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Where are the Barriers to Sustainable Construction in Africa?

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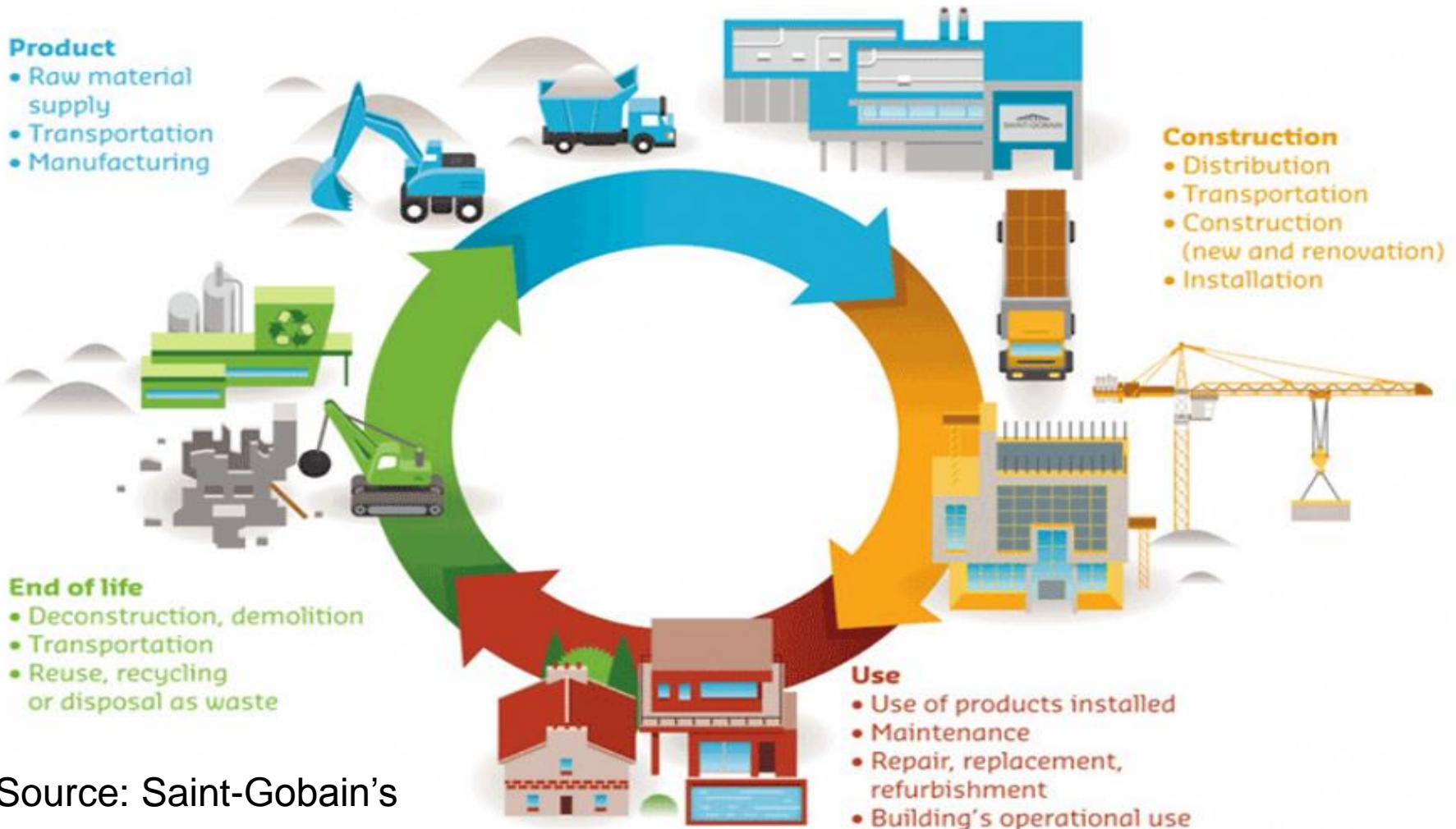
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❑ Construction Industry And the Sustainability Debate

- ❖ The construction industry is very resource intensive
- ❖ At every stage of a **project lifecycle**, huge pressures are exerted on the **natural environment** for materials, where raw materials are extracted, delivered to factories, manufactured into building materials, and delivered to construction sites.
- ❖ The construction and post construction use of buildings up to demolition stage involve the **consumption of huge volumes of materials and generation of much waste in the process.**

The life Cycle Assessment of a Construction Product





❑ Construction Industry And the Sustainable Debate.....

