Beegin

Fabricating more accessible beekeeping systems for farmers, beekeepers, and bees

In 2019, the World Bank declared South Africa the most economically unequal society in the world.[1] Within this context, Beegin is designed to provide a tool for financial empowerment, essential for undoing existing racial inequities, while simultaneously nurturing a healthy local ecology. It positively supports emerging and expert beekeepers, as well as bees themselves.

While a student at the University of Johannesburg, Ivan Brown, under the supervision of Angus Donald Campbell, Head of Department of Industrial Design, wanted to promote more sustainable beekeeping and identified opportunities to improve the livelihoods of marginalised small-scale farmers. The individuals he identified wanted to keep bees but lacked the skills and equipment to do so. Brown made this the focus for the final project in his Bachelor of Industrial Design studies, continued to develop it during his Masters studies, and finally, into a commercial enterprise.

Beegin's design research methodologies were borrowed from Timothy Prestero's design for outcomes[2], which is a participatory methodology that focuses on manufacturability, distribution and actual use to help to ensure a product's delivery and uptake. Brown paired this with the concepts of Appropriate Technology[3] and the Capabilities Approach[4] to further embed the design outcomes in the South African context. He partnered with a group of six expert- and five emerging-beekeepers to identify key issues, which included: theft and vandalism, lack of finance, diseases and pests, limited land and space, and lack of knowledge[5].

A key finding that emerged was the way that ineffective hives limited the potential of individual beekeepers. A series of beehive prototypes, each going through multiple iterations, refined the design for lightweight concrete hives. These were distributed to all 11 beekeeping partners for field-testing over one honey-production season which generated further insights for the refinement of the prototypes. The final design considered the beehives as part of a socio-technical-ecological system including the bees, the tools and materials for the making of the hives and their potential for business creation. It was optimized for protection, adjustability, ease of inspection, site, harvesting, manufacture, thermoregulation and material properties.

Beegin in use, 2019

A key innovation in the final Beegin hive was its material, which is a lightweight concrete composite. The thickness and the use of lightweight fillers resulted in the beehives having much better insulating properties than traditional wooden hives. On testing, it was found that bees in the insulated Beegin hives needed to expend less energy on heating and cooling, which enabled them to put their energy into honey production, yielding an increase of up to 40%. The Beegin hive can be locked to reduce theft, and in the event of disease, they can be non-destructively burnt to remove pathogens and mites. These qualities give the Beegin hive better longevity than wooden alternatives and therefore reduce cost of lifetime ownership.

Beegin hives can be manufactured without in-depth technical training thanks to proprietary vacuum-formed molds and simple instruction manuals. Beegin does not sell the hives directly but sells molds and instructions that can be followed by local entrepreneurs, thereby reducing the embodied energy of the supply chain needed to deliver hives to remote areas. Beegin provides a better hive for bees, which in turns aids the farmers who rely on their pollination activities, and introduces new economic opportunities for the entrepreneurs who manufacture and sell their own Beegin hives.

Beegin field testing, 2017
Images: Ivan Brown

Location: Johannesburg, South Africa
Duration: June 2015–Ongoing
Team Size: 10–20
Design Quotient (percentage of the team who were designers): 10-20%
Website: www.beegin.co.za
Designer: Ivan Leroy Brown & Angus Donald Campbell
Designer organization type (bold the one which is most descriptive):

- **For-Profit**
- Non-Profit
- Government
- Academia

Key Contributors (5 names max)

- 6 expert beekeeper participants & 5 emerging beekeeper participants

Categories:

- Economic

Project Costs: $25K–$100K
Source of Funding:

- Government

- Private Company
- University

Partners:

- Small-scale farmers
- Expert beekeepers
- University of Johannesburg, South Africa's Design Society Development DESIS Lab and the Department of Industrial Design

Impact Measurement Methods:

- Participatory case study of technology implementation over one year; expert evaluation of impact on honey production; and ongoing data gathering towards the commercial rollout, implementation and market adoption of the technology

[1] http://povertydata.worldbank.org/poverty/country/ZAF

[2] https://www.ted.com/talks/timothy_prestero_design_for_people_not_awards

[3] Hazeltine, B. & Bull, C., 2003. *Field Guide to Appropriate Technology.* San Diego, London: Academic Press.

[4] Nussbaum, M., 2011. *Creating Capabilities: The Human Development Approach*. London: The Harvard University Press.

[5] https://www.apiservices.biz/documents/articles-en/beekeeping_regional_situational-analysis.pdf