Vertical gardens likewise provide insulation, soundproofing and physical protection to the building's fabric, and they can shade windows, further reducing the need for energy-hungry climate control. They are, however, more complex to build and design than green roofs. Growing plants on a wall, as opposed to trailing them over it, requires a hydroponic system. The plants are rooted in plastic or plant fibres rather than soil, and water and nutrients are pumped into the medium. Although his *Urban Agriculture Curtain* uses this technology, architect André Viljoen questions the environmental benefits of hydroponic and indoor-grown food. "I'm sceptical about the amount of chemicals and energy used in hydroponic systems," he says. "And once you start heating or lighting these things, the environmental benefit goes out of the window."

A better option, says Viljoen, is to weave organic farming into the fabric of a city, inserting market gardens into their patchwork of industrial, residential, recreational and empty land. He has studied Cuba's use of such methods to feed its people after the collapse of Soviet aid. The government encouraged private and communal vegetable growing in cities, and developed a growing system dubbed *organopónico*, which replaced petrochemical fertilizers with organic ones such as sewage sludge. In 1997, Havana's system produced almost 21,000 tonnes of vegetables; in 2005, that had risen to 272,000 tonnes, and the project has become a flagship for similar efforts worldwide. Viljoen believes that, in the temperate developed world, 30% of a city's fruit and vegetables could be grown within its borders. By reducing food miles, this could yield big cuts in carbon emissions. But for larger reductions, he adds, you would also need changes in diet, as most of the emissions due to food come from the meat industry.

What is needed now, say both Hunt and Viljoen, are pilot projects to test the large-scale potential of green buildings and urban agriculture, which also take into account the health, amenity and aesthetic benefits provided. "Any one argument looked at on its own tends not to be strong enough," says Viljoen. "But collectively you can make a very strong case." Such schemes are more likely to come from the retrofitting of existing spaces and buildings than from high-tech, high-concept projects, says Hunt, as people green their own environments and pressurize local government to do the same. "There's a groundswell of interest in the subject, but developers are very conservative by nature," he says. "If it's going to happen it's going to be community-driven." ■

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Sustainable fashion

The sign beside the thick, soft, creamy wool rug says, "Please do not touch." Naturally, I want to roll on the rug and wrap myself in it. Each of its 11 patterned hexagonal panels was knitted from the wool of a Panama sheep that had grazed on pasture untainted by pesticides at Lava Lake Ranch, Idaho. Made by Dutch designer Christien Meindertsma using extra-large needles, the certified-organic rug forms part of *Design for a Living World*, an exhibition now on show at the Smithsonian's Cooper-Hewitt, National Design Museum in New York.

Organized with The Nature Conservancy, a global conservation group based in Arlington, Virginia, the exhibition aims to raise awareness of "the impact and promise of sustainable sourcing". Ten prominent designers were invited to create an object — a chair, a dress, a necklace — using sustainably grown and harvested materials from some of the world's most beautiful and fragile places. The sale of such objects could help to provide a livelihood for local communities in these areas — many of which face threats from over-development and deforestation — and also emphasizes how designers influence what we buy.

Fashion designer Isaac Mizrahi created a dress covered in creamy-white, sequin-like leather paillettes made from the skin of wild-caught salmon from southwest Alaska. Jewellery designer Ted Muehling fashioned bracelets and delicate flowers out of 'vegetable ivory' extracted from the seeds of the ivory nut palm tree on the Micronesian island of Pohnpei in the western Pacific Ocean. And Maya Lin — famous for designing the powerful Vietnam Veterans Memorial in Washington DC — crafted a simple bench from a single red maple. The tree was harvested from woods certified by the Forest Stewardship Council around the Upper St John River in Maine.

Some items are both elegant and useful. Israeli designer Ezri Tarazi constructed "a bamboo forest inside your living room" — towering bamboo stems fitted with clothes hooks, compact-disc racks, wine-bottle holders and lights that glow through ping-pong balls slotted in holes in the stalk. The bamboo, harvested from China's Yunnan Province, can grow a metre a day and requires little water to flourish in its natural habitat; although, a caption warns, exploding demand threatens some established forests that are being cleared to make way for bamboo plantations.

M. STROH

Second skin: Isaac Mizrahi used discs of salmon leather to adorn a dress.

Design for a Living World
Cooper-Hewitt, National Design Museum, New York City
Until 4 January 2010

Less functional are the odd objects shaped by Dutch designer Hella Jongerius out of chicle latex, extracted from the chicozapote tree in the Mayan rainforest on Mexico's Yucatán Peninsula. Once the basis for chewing gum, the elastic, viscous goo refuses to lend itself to any obvious purpose. Jongerius refers to it affectionately as "an alien in the house", and sticks strings or blobs of it around the necks of vases.

Jongerius's whimsical project raises questions as to the practical significance of the exhibits and whether they can translate into long-term, widespread and commercially viable uses for sustainable materials and practices. It is hard to imagine the average shopper investing in Lin's graceful bench. But Mizrahi believes that big opportunities await fashion designers who recognize that protecting the environment makes economic sense.

Salmon skin, for example, is normally discarded as a waste product, yet it is a valuable and resilient material that can be turned into shoes, belts and bikinis. It requires less-toxic chemicals for tanning than mammal hides because fish scales are easier to remove than hair. "People think of salmon skin as something you peel off your food; in fact it's this beautiful substance," Mizrahi says in a video accompanying his exhibit. He adds, "The fashion business is crazily competitive. All of a sudden it's going to occur to these greedy people that they can make a lot of money if they conserve." ■

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