CEWA 478
Week 2 Summary Paper

"Solutions for a cultivated planet" focuses on meeting long-term social and ecological goals (like food security or sustainability needs) through maximizing food production and minimizing agriculture's environmental footprint [Foley et al.]. In total, the paper advocates for stopping agricultural expansion, closing crop yield gaps for underperforming lands, increasing efficiency in crops (enter the kilocalorie), shifting global diets, and reducing waste. Meanwhile, a global analysis on "Crop Water Productivity['s] increase [of] water sustainability and food security," hones in on the the global patterns of crop water efficiency and the food produced (kcal) per one unit of water consumed, as a means to approach the Water-energy-food nexus [Brauman et al.]. Following their spatially distributed global analysis of water consumption and crop yield data, this paper submits that proficient water management of 16 major food crops– whether it be rainfed or irrigated cropland– could reduce total water consumption by up to 15% in regions of Africa, Asia, Europe, and South America. Both of these paper's efforts could be accomplished through prioritizing leveraging agricultural systems where food and environmental benefits could be achieved with the least effort and cost. Furthermore, establishing better data and decision support tools to improve agricultural management decisions and environmental stewardship– as well as making sure that these approaches are diverse and nuanced– are imperative in problem solving for the issues facing global agriculture. These multifold challenges need multifold, compassionate, and equitable solutions that move both Global North and South towards a collective agriculturally stable and sustainable future.

For me, these articles touch on a fascinating key point about the humanity side of the water-energy-food nexus. Global discrepancies and biases when it comes to expressing technological or environmental solutions– especially when considering who directly and disproportionately feel the impacts of such food insecurity and unsustainable resource consumption– are a pervasive issue in engineering solutions going forward. In this case, we see it in the regional disparities between nations like Asia or Africa versus North America or Europe when it comes to upholding global edible crop growth, as Foley notes. Such extreme differences can promote the exploitation of labor and the environment, or force market control and debt dependency which creates a lack of security, sustainability, and economic independence for Global South countries shouldering these agriculture demands/ needs. Additionally, it furthers the divide between choosing livelihood *or* ecological shepherding in the Global South. Which is why water management solutions– like Brauman's point regarding cultivating sustainable water consumption on irrigated cropland to meet the annual domestic water demands of an additional nearly 1.4 billion people– are so crucial. Solutions like these examine engineering from a just and balanced perspective. They look to include novelty, discovery, and tradition for all aspects within sociopolitical dynamics.

I had questions around the Foley paper's mention of clearing forested lands for farming or cattle, but neither Foley or Brauman really touched on forests in their connection to agriculture. I would have been curious to see information on the water management angle in relation to forests or agroforestry? Also, I'm curious how Brauman would relate emissions to water savings/ productivity? And what are the impacts of more nutrient rich foods on water productivity (vegetables, fruits, nuts, lean meats)?