The world’s population is expected to grow to 9.8 billion people by 2050, with much of the growth expected to be in the developing world. During this period, there will be a need for a 70% increase in food production, and a greater demand for animal-source foods. Because of the expected increase in global population, the intersection between adequate healthy diets and sustainability is more important. Plant-based diets have been proposed as a solution. In contemplating this shift, there will be synergies and tradeoffs associated. This review aims to evaluate the sustainability implications of a global shift to a plant-based diet using the four domains of the Global Forum for Food and Agriculture (GFFA).

Methods
Our team conducted a literature review, interviewed scientists, and summarized our findings in a document, power point presentation, and an annotated bibliography.

Results
Our results are summarized using the four domains of the framework outlined by the Global Forum for Food and Agriculture (GFFA).

GFFA Framework

Food and Nutrition Security
With climbing rates of obesity, plant-based diets combined with appropriate lifestyle changes can reduce the prevalence of both weight concerns and non-communicable diseases. The tradeoff is in the adequacy of available micronutrients and risk of nutrient deficiencies. Many nutrients found in animal source foods cannot be easily replaced with those found in plant sources due to varying bioavailability or nutritional composition especially in vulnerable populations such as pregnant women, young children and older adults who have specific nutritional needs. Specific nutrients of interest are iron, zinc, calcium, vitamin B12, vitamin A, and vitamin D. Animal-derived protein provides a higher-quality source of protein and nutrient density. Plant-based diets also bring challenges in food security through food waste increases. Meat is commonly wasted due to high value and taste preference, but at all levels of the food production system, plant-sourced foods are wasted often because they are less expensive and less preferred by much of the developed world. In the discussion about food vs. feed, a balance to achieve efficiency of production of livestock and availability of food for human must be sought.

Livelihoods and Economic Growth
Gross Domestic Product (GDP) of livestock production comprises 50% of all agricultural GDP in developing countries and 33% in developing countries. Initiatives designed to advance a global shift toward plant-based diets would largely reduce the livestock sector of many developed countries in which the industry makes up a substantial portion of the economy. In the United States alone, the livestock sector was valued at over $180 billion in 2017 (USDA, 2017). Fruits and vegetables are primary exports, so a plant-based diet would likely be more beneficial to fostering growth in developing economies. However, fruit and vegetable production does not carry the same market value as meat production.

Since not all land area and climate types are sufficient for food crop production, this means there will not be a scenario in which all livestock and meat industry workers will be able to find work in a plant-based diet landscape—a shift that results in “many losers, but also some winners.” Global partnerships will be an essential component of reducing inequalities between developed and developing nations through equitable trade agreements.

Background
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