Paper about the question "To feed the future world population without putting too much pressure on the environment, it is necessary to maximally increase agricultural production on existing land."

Written by: Leonardo López

To feed the future world population without putting too much pressure on the environment, it is necessary to maximally increase agricultural production on existing land. This is a premise I don't fully agree with anymore, by the time I started with the course I believed this was the only solution to a problem we will definitely be facing at the current growing rate of population.

The reasons my opinion has changed over the duration of the course started with learning about the three pillars of sustainability: Planet, Profit and People (Wageningen University & Research). Understanding that the definition of sustainability as shown in the MOOC is dependant of everyone's world view. Therefore, it is of utmost importance to find solutions that involve all stakeholders and do not leave all responsibility to farmers, scientists, producers, retailers and distributors but it is crucial to involve the entire population, specially also as consumers.

As presented in the course, the DPSIR framework allows us to see that human needs are the main Drivers for the subsequent Pressures, States and Impacts. This to me indicates that education should play a bigger role in order to address the issues that arise from these drivers at an early stage and has to be part of a set of measures to be able to feed the world population. Among these measures I will consider the following: Closing the yield gap, reexamine ancestral knowledge, increasing urban agriculture and implementing early education programs about agriculture. As we saw during the course there is not a panacea to end the problem, therefore these are just some of many.

Research indicates that reducing the yield gap for the 16 largest crops in the world has the potential to augment the total food production up to 60 percent without trading off for environmental deterioration (Foley, 2011, 64). Developed countries will play a key role by making available knowledge and technology allowing for precise agriculture that counteracts waste of water, energy and over fertilization that impose too much of a trade off between issues affecting the environment and generating sufficient feed. Favoring smaller farms with the lowest yields would not only help closing the yield gap but it would also close the inequality gap addressing all of the pillars of sustainability.

The fact we currently live under a neo-liberal and capitalist model does not imply it is the ideal and thus it is worth reexamining ancestral knowledge. Take for example the theory of Sumak Kawsay or Buen Vivir or Living Well in English. A theory that delves into the characteristics of indigenous communities that allowed them to live in harmony with one another and the earth, instead of the race and struggle that many times capitalism imposes (Céspedes, 2010, 8). A mindshift could not only help reach a common understanding of sustainability but even lead to

changes in our diets, it is unlikely a drastic change occurs but even small steps in the feed-food competition can add up to bigger gains (Foley, 2011 65)

It is estimated that the current global urban population will double in size by 2050 (Dubbeling, 2011, 43) and that by 2050, 70% of Earth's population will inhabit urban areas (Walsh, 2009 as cited by Besthorn, 2013, 191). With these numbers in mind is impossible to ignore the importance of urban farming which not only would help to achieve the goal of feeding the future world population without putting too much pressure on the environment, but open up the possibility of addressing additional social and nutritional issues that should be taken into account when discussing sustainability. The increase in population in urban areas is also leading to the increase of poverty urban areas (Dubbeling, 2011, 43) and poorer communities are limited both geographically and economically to access healthier foods (Besthorn, 2013, 191), however the urban context allows for better planning, more access to technology and education (Dubbeling, 2011, 43) which could transform this reality by empowering this communities to produce their own feed through the creation of community gardens and plots. This could also help regulating and monitoring the use of resources and fertilizers to prevent further stress on the environment and in conjunction with architects and urban planners take advantage of space that is not being used within the cities and maximize the use of resources such as solar energy. Successful case studies and early attempts can be seen in different countries around the world already where the yield of crops were up to 45 kg/yr/m2, a considerable contribution of the vegetable consumption for the families involved (Dubbeling, 2011, 44-45).

As a final possible solution I want to explain what I meant by early education programs about agriculture. Nowadays we have become too disconnected from food and its origins reaching extreme cases such as children not knowing that eggs come from chicken (Frawley, 2016, Express.co.uk). Bridging the gap between consumers and producers can help people become more aware of what is required in order to be able to find food available in the supermarkets , be conscious about the animal welfare issues of our current food production systems and possibly spark enthusiasm to either consume less meat or start a backyard plot among many other benefits of addressing the human needs that in the end put the biggest burden on the environment. A research conducted by the Purdue University (2001) indicated that among students who participated in a biology class that was taught using agriculture as the context, 80% turned out to be moderately to very interested in food systems and animal agriculture and the vast majority (nine out of ten) concurred that it led to further appreciation of the role of agriculture, farmers and those who work in agricultural activities (Balschweid, 2001, 369-370). Although the sample is too small to conclude the results would be similar in a global context, it does show the importance and therefore the necessity to think about including similar subjects or experiences in early stages of education.

Reference list:

Balschweid, M. A. (2002). Teaching biology using agriculture as the context: Perceptions of high school students. *Journal of Agricultural Education*, 43(2), 56-67.

Besthorn, F. H. (2013). Vertical farming: Social work and sustainable urban agriculture in an age of global food crises. *Australian Social Work*, 66(2), 191-203.

Céspedes, D. C. (2010). Hacia la reconstrucción del Vivir Bien. Sumak Kawsay: recuperar el sentido de vida. ALAI, (452).

Dubbeling, M. (2011). Integrating urban agriculture in the urban landscape. *Urban Agriculture Magazine*, 25, 43.

Foley, J. A. (2011). Can We Feed the World. *Scientific American*.

Frawley, F. (2016) *'Avocados come from ANIMALS' Kids' shocking lack of food knowledge exposed* available online retrieved on January 17th, 2018 from https://www.express.co.uk/life-style/food/712737/avocados-come-from-animals-Kids-shocking-lack-of-food-knowledge-exposed

Wageningen University & Research (undated) *Sustainable Food Security: The value of systems thinking* available online https://www.wur.nl/en/activity/Sustainable-Food-Security-The-value-of-systems-thinking.htm