

THIRD MILLENNIUM FARMING

3MF

Is it time for another farming revolution?

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FOODPRINT is the amount of land necessary to grow all of the food required to feed one person, for one year.

This map shows the **GLOBAL FOOD-PRINT**, where the intensity of red is proportional the foodprint in that region.

When judged for its sustenance, **MEAT**, has the largest foodprint out of all the food groups.

In fact, if everyone on Earth became a vegetarian we would be able to produce more than enough food at our current levels, than would be needed in 2050, when the World's population is expected to peak at 9 billion people.

Historically, the consumption of meat has been linked with **WEALTH**. As the developing world catches up, and will possibly surpass, the wealthiest nations, their food consumption hab-

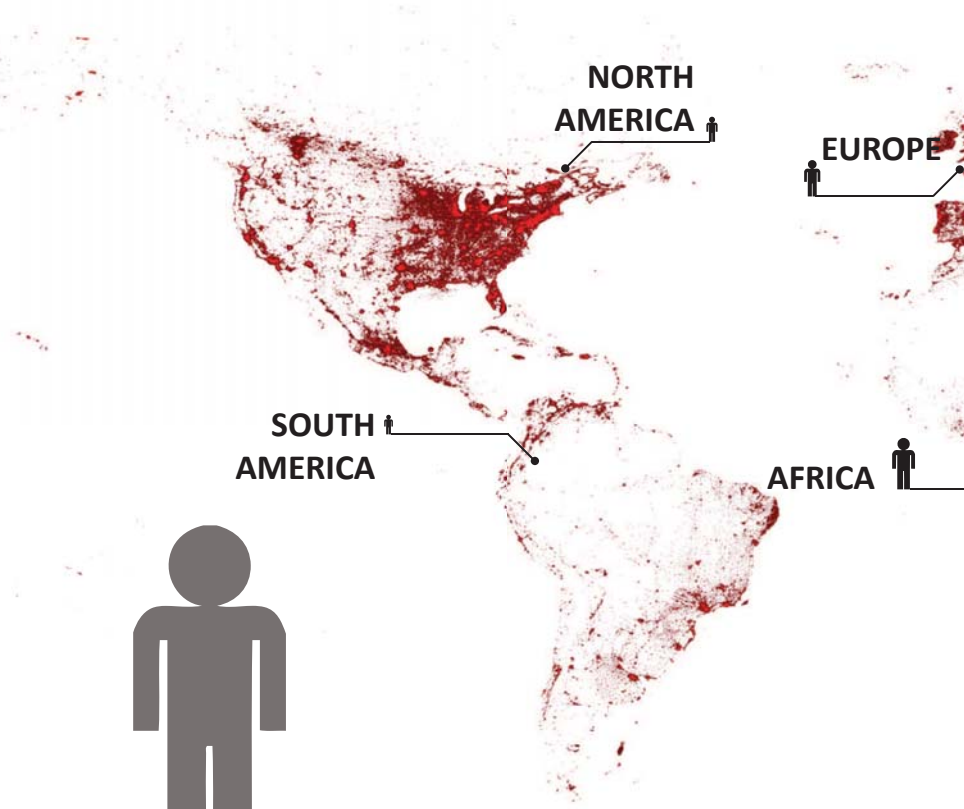
3MF hinges upon the assumption that future chefs and culinary experts will demonstrate creativity and innovation in using micro-livestock to whip out things from oozes to mousses, right down to a insect-protein cookie which will feed a hungry child for a day.

One promising method for turning insects into readily edible food is to make flour out of them - by simply flash-baking and then pulverizing the micro-livestock into a powder. This product would be similar in nutritive value to the protein powder currently used in energy/body-building drinks, except 3MF protein is grown on a fraction of the foodprint of current protein.