❖ Buildings impact on the natural environment continues:

- ✓ Buildings account for **45-50% of total global energy** consumption
- ✓ **50% of total global drinking water** go into construction
- ✓ **60% of global bulk of raw materials** go into construction



❑ Construction Industry And the Sustainable Debate.....

❖ Buildings impact on the natural environment continues:

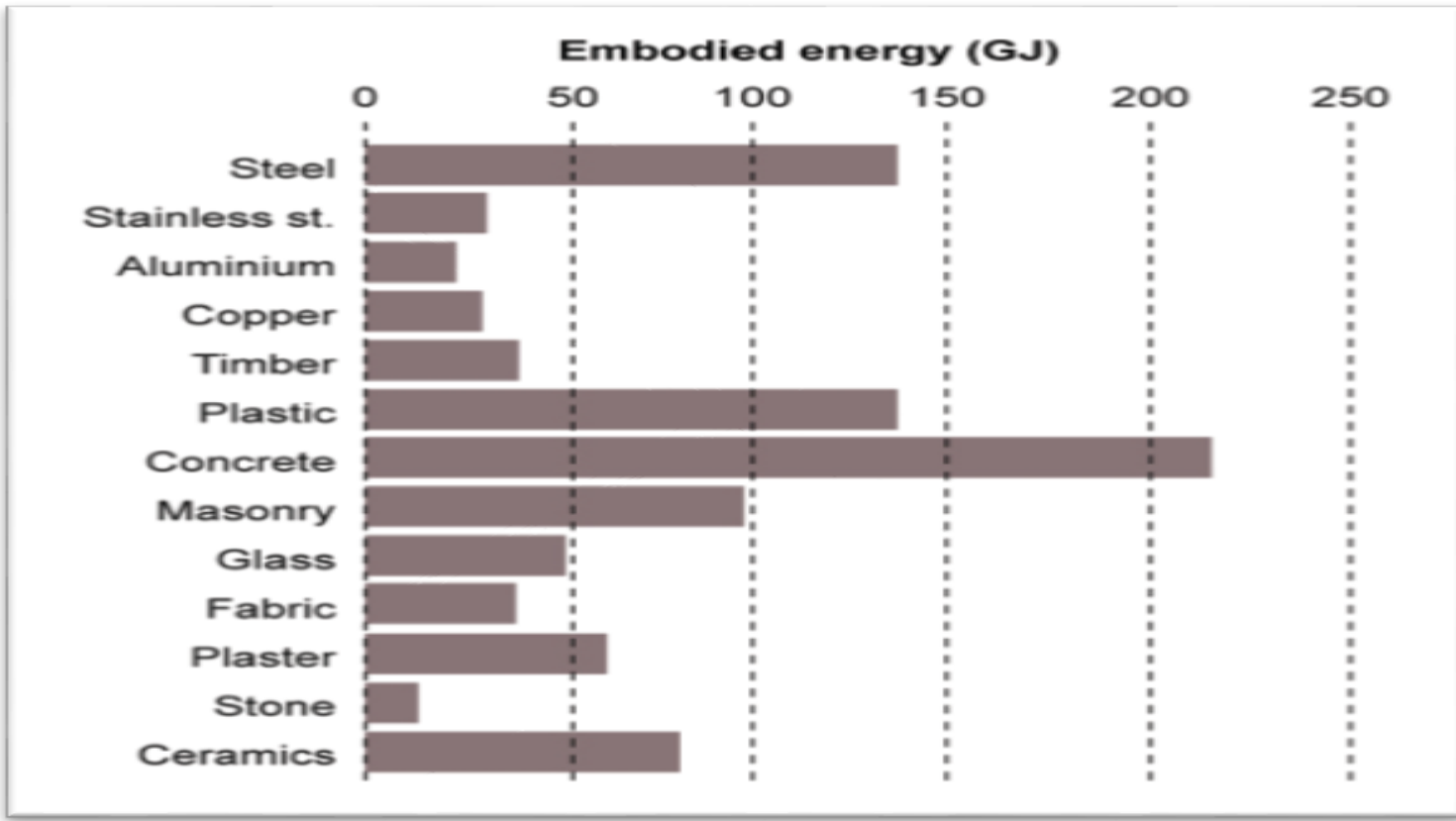
✓ **60% of timber products** (of which 90% of this is hardwood) is consumed by construction

