GreenCape

INDUSTRY BRIEF

Opportunities for hemp in Cape Town and South Africa's construction materials value chain

3 of 3

Investment opportunities for cannabis in Cape Town

1. Pharmaceutical industry | 2. Textiles | 3. Construction material

Main insights

- Globally, the cannabis sector is growing, and is currently valued at $51.28 billion in 2023 [1].
- In South Africa, recent policy and regulatory changes create an enabling environment that is opening up local opportunities for investment and job creation within the sector. In his State of the Nation address in February 2022, President Cyril Ramaphosa indicated the sector could be worth R406 billion by 2026.
- In Cape Town, and more broadly in South Africa, one of the key opportunities for investment in the sector lies within the construction materials value chain. Hemp can be used as a substitute raw material in the manufacturing of construction materials.
- As the hemp processing sector is nascent in South Africa, local manufacturers have to import hemp components which increases the price of hemp construction materials and negatively impacts market demand.
- Cape Town is well-positioned to become a hemp construction material hub in South Africa. It is already home to two companies that sell hempcrete, hemp insulation and hemp plaster, as well as the world's largest building made with industrial hemp [2].

This document is one of three sector-specific briefs that highlight opportunities for investment in the industrial hemp value chain in Cape Town and South Africa. This brief is written for:

Investors interested in the sector-specific opportunities for industrial hemp in Cape Town and South Africa.

Construction professionals and developers looking to learn more about the advantages of using hemp construction materials.

Context

Hemp is a non-psychoactive varietal of cannabis, and it can be used in a number of different industries, such as textiles, construction materials, plastics etc. In recent years, hemp has grown in popularity as a more sustainable input, particularly because of its agricultural benefits in comparison to other industrial crops.

South Africa is particularly well-placed to take advantage of this interest, as the climate is well-suited for hemp cultivation. In his 2022 State of the Nation Address President Cyril Ramaphosa stated that unlocking South Africa's cannabis industry could create more than 130 000 new jobs and be worth R406 billion by 2026. However, these benefits are only likely to be fully realised if efforts are made to localise full value chains for greater value-add and job creation.

This offers an opportunity for the City of Cape Town to tap into this emerging sector, by leveraging on existing companies, infrastructure, and skills.

1. Construction materials value chain analysis and identified investment opportunities in Cape Town

It is estimated that the building and construction sector accounts for around 40% of greenhouse gas (GHG) emissions globally, from materials to heating, cooling, and lighting [3]. The decarbonisation of the construction sector requires three main actions:

1. Lowering the carbon intensity of building materials.
2. Implementing clean-energy alternatives and improving energy efficiency.
3. Designing buildings with circularity in mind (incorporating greater recycling and closed material flows in the refurbishment and demolition of buildings). [3]

Hemp construction materials fulfil a number of these sustainability metrics. Firstly, the manufacturing of hemp construction materials is less carbon intensive than traditional materials. Secondly, the properties of hemp, such as vapour permeability, make it a good temperature regulator, thus reducing the energy demands of heating and air-conditioning.

Hemp construction materials

There is a growing interest in the use of hemp in the construction sector globally, particularly as the sector looks at different pathways for reducing the overall carbon footprint of the value chain. The most popular hemp construction materials are hemp insulation and hempcrete. The materials are made from different components of the hemp plant, as can be seen in **Figure 1**.