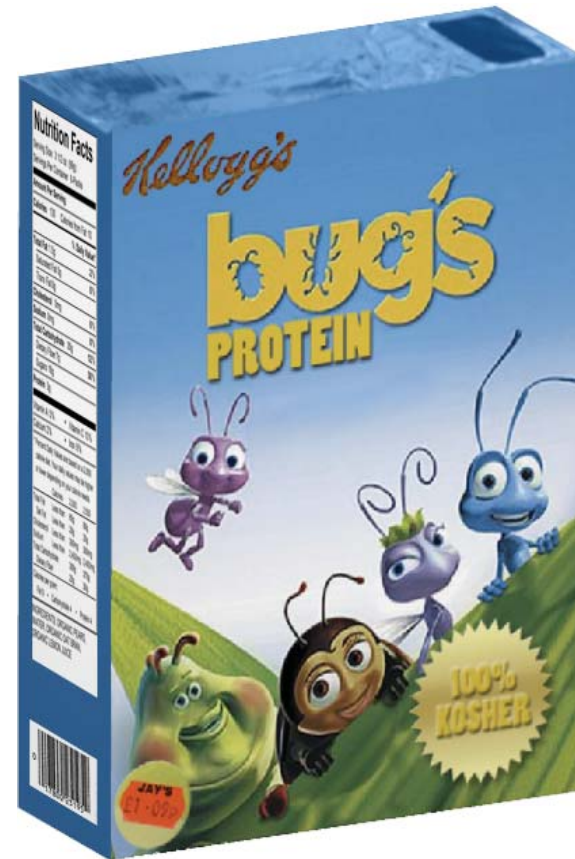
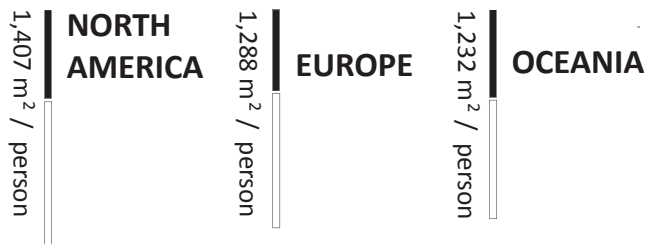
3MF EMERGENCY PROTEIN COOKIE

- One day food ration, non-perishable.
- Provides 3500 calories
- Cost 3 cent

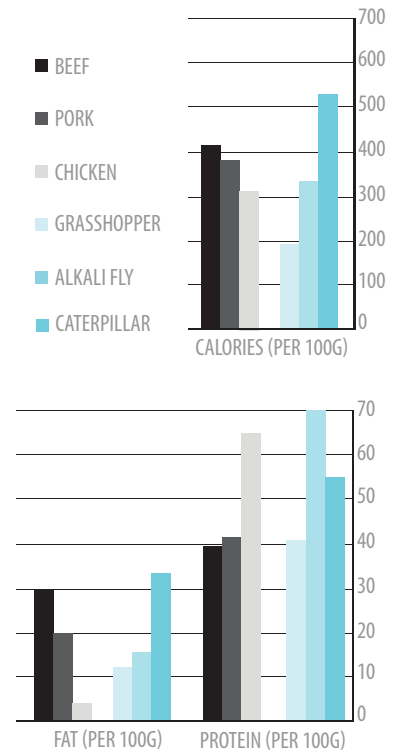


WORLD
6,908,685,000 people

■ MEAT
□ OTHER



LIVESTOCK VS MICRO LIVESTOCK NUTRITION



3MF seeks to both, decrease the size of our foodprint and produce cheaper food, and to do it: **1. Organically, 2. Ethically, and 3. Locally.**

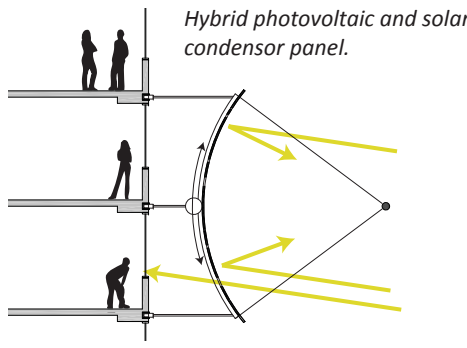
3MF operations would be totally organic - feeding off of the organic and semi-organic wastes produced in every city. The farming of micro-crops, such as algae, would require large inputs of CO₂, of which we have no shortage of today, and nutrients like nitrogen and phosphor, the exact same stuff we try to filter out of our waste water before returning it to lakes and rivers. These micro-crops produce plant biomass that is semi-edible for humans, but more importantly, which can be fed to insects that are edible to humans. Micro-livestock in turn, are much more efficient at producing protein than livestock on account of being cold blooded.

1. Micro-livestock farming operations would require completely controlled environments in order to create the exact conditions necessary to enable the explosive growth rates that insects are capable of – no fertilizers, pesticides or growth hormones!

