

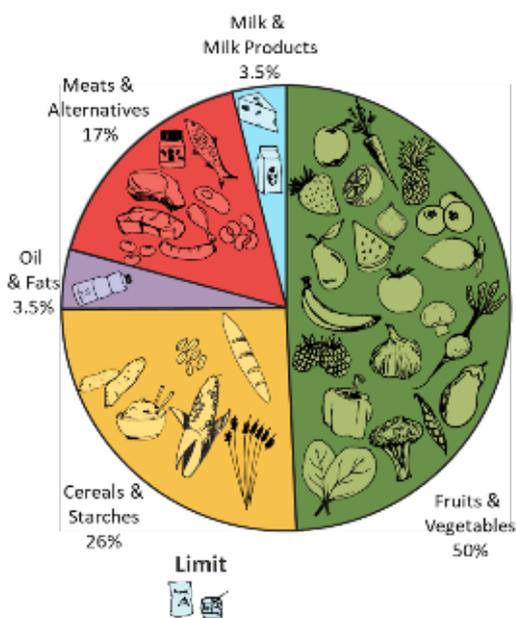
## Interplay between climate change, land use and food system: global perspective and local examples

Humanity faces two major challenges: climate change and feeding a growing population. These two phenomena are interdependent as climate change makes it more difficult and expensive to produce food. On the other hand, increasing agricultural activities will further generate more greenhouse gases, one of the primary causes of climate change. Therefore, we must adapt to rapid and interacting economic and climatic changes by creating a food system that provides adequate and appropriate nutrition for a growing population in the future that does not compromise ecosystem services such as biodiversity conservation and carbon sequestration.

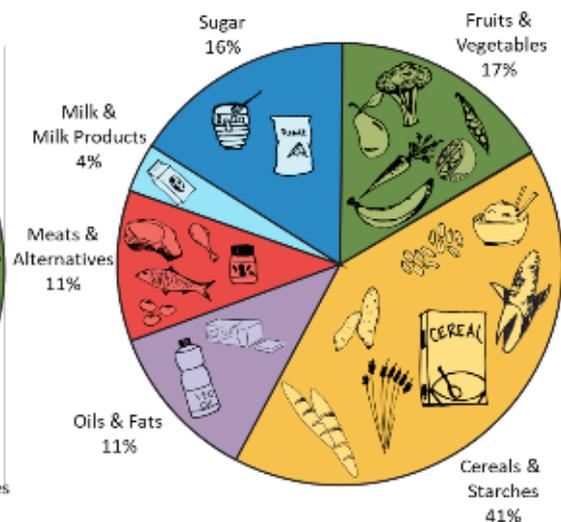
Many scholars worry that food security may be threatened over the next 50-100 years unless production is increased by approximately 70%. In this literature, scholars are concerned not only because our demand for food is rising but also because environmental changes threaten to make food more difficult and expensive to produce. Much of the conversation about “feeding the future” focuses on whether we will be able to produce enough food for everyone in the year 2100. However, one sidestepped topic is whether we are producing the right kinds of food for all of us to be healthy. Another issue that has been overlooked is whether climate change can create new opportunities for expanding farming areas.

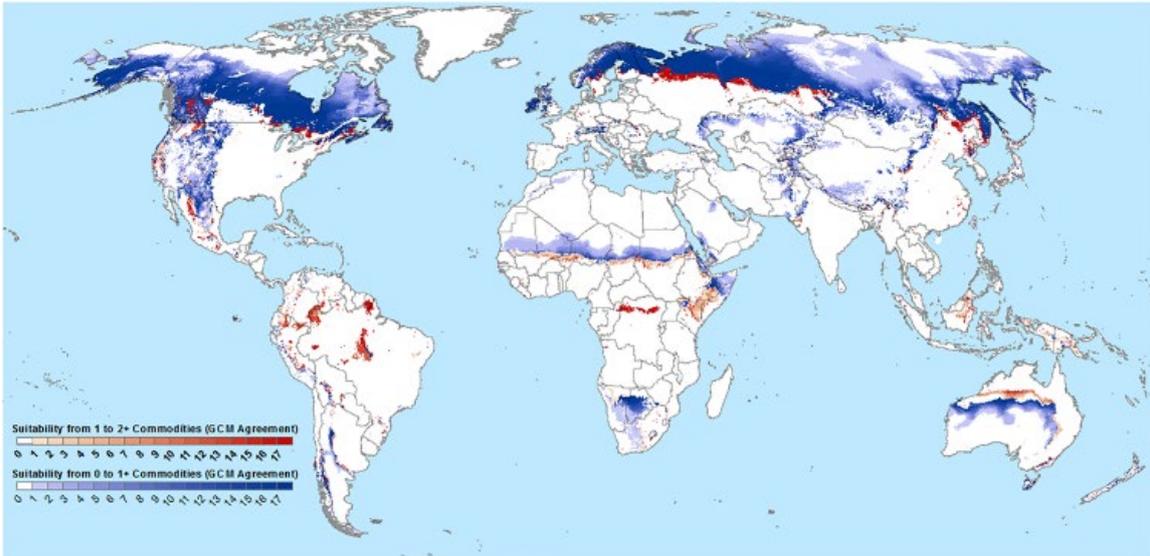
Research has found that we are producing only 50% of the necessary fruits and vegetables. More importantly, if we adopt a plant-based protein diet we may be able to feed the global population a nutritionally balanced diet using existing cropland. We found that climate change may create opportunities for huge areas in the north of the planet, which were not suitable for farming until a few years ago, can be developed into farmland. However, research warns that the environmental consequences would be very risky.

**What we should be eating**  
(Harvard's Healthy Eating Plate Model)



**What we are actually producing**  
(According to 2011 FAO)





Looking at these phenomena on a small scale can have a very different perspective. For example, very recently we have been exploring the Tonle Sap System of Cambodia. The sustainability of the food system is completely dependent on the lake and the sustainability of the lake depends on the hydrologic system in the Mekong basin. Therefore, there are many uncertainties about the scale of agricultural expansion and its effect on the environment. We can see continued land transformation around the upland areas of the Tonle Sap Lake because many fishers do not believe they will be able to continue their livelihoods by living in the lake as fishers like their parents and grandparents used to. This gives us a message that we definitely have a global problem of feeding a growing population without compromising ecosystem services such as biodiversity conservation and carbon sequestration but to achieve this, locally appropriate solutions need to be found and implemented.

#### Bio



Dr. Krishna Bahadur KC is an Adjunct Professor at the Department of Geography, Environment, and Geomatics at the University of Guelph, Canada. He is an agricultural geographer with expertise in agriculture, natural resources management, geographic information systems (GIS), and remote sensing. Specifically, KC's research addresses local and global environmental change, the economics of land use and management practices, climate change, and food security. Most recently, Dr. KC has also been working on maintaining productivity and incomes in the Tonle Sap fishery in the face of climate change. Dr. KC's research activities were also widely covered by media like CBC, CTV, and Reuters, among others.