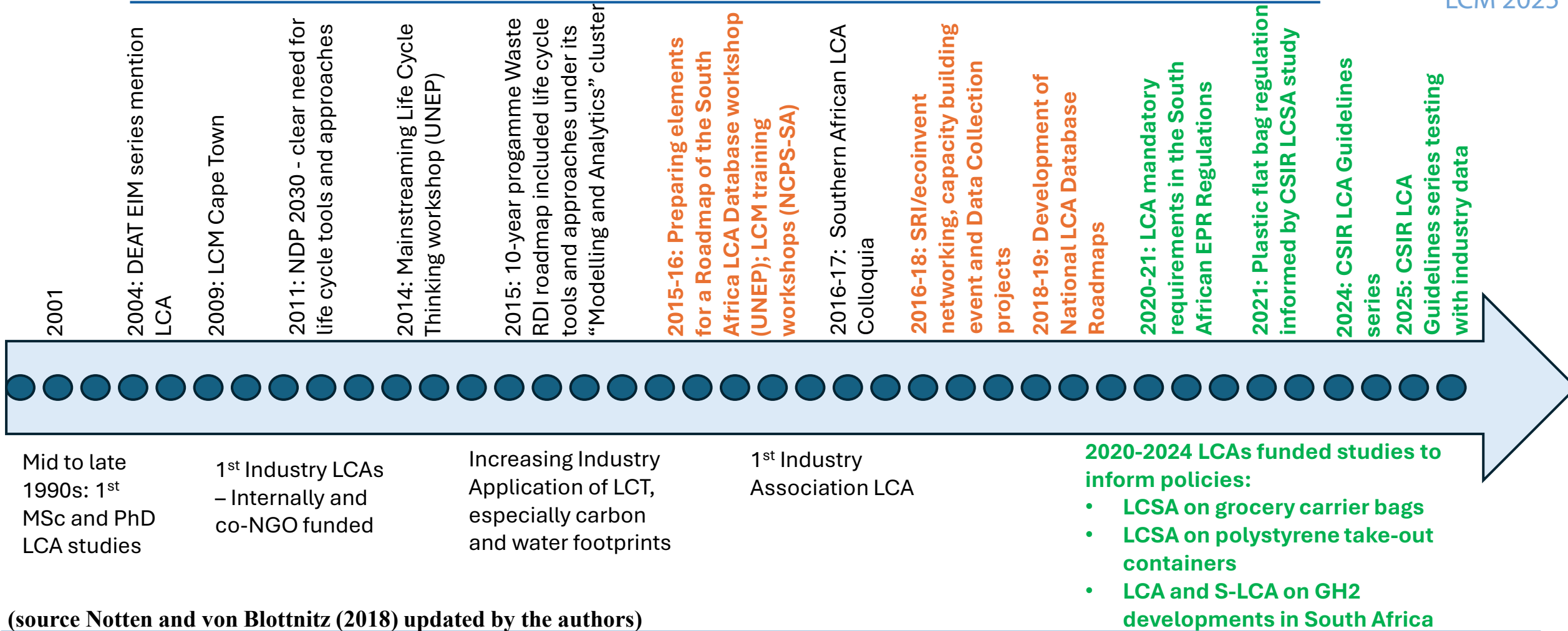


Summary of environmental studies available in the literature for South Africa (2011–2019)
(Source: Harding et al. (2021))

Bibliometric analysis and visualisation of research on LCA in Africa (1992–2022)
(Source: Isha et al. (2024))



Timeline of LCA developments and LC-related events & research in South Africa



(source Notten and von Blottnitz (2018) updated by the authors)

Mandatory LCA into EPR Regulations



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South Africa's only example of integrating LCA into public policy is found in the EPR Regulations

Requirements of the EPR Regulations in terms of Life Cycle Assessment

"5. (1) The producer of a product or class of products, as identified by the Minister in terms of section 18(1) of the Act, must-...