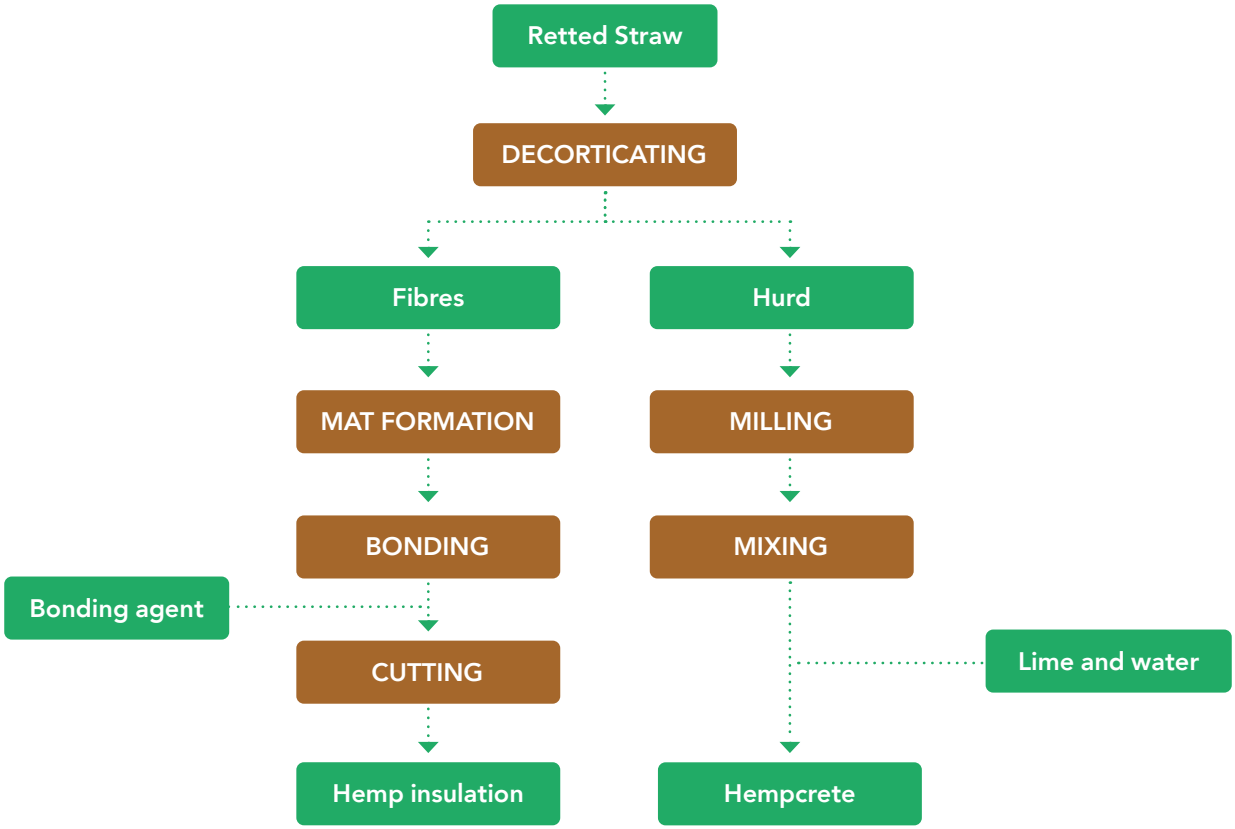


Figure 1: Hemp construction materials value chain

1.1 Hemp insulation

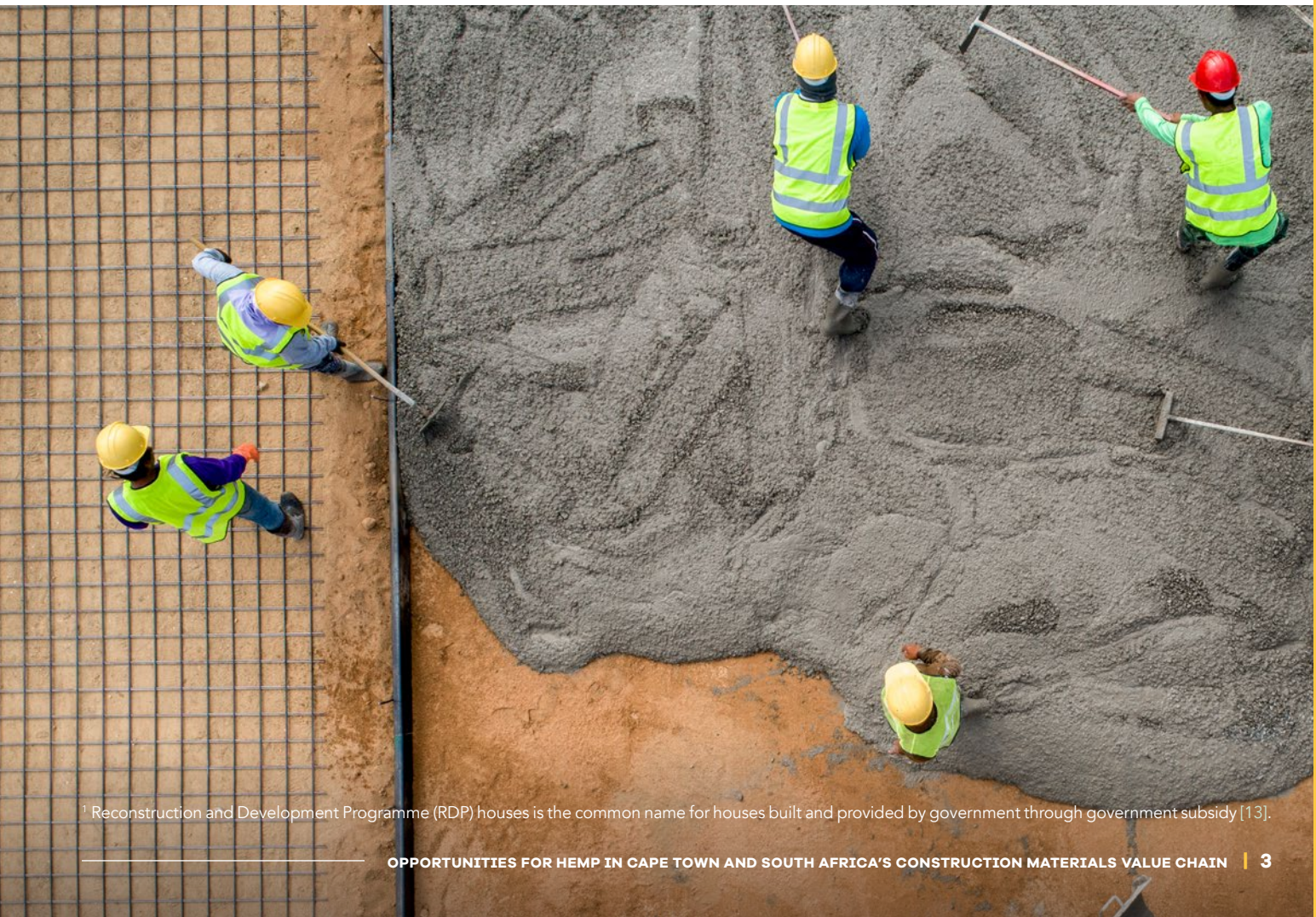
One of the more common uses of hemp in construction is as insulation. Many properties of hemp, such as its mould- and mildew-resistance, breathability, fire-resistance and tensile strength make it a good insulation material. In fact, although more expensive at this stage, it performs well when compared to other popular insulation materials, highlighted in **Table 1**.

Table 1: Comparison of different insulations materials [4] [5] [6] [7]

	HEMPWOOL	FIBREGLASS	MINERAL WOOL	SPRAY FOAM
Materials	Hemp fibres	Glass	Volcanic rock	Polymers
Cost	High	Low	Low	Low-mid
Mainstream use	Uncommon	Popular	Common	Uncommon
Thermal resistance/ R-value	3.5	2.2 – 3.2	3.0 – 3.1	4.0 – 7.2
Carbon footprint	Low (can act as a carbon sink)	Mid	Large	Mid

R-value is used to describe the thermal resistance a material has i.e. it's resistance to heat flow across it. It is a direct indication of how well insulation material will perform. The larger the R-value for material, the greater its capacity to prevent heat loss. As can be observed in **Table 1**, hemp insulation has a greater R-value than all other conventional materials except for polymer insulation.

A feasibility study was conducted in a major metro in South Africa and it was explained anecdotally that this study demonstrated that the use of hemp insulation in RDP houses[1] could result in a 60% reduction of heating costs.



[1] Reconstruction and Development Programme (RDP) houses is the common name for houses built and provided by government through government subsidy [13].

1.2. Hempcrete

Another hemp construction material that is growing in use is hempcrete. Hempcrete is a biocomposite material, made from the hurd[2] of hemp, lime binder and water. The mixture can be produced as a slurry to form a solid wall or poured into moulds to form bricks [8]. Hempcrete shares the same properties as hemp insulation: Breathability, fire-resistance, mould-resistance and antimicrobial properties. Moreover, the process of manufacturing hempcrete produces less carbon than is absorbed in the biomass of the hemp plant, making it a vehicle for carbon storage. It is estimated that hempcrete can sequester 108 kg of carbon dioxide per cubic metre, acting as a carbon sink for the lifespan of the building [9]. For example, if a house uses 50 m^3 of hempcrete for its walls, 5.4 tonnes of CO_2 would be sequestered in the lifespan of the building. In comparison, the same house with walls constructed with cement should be associate with 48 tonnes of CO_2 emissions [10].

A limitation of hempcrete is that it cannot be used in any load-bearing applications. It is typically used as an "infill walling system between other structural elements" such as steel frames [6].