✓ **80% of global agricultural land** is lost to buildings

✓ Construction activities account for **50% of destructions** to rainforest

❖ **75%** of all known factors responsible for global environmental degradation **is traceable to the built environment sector.**

❑ Construction Industry And the Sustainable Debate



**Remember : a gigajoule (GJ) is the equivalent to 1 billion joules
1 GJ = 277.8 kilowatt hours of energy that is lost or utilized**



❑ Construction Industry And the Sustainable Debate

❖ As the **natural resource consumption intensity of building construction industry rises and the global environment deteriorates, so will the fortunes of the building construction industry decline rapidly:**

1. Energy scarcity, particularly electricity supply and the impact on building material costs **have a cumulative impact** on housing **affordability.**
2. The decline of building materials owing to **rapid depletion of the raw material** for components of building materials, hence **cost escalation** of building materials and attendant will collectively impact on **housing affordability.**
3. **The fate of the building construction industry and the natural environment are inextricably linked.**



❑ Construction Industry And the Sustainable Debate

- ❖ In other words, just as it is in the interest **of the natural environment for the building construction industry to be sustainable, it is vitally of significance for the construction industry too**, if it is to grow and develop uninterrupted.
- ❖ Fundamental to this discussion is the question that I would like to pose to built environment professionals in Africa, which is:

Why have we been unable or unwilling to respond to Africa's environmental challenges through design and construction of the built environment?



❑ **Construction Industry And the Sustainable Debate**

❖ **Africa's environmental challenges:**

- ✓ **Incessant electricity failure and interruptions**
- ✓ **Water scarcity (Cape Town water crisis)**
- ✓ **Forest depletion**
- ✓ **Flood**
- ✓ **Extreme weather conditions**
- ✓ **The lack of dedicated or collaborative research in all these areas.**

❑ Construction Industry And the Sustainable Debate

❖ Despite Africa's environmental challenges, why:

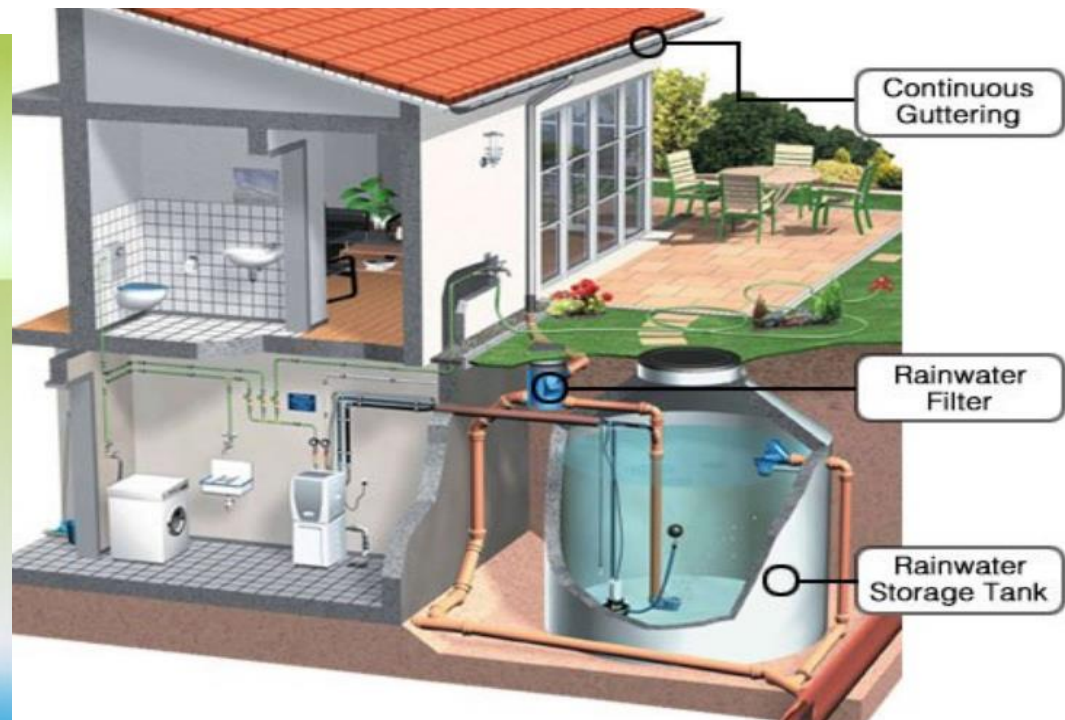
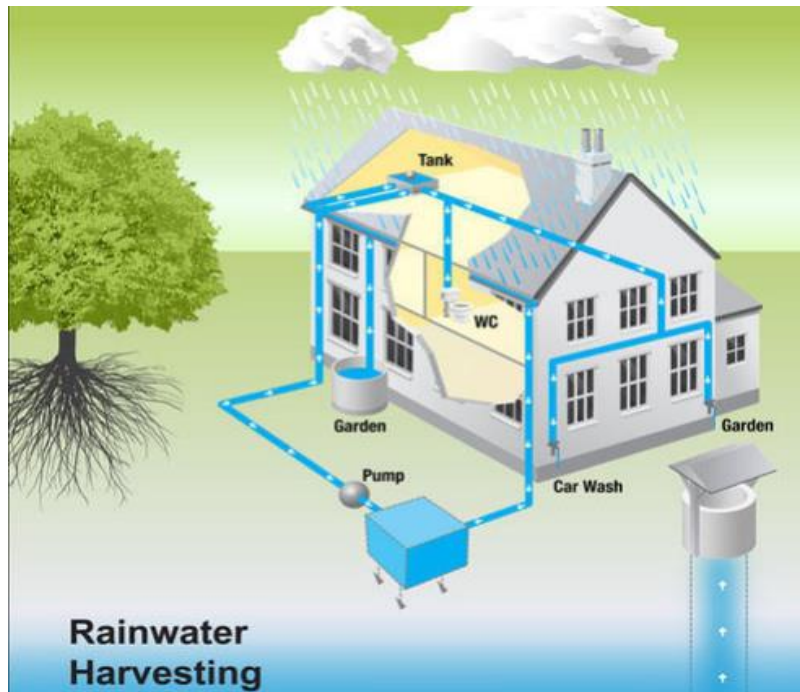
- ✓ do we still build houses where one needs to turn on the light in broad day light to see around the house?