2. Due to the fact that micro-livestock are cold blooded, euthanizing/harvesting them can be as simple and humane as lowering their temperature to the point that they fall asleep and pass away.

3. 3MF would change the tectonics of traditional farming, and move operations into cities. The availability of infrastructure in cities, and the tectonics of our built environment provide precisely the type of conditions necessary for grafting on the photo-bio reactors (used to grow micro-algae and seaweed) and insect incubation chambers (requiring 24/7 access to heat, light and nutrients) that 3MF would utilize.

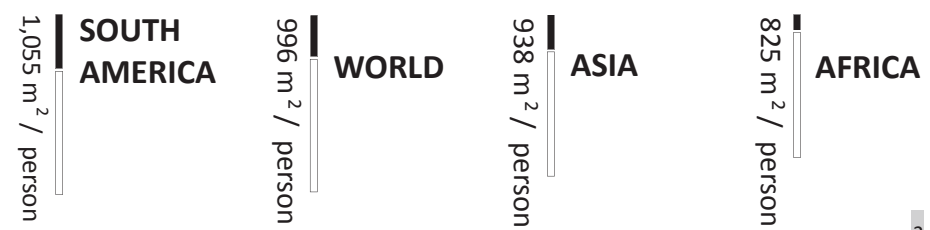
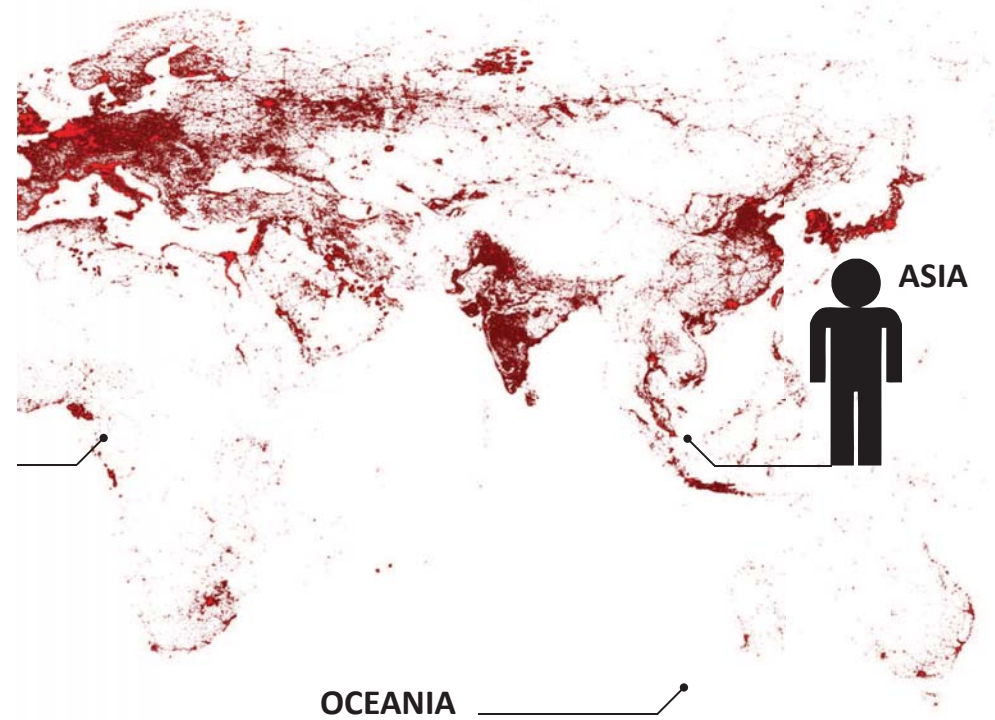
What if we could reduce our foodprint? And what if we could bring farming into our cities? And what if we could make our cities more sustainable? Maybe the antagonism between city and agriculture, core and periphery, would fade away, allowing for one to be grafted onto the other, while simultaneously allowing nature to creep back into our metropolises and daily lives. Farmers might return to the city transformed - a mix between engineer, biologist, botanist and scientist - managing high-tech farms integrated into our buildings' systems and city infrastructure.