(k) conduct a life cycle assessment, in relation to the product, in accordance with the applicable standards within 5 years of implementation of their extended producer responsibility scheme;

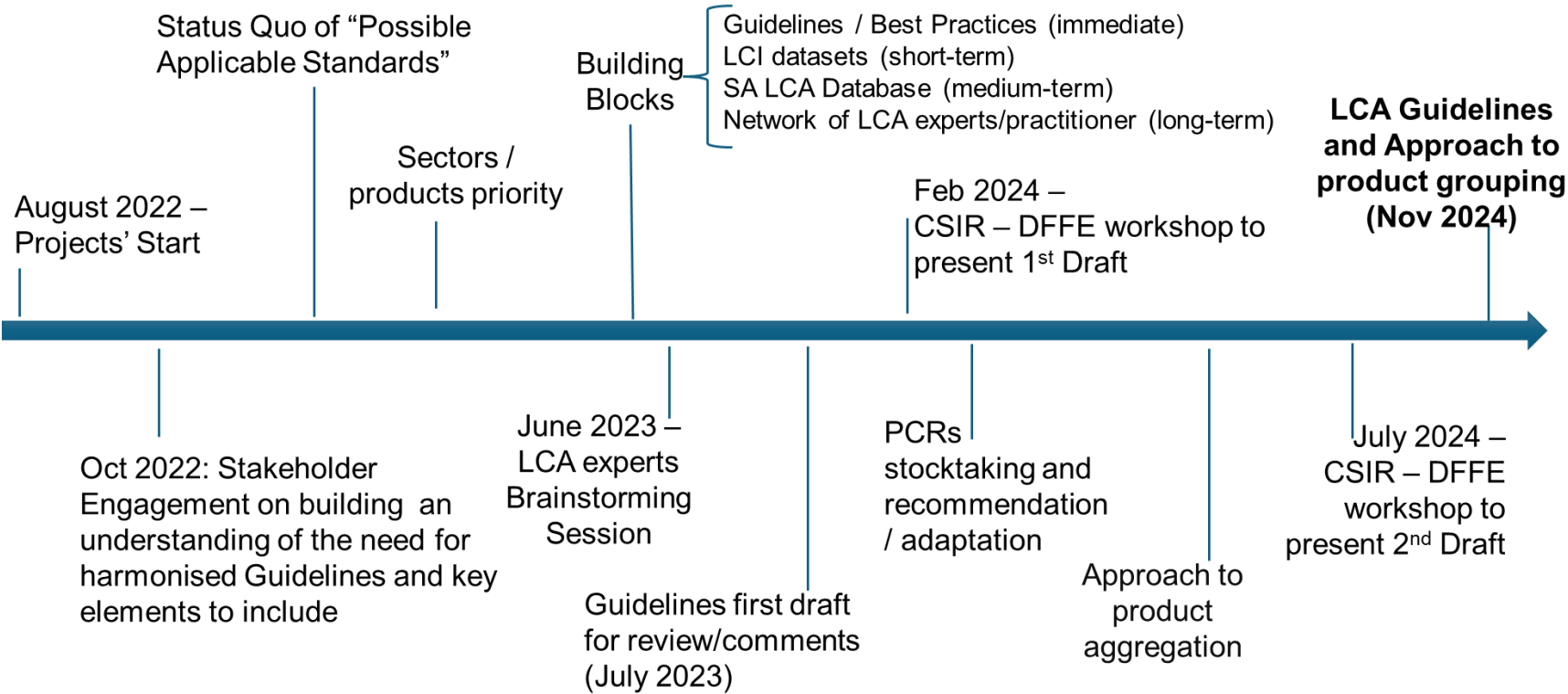
(l) through the life cycle assessment as a minimum focus on the following:

- (i) Minimisation of material used in the identified product;*
- (ii) Design of the product to facilitate reuse; recycling or recovery, without compromising the functionality of the product; and*
- (iii) Reduction of environmental toxicity of the resulting post -consumer waste stream."*

The CSIR LCA Guidelines



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AIM

To provide clear guidance to South African producers on how to conduct an LCA in an effective, practical and consistent way so to ensure results are robust and scientifically credible