❑ Construction Industry And the Sustainable Debate

❖ **Despite Africa's environmental challenges, why:**

✓ do we build houses that water is not **harvested and allowed to run off?**





❑ Construction Industry And the Sustainable Debate

❖ **Despite Africa's environmental challenges, why:**

- ✓ **do we still build houses that require mechanical ventilation and energy systems for thermal comfort when passive cooling and ventilation systems and procedures are well established and practiced widely around the world? Why are we just waking up to it?**



❑ Where else are the Barriers to Sustainable Construction in Africa? **Endogenous and Exogenous barriers**

1. **Endogenous Barriers**

Established design firms or construction outfits are fearful of **new entrants into the market.**

This habit (at individual or company level) generally inhibits efforts to collaborate or share research ideas let alone, come up with new ways of doing things! This is because we simply want progress for our **selves... 'the Silo mentality'.**



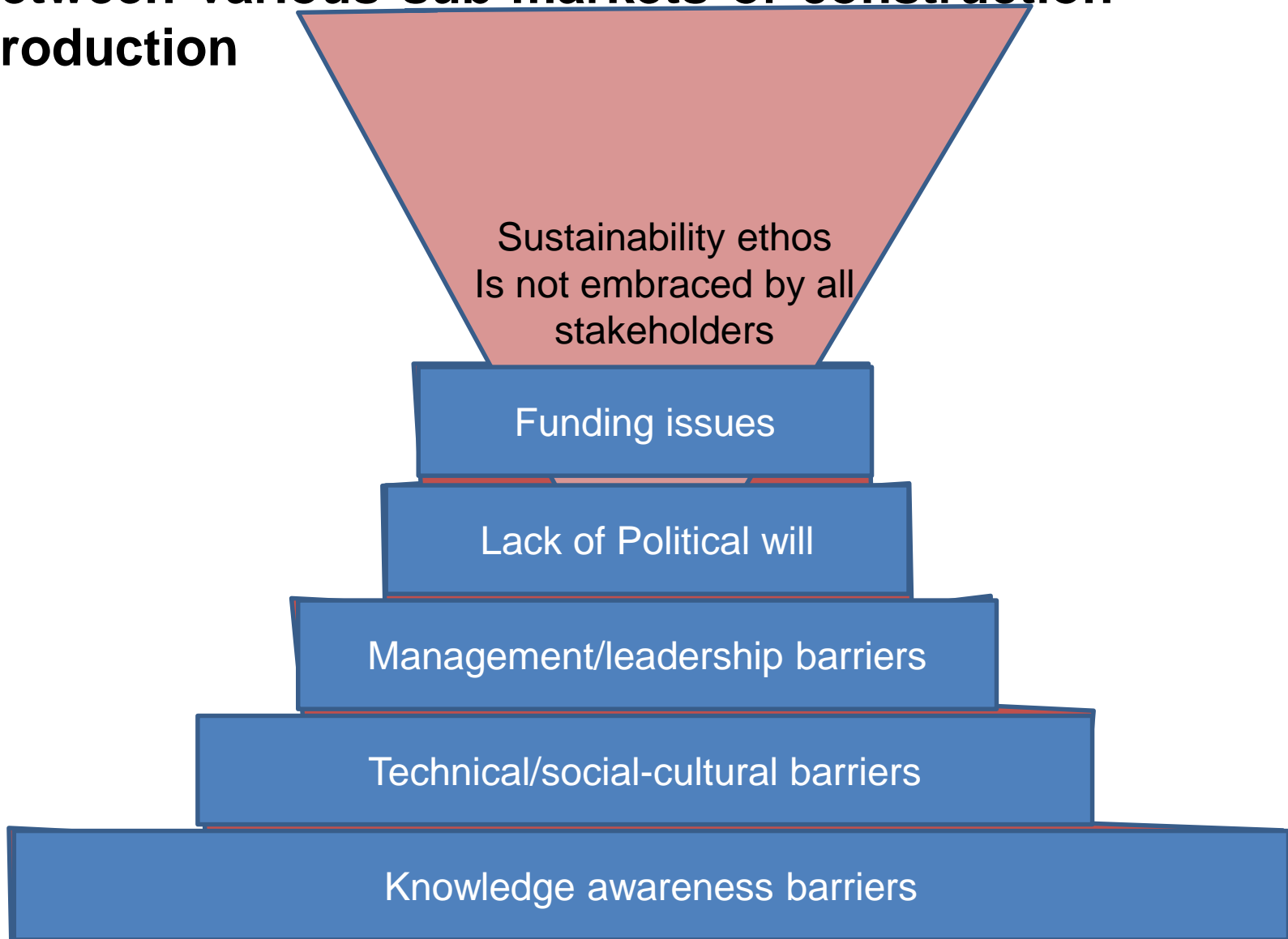
❑ Where else are the Barriers to Sustainable Construction in Africa?

2. Exogenous Barriers