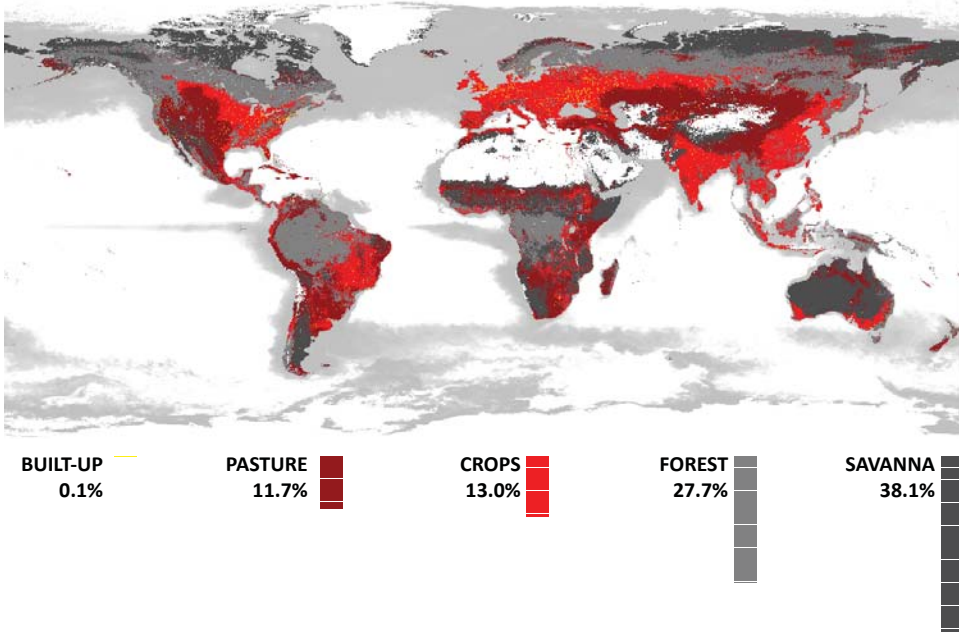
its are expected to increase proportionally.

Every year the World's surplus in food production gets smaller, and every year the World's food producing lands expand by less, as we run out of space. As we face the specter of a **CHANGING CLIMATE** how will we plan to overcome potential disasters that could significantly harm our food production yields?

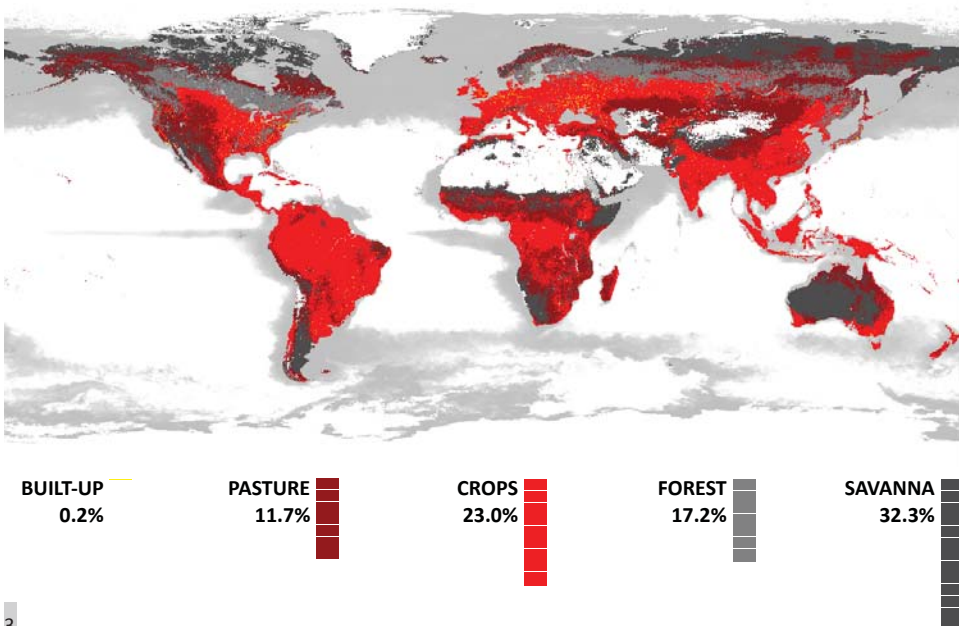
In an age where the World's population is expected to grow by about 50%, and the average person's food consumption is expected to increase by about 50%, and as our ability to expand our food producing lands and sustain our food producing yields diminishes, **HOW WILL WE FEED EVERYONE WHEN THE TIME COMES?**



