

The Importance of Food security harmonizing with Climate Change Research

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Stats on Global hunger and Food Waste

Food insecurity is not having reliable access to a sufficient quantity of nutritious food. Food is one of the basic needs for survival, but it has been looked at as a privilege in almost every society on earth. The issue of food security, is a complex world problem along with climate change, and the two are interconnected. We have decimated natural ecosystems and rainforests, to create land for farming, without taking the proper actions to ensure that we are taking care of our planet. Due to climate change, we are going to have to find new ways to cultivate food, while also changing our relationships with food. We have more than enough food to feed everyone, but according to UNICEF (which is an organization that works to save children's lives) "Almost 690 million people around the world went hungry in 2019" (FAO, 2020). That number is only expected to go up, as we see the full effects of COVID-19 on our society. This study calls on the government to "[u]rge a transformation of food systems to reduce the cost of nutritious foods and increase the affordability of healthy diets" (FAO, 2020). It is important to dig even deeper to see why this issue is so prominent.

One issue is the amount of food that is wasted every year. Food waste in social and human relations contributes to increasing poverty and hunger, and so the cycle continues. In the article 'Global food waste statistics 2020' published by CUBII which is based in the Middle East. "1.3 billion tons of edible food is wasted annually, which is the equivalent to a third of global population" (Food Waste, 2021). This is alarming because not only is this food not being put to a greater use which would be going to feed individuals, it also amounts to a large squandering of resources. These resources include water, land, energy, and labor. Food waste needlessly produces greenhouse gas emissions, which as we know contribute to global warming

and climate change. Food waste happens on the farm, in grocery stores, and in homes. Staggering facts show that “[p]ackaging now contributes about 5.4 percent of global food system emissions, more than any other factor in the supply chain system including transportation” (Food Waste 2021). What food waste looks like in developing and developed countries is largely different. In developing countries, food waste and loss occurs mainly at the early stages due to financial and technological constraints. While in developed countries, most of the loss is occurred during the later stages of the supply chain, and the behavior of consumers plays a significant role to what is lost. Food waste plays an important role in addressing climate change and sustainable farming. “In May 2015, under the presidency of Turkey, the G20 Agriculture Ministers highlighted the scale of food loss and waste as a ‘global problem of enormous economic, environmental and societal dimension,’ and encouraged all G20 members to strengthen their collaborative efforts to prevent loss and waste of food, and reduce them” (Food Waste, 2020). We have to change the way we see food and how we cultivate it, if we want to properly address and create solutions to hunger and food sustainability.

Facing the Challenges of Climate Change

In the book ‘Facing the challenges of climate change and food security’ written by Cees Leeuwis and Andy Hall, there are two critical features to addressing food security along with climate change; one being the importance of negotiating new rules or institutional arrangements and two being the importance of reconfiguring networks of activity to bring about change. Networking building, Social learning, and Conflict management being tools that can bring about this change. We as a society are at a point where we need to actively be looking for solutions to the problems we have created. Climate change is a complex problem situation, and it has

unknowing consequences that we are only beginning to see in depth. “[a]dds urgency to the need for adaptation in its wildest sense in the natural resources sphere: agriculture, forestry, livestock, etc...” (Hall & Leeuwis, 2013). We have to start understanding and learning ‘Climate smart farming’ which in essence is growing more food, using less land, water, fertilizer and pesticides. We have to become less dependent on external resources which are limited, and more dependent on labor, care and intelligence, which are abundant. This requires permanent attention from research, extension and communication institutions around the world. The issues of food insecurity and climate change, can’t be fixed by one country alone, it is a global problem and must be addressed as so. Some solutions include; new crop varieties, agro-forestry systems, more efficient irrigation techniques, preserving soil fertility, and new forms of water harvesting. The research into these ideas, have to be combined and embedded in new institutional solutions, which are informal and formal rules in organizational forms and policies in our societies.