New designers firms or construction outfits as entrants are fearful of the veterans or the already established firms with the market. **The only solution is to buy them out through vertical integration.** This tendency thwarts efforts to collaborate in new research ideas and thus coming up with new ways of doing things! This is because we simply seek progress for our **elves...again the *Silo mentality subsists.***

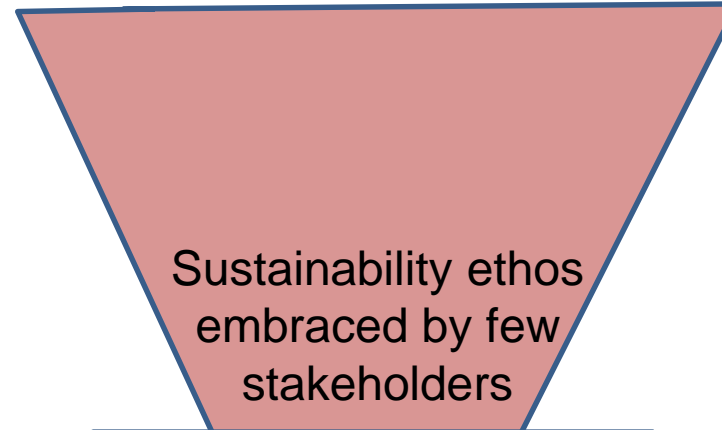
Endogenous-Barriers

At African level, there is a lack of harmony between various sub-markets of construction production



❑ Exogenous-Barriers

At African level, there is a lack of harmony between various sub-markets of construction production



Statues & Planning laws

Lack of Govt commitments

Fear of high investment costs

Lack of professional knowledge

Lack of statutory instruments (SIs) or commitments to improve the phase change arising from construction research findings and recommendations.

❑ Don't be scared to be the research frontiers!
Where is **the next silicone valley in Africa?**

- The next innovative materials are just around you – e.g. anthills or the waste you throw away!!!!
- My PhD student successfully defended his thesis looking at anthil soils, corncob Ash and Rice husks as cement replacement materials (so called pozzolanic materials)



*'Magnetic' termite mounds built by *Amitermes meridionalis* appear to be adapted to seasonally flooded habitats*



(a) Some single layered finished panels (in perspective).



