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« SECTION EUROPEENNE OU DE LANGUE ORIENTALE »
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Thème 2 – Enjeux planétaires contemporains
2-B – La plante domestiquée

Feeding humankind: a new challenge

By Betsy Isaacson - Green Rankings, U.S. Edition Wed, Mar 14, 2018

Question. Explain the benefits and difficulties of implementing vertical farms.

Document 1: a vertical farm concept (taken from http://www.collective-evolution.com/2015)

Document 2:

Right now—at this very moment— the earth is swarming with 7 billion people. That's a lot of mouths to feed. To sustain them all, we've taken 40 percent of the planet's total landmass and turned it into cornfields and almond orchards, cattle ranches and orange groves, all to churn out [1] the cereals, produce and meat that feed humanity.

Unfortunately, that's left us in a bit of a bind[2]. The world population is expected to grow to 9.6 billion by 2050, and according to the Food and Agriculture Organization of the United Nations (FAO), if we

[1] To produce in large quantities
[2] A bad situation

want to avoid mass malnutrition, we're going to have to increase our food production by 70 percent by 2050. The problem is that most of the land we can work for food is already being cultivated. The rest is atop[3] mountains, covered by desert sands or in Antarctica. The only potential farmland left would require slashing and burning the world's remaining rain forests. That means we're going to have to make some large-scale changes to how we farm.

The "stacking" of plants shown in document 1 can be taken to extremes. In 2005, Dickson Despommier, professor emeritus of public health at Columbia University, put up a website plugging[4] "vertical farms," a concept he'd invented with his students four years prior[5]. In some ways, it's as simple as it sounds: "A vertical farm is a multiple-story high-tech greenhouse," says Despommier. But there are a lot of challenges involved, from getting sufficient light to all the plants to keeping pests and diseases out of the crops to make sure they grow properly. "There's a lot of technical stuff and engineering that needs to be overcome, and that's why it wasn't done until it became necessary to do it."

But with vertical farms, at least as they're currently conceived, light remains a problem; the towers need to be narrow enough to let sunlight penetrate all the way through, or else builders must figure out a way to rotate the growing plants to make sure they all catch a healthy complement of sunlight. Or, perhaps, there's a simpler solution: replace that sunlight with artificial sources of light energy, like light-emitting diodes.

As a result, the plants grown in these "pink houses" grow 20 percent faster than their outdoor cousins, and need 91 percent less water, negligible fertilizer and no treatment with herbicides or pesticides. Currently, the LEDs keep the upfront costs of constructing pink house very high, but LED prices are projected to drop by half in the next five years. Given that, perhaps we ought to be preparing for a future where the majority of our produce is grown industrially in LED-lined skyscrapers made of steel and concrete[5].

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[3] On the top [4] Prior – before [5] Building material