2. Drivers

2.1. Growth of the green building sector

The South African green building sector is growing at a rate that exceeds that of regions such as Europe, Australia, United States of America with well-established sustainable building sectors [11]. The main focus of the green building sector, currently, is on energy- and water-efficiency. However, the pace at which the sector is evolving indicates that sustainable materials should become of interest too, as it has in other regions, particularly in Europe.

A positive indication of this has been the recent completion of the "Hemp Hotel" in Cape Town. The building has 54 rooms and stands at 12 storeys and is the "tallest building to incorporate hemp-based materials in the world", according to the director of the International Hemp Building Association [2]. The building marks a new milestone in the scale of projects using hemp construction materials in South Africa; previous examples of hemp buildings in South Africa were houses and small office buildings.

[2] Hemp hurd is the woody inner parts of the hemp stalk

2.2. Rise in construction input costs

There has been a concern that the price of building material inputs has been increasing faster than building prices, making construction profit margins tight [12]. The price of cement in particular has fluctuated more than other construction material inputs, as can be seen in **Figure 2**.

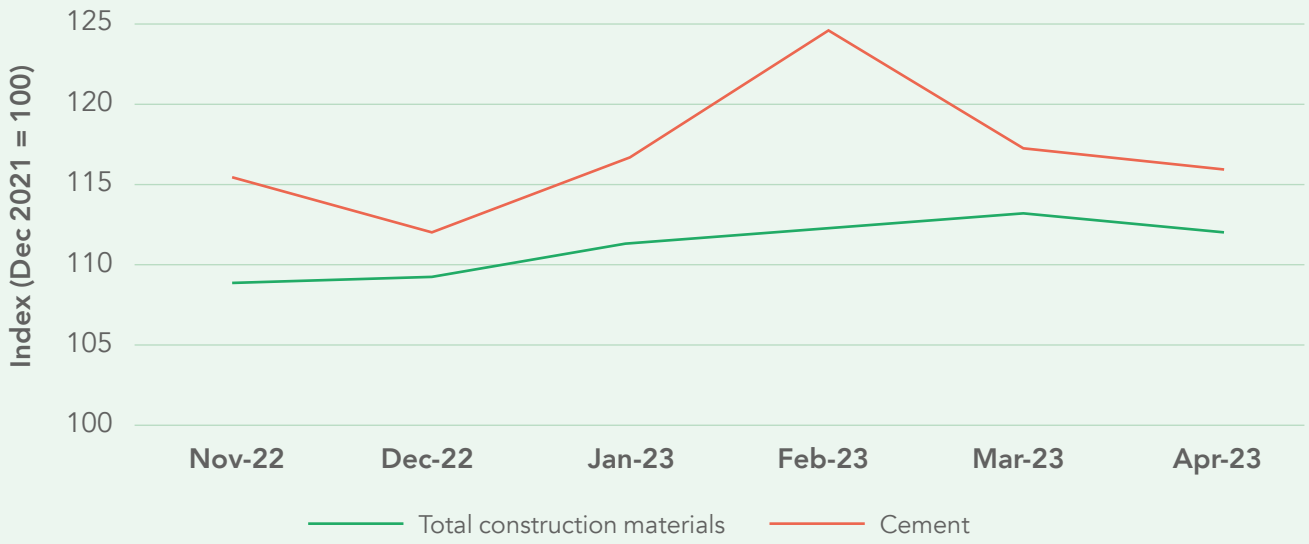


Figure 2: Construction input price index (CIPI): material purchases for whole industry
Source: Statistics South Africa

Some cite the supply chain disruptions due to the Russia-Ukraine war as the reason for price pressures. The use of local hemp hurd in hempcrete could reduce the vulnerability to price volatilities exacerbated by supply chain disruptions.

3. Barriers

3.1. Lack of local demand

A significant barrier local manufacturers cited is sustained local demand for hemp construction materials. There are two main reasons behind for this: The price of hemp construction materials and the lack of awareness among developers.

On average, hemp-based construction materials are 20% more expensive in comparison conventional materials [2] and in South Africa, the price is even greater due to cost of importing hemp hurd. One industry insider suggested that if manufacturers are able to procure locally-cultivated hemp hurd, the price could potentially be reduced by 40%.

There is also a lack of awareness among developers about hemp construction materials, as well as the existing manufacturing capacity. There is a knowledge gap around how the materials perform and how to install the material. Architects and civil engineers are particularly risk-averse as they sign off on buildings once complete and are professionally liable for its structural performance for a period of time.