(b) Maize cob panel.

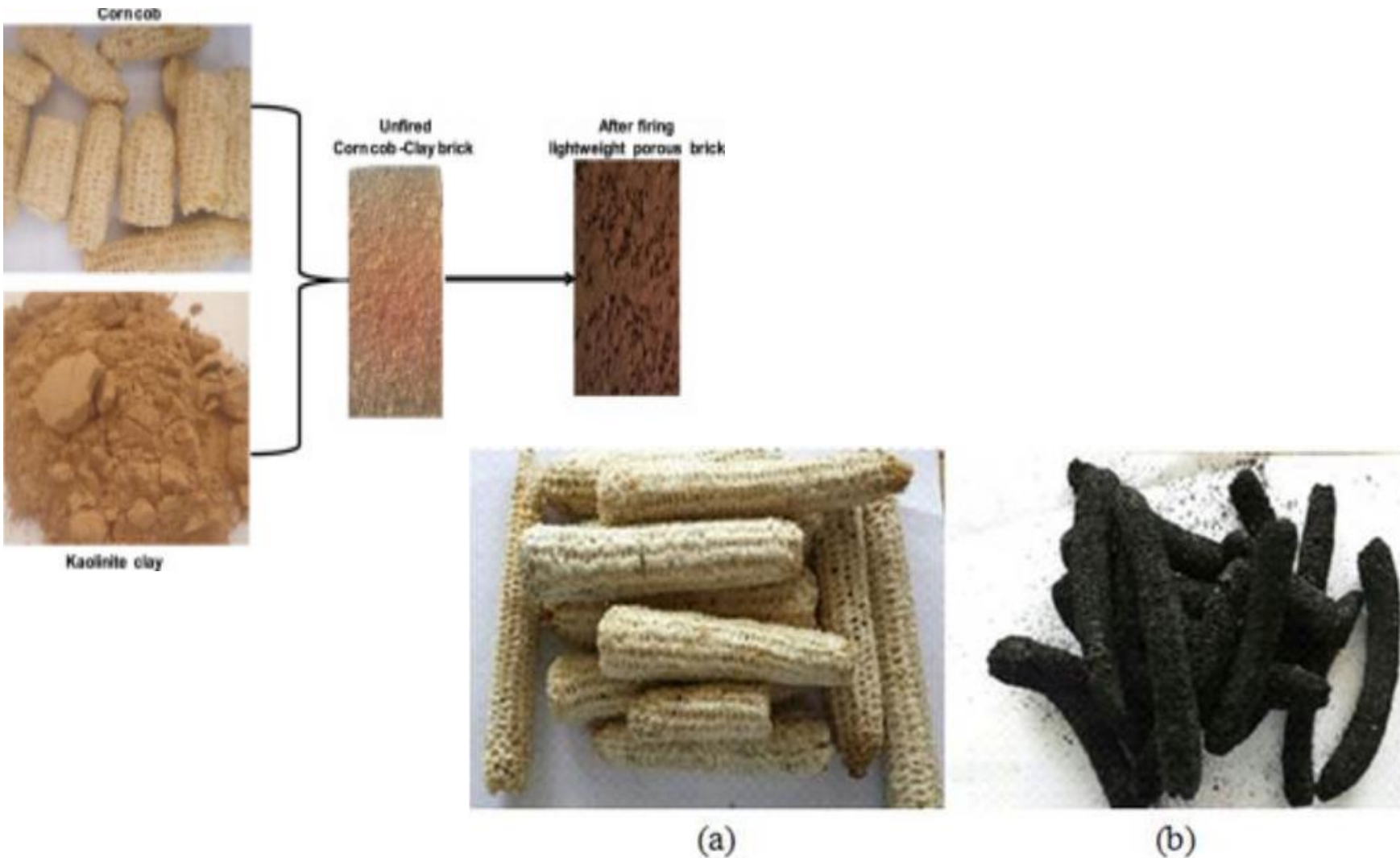


(c) Rice husk panel.



(d) Groundnut shell panel.

Our fore fathers never communicated why they used some materials but they left a lot of clues behind. It is a question of having an inquisitive eye and intuitive mind



Cobs: (a) Before carbonisation (b) After carbonisation at 900°C pyrolysis temperature.

Where are the Barriers to Sustainable Construction in Africa

Let us all be embracing of new players!

Let us seek new research ideas and not be fearful of those coming into our built environment markets!

There is safety in numbers.

Thank you !