Title of the project: Energy-water-land footprint of organic food	
Assignment no.: 03.19	**Internal/external:** Internal
Head graduation committee: Voinov/Hoekstra	**Daily advisor:** To be decided
Name(s) of participating companies or institutes:	**Start of the project:** Flexible
Required courses: Water Footprint Assessment	

Short description and objective of the project:

All things considered, what is better: to grow livestock in confined areas where they grow and fatten faster or to encourage free-roaming, grass-fed cattle production?

Syngenta does not like Organics

Green Inc. - November 25, 2009, 8:15 am Agribusiness Chief Slams Organics

Syngenta Michael Mack, the chief executive of the Swiss agribusiness firm Syngenta, says organic farming is "categorically worse" for the planet. When Michael Mack, the chief executive of Syngenta, a Swiss agribusiness giant that makes pesticides and seeds, hears people say that organic food is better for the planet, he has one response: "Au contraire."

"If the whole planet were to suddenly switch to organic farming tomorrow, it would be an ecological disaster."

"Organic food is not only not better for the planet," he said, in an interview at The New York
Times building on Tuesday. "It is categorically worse."

The problem, Mr. Mack said, is that organic farming takes up about 30 percent more land, on
average, than nonorganic farming for the same yield (though this varies by crop, of course).
Pesticides that help crops to grow more efficiently "have been proven safe and effective and
absolutely not harmful to the environment or to humans".

Similarly: how do we grow our crops? In greenhouses or land intensively treated with fertilizers and pesticides? or organically, using natural pest control, compost and manure?

There are many factors we may want to take into account. First, how much land we can afford to use. How much land we have available? how productive it is? how is it used?

Second, you may wish to consider the inputs: what fertilizers are required and what is their cost? how much energy are we using? While intensive agriculture may seem indeed a better choice, things may change if we realize that no intensive agriculture is possible without high energy inputs, including those that come from fossil fuels.

And third, let's look at the outputs: what kind of pollution is generated and how do we deal with it? Is intensive farming really more 'ecologically friendly'? I don't know. Let's find out.

Prof debunks 'green' food myths

Although many consumers believe eating grass-fed meat or locally grown food are environmentally friendly decisions, that's not always the truth, according to a paper presented at the 71st Cornell Nutrition Conference. The time needed to grow an animal to slaughter weight is nearly double that of animals fed corn, which means that energy use and greenhouse gas emissions per pound of beef are increased three-fold in grass-fed beef cattle. In total, having the current U.S. population of 9.8 million fed-cattle on pasture would require an extra 60 million acres of land.

The desire to protect the environment and to do so, in part, by altering personal behaviors, is admirable, however, those decisions must be based on logic rather than intuition.

Research objective & methods -

- What are the inputs and drivers of the agricultural process?
- What are the land. energy, and water footprints of conventional agriculture? How organic is different? Where do we save, where do we lose?
- What are the ecological benefits/loses? What are the health benefits? How can they be compared, included in the assessment?
- Conceptual modeling, casual loop diagrams, fuzzy mental models, life cycle assessment

References

Reganold, J.P. & Wachter, J.M., 2016. Organic agriculture in the twenty-first century. Nature Plants, 2(February), p.15221. Available at: http://dx.doi.org/10.1038/nplants.2015.221.

Venkat, K., 2012. Comparison of Twelve Organic and Conventional Farming Systems: A Life Cycle Greenhouse Gas Emissions Perspective. Journal of Sustainable Agriculture, 36(6), pp. 620–649.

Crowder, D.W. & Reganold, J.P., 2015. Financial competitiveness of organic agriculture on a global scale. Proceedings of the National Academy of Sciences of the United States of America, 112(24), pp.7611–7616. Available at: http://www.pnas.org/lookup/doi/10.1073/pnas.