3.2. Limited advocacy and research

Sustainability within the construction sector remains focused on energy- and water-efficiency. Use of hemp, which has superior insulation properties, is widely recognised or tested as an energy efficiency measure. Furthermore, advocacy for sustainable materials is low, meaning that wider awareness and adoption of hemp materials will remain limited, as developers are wary of using an unfamiliar construction material. Advocacy within accreditation boards such as the Construction Industry Development Boards (cidb), Engineering Council of South Africa (ECSA) and the South African Council for Project and Construction Management Professions (SACPMP), could go a long way in establishing norms and standards for the use of hemp construction materials as well as generating more research data around the performance of hemp construction materials in South Africa.

Further information

In summary, the hemp construction material sector is an emerging sector and an opportunity for investment and job creation in Cape Town. For further information and support on any of the content provided here, please contact GreenCape's Sustainable Agriculture sector desk: agri@green-cape.co.za

References

1. Statista, "Cannabis - Worldwide," Statista, 2023. [Online]. Available: https://www.statista.com/outlook/hmo/cannabis/worldwide. [Accessed 5 June 2023].
2. AfricaNews, "World's tallest hemp hotel set to open in June in South Africa," AfricaNews, 8 May 2023. [Online]. Available: https://www.africanews.com/2023/05/03/worlds-tallest-hemp-hotel-set-to-open-in-june-in-south-africa//. [Accessed 13 May 2023].
3. M. Muller, T. Krick and J. Blohmke, "Putting the construction sector at the core of the climate change debate," Deloitte, Berlin, 2020.
4. Hempitecture, "Fibreglass vs. Mineral Wool Insulation and an Excellent Alternative," 25 September 2022. [Online]. Available: https://www.hempitecture.com/post/fiberglass-vs-mineral-wool-insulation#:~:text=Hemp%20insulation%20has%20a%20comparable,cuts%20similar%20to%20mineral%20wool. [Accessed 19 February 2023].
5. M. Power, "Insulation R-values Chart and Buyer Guide," Green Builder Media, 10 August 2020. [Online]. Available: https://www.greenbuildermedia.com/blog/insulation-r-values-chart. [Accessed 19 February 2023].
6. M. Nortje, "Hempcrete advantageous for construction," Engineering News, 31 July 2020. [Online]. Available: https://www.engineeringnews.co.za/article/hempcrete-advantageous-for-construction-2020-07-17. [Accessed 1 June 2023].
7. E. Shine, "Home Insulation R-Value vs Cost: What's the best to buy," Attainable Home, 25 September 2021. [Online]. Available: https://www.attainablehome.com/home-insulation-r-value-vs-cost/. [Accessed 1 June 2023].
8. Hempt, "Hempcrete," Hempt, 2019. [Online]. Available: https://hempt.co.za/blogs/news/hempcrete. [Accessed 1 June 2023].
9. Envirotecture, "Hempcrete - a whole (not so) new low energy material," Envirotecture, 4 December 2012. [Online]. Available: https://www.envirotecture.com.au/hempcrete-a-whole-not-so-new-low-energy-material/. [Accessed 1 June 2023].
10. Green Economy Media, "Hemp is where the home is," Impact Magazine, 5 August 2021. [Online]. Available: https://issuu.com/alive2green/docs/_impact_magazine_issue_13/s/13033604. [Accessed 1 June 2023].
11. ITA, "South Africa - Green Building Technologies," International Trade Administration, 6 May 2023. [Online]. Available: https://www.trade.gov/country-commercial-guides/south-africa-green-building-technologies. [Accessed 1 June 2023].
12. E. West, "Construction tender prices fall in first quarter as prices rise," IoL, 30 March 2022. [Online]. Available: https://www.iol.co.za/business-report/companies/building-construction-tender-prices-fall-in-first-quarter-as-prices-rise-3a030ef3-6d9e-46b5-8aa4-eb7fb0a71d3a. [Accessed 1 June 2023].
13. DHA, "FAQ," Department of Human Settlements, [Online]. Available: https://www.dhs.gov.za/content/faq#:~:text=Subsidised%20Housing%20%E2%80%93%20is%20a%20programme,referred%20to%20as%20'RDP%20Houses. [Accessed 1 June 2023].

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For more information and support contact:

GreenCape: info@greencape.co.za | (021) 811 0250