In the book ‘Agrobiodiversity Management for Food Security: Critical Review’ the authors Lenn’e and Wood state a very important word which is Agrobiodiversity. It is the shorten term for Agriculture biodiversity, and is an exceptionally important subset of biodiversity. “Agriculture and climate change are linked in important ways. Rising temperatures, altered rainfall patters, and more frequent extreme events will increasingly affect crop production and agriculture, but precisely where and how much is uncertain” (Lenn’e & Wood, 2011). Food insecurity is a complex problem that each country is facing, and climate change is only going to increase the percentages of people going hungry. It is increasing important to understand how biodiversity is essential to our survival, and agriculture is the largest global user of biodiversity. “Indeed it is certain that the most immediately valuable part of global biodiversity is agrobiodiversity on which farming and, in turn global food security, depends” (Lenn’e & Wood,

2011). As a society we are beginning to see the effects of climate change, and one of the places we will see the consequences will be in our structure of agriculture. In chapter twelve, page 189 ‘Agrobiodiversity Management for Climate Change’ it shows the innovations on agrobiodiversity that reduce vulnerability to climate change through the genetic improvement of resilient and climate-proof crops. These innovations will greatly assist in advancing our knowledge of today’s current agrobiodiversity management. In doing so we can see which crops, and cropping systems are able to cope against extreme weather variations. Crop modelling is showing that climate change will continue to reduce agriculture production, and in turn limiting the availability of food security (Lenn’e & Wood, 2011).

To put the severity of climate change affecting food security in light, this quotes shows a model of what crop production could look like in the different parts of the world. “[s]everal crop losses are expected for cotton, maize, and soybean in the USA by the end of this century due to warmer temperature. Grain harvests in China and South Asia may also drop by 37 % and 30 % respectively, by 2050 due to weather extremes”(Lenn’e & Wood). In any regard to coping with climate change, an adaptation focusing on an increased agroecosystem resilience needs to be put in place. Adapting agriculture to climate change will not be easy and will require many different resources like technology, money, land, and water availability. This issue is extremely complex, with many different options to take, but it is clear that action, policies and research must go into the process of finding solutions.

Multifunctional Land uses In Africa

Although food insecurity is a massive global issue, each country has a part to play in the importance of creating different avenues for success regarding agriculture and climate change policies. Multifunctional land use is based on systems that are managed with the goal of producing more than one product or service. The best example to use is home gardens, which are among one of the least regulated land-use systems. These gardens essentially become places for land user's experimentation of different species while also being great biodiversity banks. Most the farming that we see today, is monoculture, and does not offer as many options as multifunctional land. Unfortunately there is not much data on multifunctional land usage as it is seen as difficult, due to its diversity, flexibility, and context-specific needs. But that is exactly why its benefits need to be closely examined. "Yield gains could also be achieved through the positive interactions between trees and crops that make use of environmental functions" (Simelton & Ostwald, 2020). Some of the benefits being increasing yields by modifying nutrient-limited conditions, and improving economic resilience. Because the demand for food will only increase due to population growth, multifunctional land use could be a key factor in how we respond to those numbers. In the Benu region of central Nigeria, studies were conducted on the benefits of multifunctional land use. In that region they identified several intercrop combinations that render higher maize yields, than just the single monoculture yield. There are five climate-smart agriculture practices in this region; parklands, intercropping, citrus orchards, zero tillage, and improved varieties (Simelton & Ostwald, 2020). Multifunctional land use can lead to more stable or higher yields and incomes, while also being proven to be resilient to the variable rainfall patterns. These new varieties also delivered what farmers desperately needed, which is

drought and disease resistant crops. It is important to view this as a possible reference guide to multifunctional land use that could be used in America, while also worldwide.

Conclusion

Food Insecurity and Climate change go hand in hand. In recent decades we have seen the consequences of climate change, and food insecurity become intertwined. These issues may not be easily fixed, but there are things that we as a society can do to be more mindful about where our food is coming from and how much of it we are throwing away. It's our responsibility as a society, to fight for changes that benefit all. Understanding the importance of multifunctional land use and agrobiodiversity is just a small step in the right direction, but it is essential in knowing what could be a possibility for our future.

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