

## **The health implications of replacing common building materials with natural fibre reinforced composites**

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### **Abstract**

This paper highlights the need for a non-chemical approach to the cultivation of fibre crops intended for building applications in South Africa. A case study considered four fibre crops – flax, industrial hemp, kenaf and sisal – that are currently cultivated in South Africa on a commercial or trial basis. The investigation was limited to the synthetic pesticides that are approved for use in South Africa. A toxicity profile was developed for each natural fibre on the basis of the chronic health effects of the selected pesticides. Common building materials are associated with non-renewable resource depletion, embodied energy use and embodied toxicity. Replacing common building materials with natural fibre reinforced composites (NFRCs) is a strategy known to save materials and their embodied energy and reduce greenhouse gas (GHG) emissions. However, the current fibre crop cultivation practices rely heavily on inputs of synthetic pesticides, a significant proportion of which have been linked to chronic health effects in humans and ecosystems. From the case study results, an input of pesticides is not a prerequisite for the cultivation of sisal. However, the synthetic pesticides that are routinely used to manage diseases, insect pests and weeds in flax, kenaf and industrial hemp cultivation are all implicated in human cancer, endocrine disruption, eco-toxicity or a combination of the three. Thus, scaling up the production of natural fibres based on current cultivation practices for flax, kenaf and industrial hemp would increase the burden of disease and contribute to bio-diversity loss. Improvement efforts should primarily focus on a shift to organic agriculture.