CURRENT LAND USE : 2010



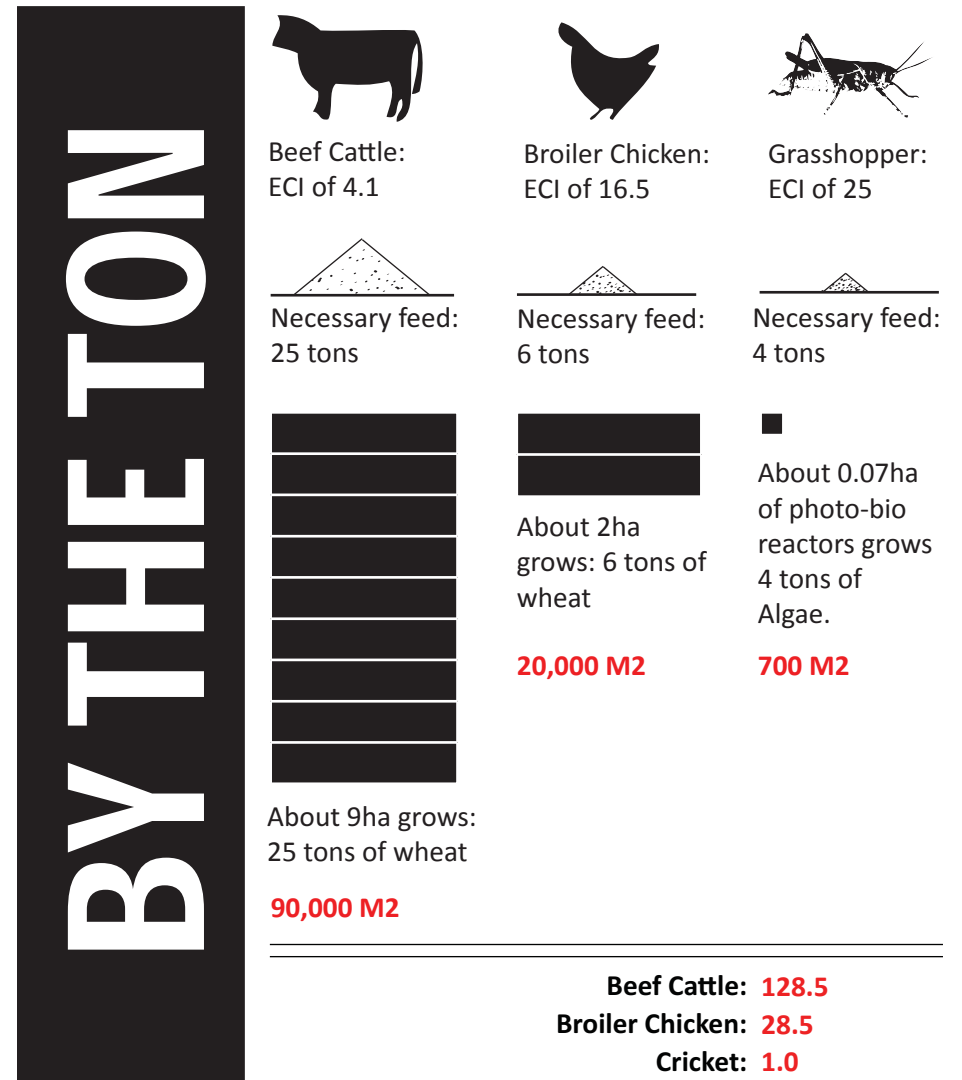
PROJECTED LAND USE : 2050



It is anticipated that in 2050 the world's population will exceed 9 billion people; the expansion of the world's food production footprint that is expected to accompany this population increase may exceed the tolerances of our planet's ecosystems, activating unknown tipping points, and result in extreme food shortages. This project proposes a vision for agriculture - Third Millennium Farming (3MF). The aim is to harness the remarkable abilities of micro-organisms (algae and phytoplankton) and micro-livestock (insects) to rapidly reproduce, for the purpose

of food production. An examination and quantification of 3MF food production strategies reveals that more food could be produced, on a smaller footprint than current crop farming and livestock rearing methods are capable of. Additionally, an analysis of micro-organism and micro-livestock farming reveals that these farming operations could be fed with certain types of city bio-wastes – creating a new, sustainable, type of food chain with an extremely small footprint-to-food-yield ratio.

Below: shows land and resources required to grow one ton of cattle, chicken and cricket meat.



Beef Cattle: 128.5
Broiler Chicken: 28.5
Cricket: 1.0