Mainstreaming LCA in policy in South Africa (1)



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Case Study	Methodology	Policy Outcome
National LCA Database Roadmap (Notten & von Blottnitz, 2018)	LCT/LCM	Provided a pathway for SA's national LCA database and evidence-based policy
Grocery Bags in South Africa (Russo et al., 2020)	LCSA/LCA	Informed recycled content targets in plastic bag regulations (DFFE, 2021) and supported policy on plastic pollution.
Plastic Bag Alternatives (Stafford et al., 2022)		Provided evidence for SA's position in UN treaty negotiations on plastic pollution
Food Containers & Cups (Russo & Stafford, 2023)	LCSA	Supported SA's Action Plan for transitioning to more sustainable materials for identified problematic plastics
LCA Guidelines (Russo et al., 2024)	LCA	Developed harmonised LCA practices for EPR compliance (ex-ante & ex-post).
International LCA Data in EPR (Botha & Harding, 2024)	LCT/LCM	Assessed use of secondary data to streamline LCA for EPR compliance.
Green Ammonia for Transport (Stafford et al., 2024)	LCA	Informed project design and contributing to green hydrogen certification development (DFFE).
Saldanha Hydrogen Hub (Russo & Goga, 2025)	S-LCA	Supported Just Energy Transition (JET) alignment (ex-ante).
Power-to-X & GHG Reduction (Stafford et al., 2024)	LCA (GHG focus)	Recommended PtX inclusion in future NDCs to meet Net Zero by 2050 (RSA, 2021)
Circularity in NDCs (Stafford et al., 2025)		Piloted UN Toolbox; identified circular economy potential in construction sectors (UNEP et al., 2023a)
Diaper in Rural Context (Chitaka & Nel, 2025)	LCA	Highlighted geographic relevance in LCA and supported SARChI Chair's municipal waste research.

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Mainstreaming LCA in policy in South Africa (2)



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The LCA mandatory requirements in the EPR Regulations expected to significantly drive LCA adoption

Challenges are related to limited local expertise, limited local data and the lack of methodological guidance in the EPR Regulations:

- To overcome that research institutions have developed the *CSIR LCA Guideline* series (Russo et al., 2024) and explored local adaptations of international LCI data (Botha & Harding, 2024).

Govt departments that support LCA initiatives are:

- **Department of Forestry, Fisheries and the Environment (DFFE)** which has played a key role:
 - By publishing the LCA information series (2004)
 - Drawing on evidence-based research to set targets for increased recycled content in plastic bags (2021)
 - Gazetting the Extended Producer Responsibility Regulations (2020) which mandate LCA to promote long-term product sustainability and material circularity
- The **Department of Science, Technology and Innovation (DSTI)** has further advanced LCA adoption through its 10-year “Waste RDI Roadmap” programme, which incorporates life cycle tools under the “Modelling and Analytics” cluster and supported numerous LCA research studies

Concluding Remarks



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- **LCA is increasingly mainstreamed in policy in South Africa supported by LCA research that provides the evidence-based to inform policy actions and its integration into the EPR Regs marks a significant milestone in advancing environmental sustainability**
- South Africa, a founding member of the African Circular Economy Alliance (ACEA) since 2017, **actively promotes LCT and CE strategies** across Africa in line with the African Union's Agenda 2063 for inclusive, sustainable development
- The 2019 White Paper on Science, Technology and Innovation **emphasizes STI's role in promoting environmental sustainability through systemic innovation, life cycle approaches**, and alignment with the NDP 2030 and the Sustainable Development Goals.
- Some **challenges** still remains:
 - Limited local expertise
 - Lack of local life cycle data continues to limit relevance for national policy
 - LCA integration into policy is hindered by its technical complexity and assumption-driven result variability, making interpretation difficult for policymakers
- Socio-economic aspect that reflect South Africa's unique challenges (e.g. inequality) should be also considered for a more comprehensive sustainability assessment

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