

We need nothing less than institutional change across farming practices, policy, technology used in agriculture, and the global economy to create a resilient food production system that can withstand and adapt to the effects of climate change.

To move towards a more sustainable food production system, we need to enforce farming practices and designs that reduce pesticide use, decrease water consumption and pollution, limit soil erosion, and encourage biodiversity (Nicholls and Altieri 110). Many of these sustainable practices are prevalent in traditional farming communities, whose techniques have proven to reduce their crops' vulnerability to climate change. Some of these traditional agroecological strategies include crop diversification, maintaining local genetic diversity, animal integration, soil organic management, and water conservation and harvesting (Altieri 869). Enhanced biodiversity in crop fields support the resilience of agroecosystems and reduce vulnerability, contrary to the conventional practice of monocultures in industrial agriculture (Altieri 874). There are various forms of diversification which allows farmers to implement strategies that best suit their geographic location and other constraints, such as diversification through agroforestry practices: crop-livestock integration, hedgerows, corridors, etc. (Altieri 875). Many traditional and organic farmers have also found efficient ways of "conserving soil, improving the soil ecology, and stabilizing and enhancing crop yield and water conservation" through cover crop mulching and using green manures as soil organic matter (Altieri 879). This traditional farming knowledge should be incorporated into farming practices worldwide in an adaptation that is suitable for the region and culture. A resilient food production system must also equally value the health of the producer (farmer), consumer, and environment, which begins through the "reduction and/ or elimination of pesticide use in the agroexport sector" and the application of "biological control and integrated pest management (IPM) programmes " (Nicholls and Altieri 110, 93). This may be achieved through major policy reform (remove incentives/subsidies for pesticides, tightening regulations on their import, etc.), increased research, and education and outreach in IPM (Nicholls and Altieri 93, 108).

Another key component of a resilient food production system is food sovereignty. This requires significant reform within the country's government since a strong and egalitarian governing body is needed to establish firm regulations in the food commodity markets, to protect the food production of farmers, maintain control over national grain reserves, and implement export control (Rosset 20). A pivotal first step would be for the government to work

with farmer coalitions, like La Via Campesina, to create sustainable food and agriculture policies that value and respect local farmers and traditional knowledge (Rosset 20). Proactive initiatives and policies that protect and support small local farmers should also be enacted so that in times of crisis, these countries may be self-sufficient and reduce their dependence on foreign intervention, which may actually weaken the nation's food economy (Rosset 17). If food sovereignty were to be implemented, destructive deforestation, environmental degradation, and displacement of rural communities due to land grabbing must also cease; this means complete reform of corrupt governments involved in this business, particularly those associated with (Trans-) Latin American Companies (TLCs) in the Latin American and Caribbean region (Borras 845).

Equitable agricultural technology would also help create a resilient food system, and as data science and technology advances, incorporating these tools into farming practices may be beneficial. For example, ClimateAI provides farmers with the tools needed to make "critical weather-based decisions" well in advance before any major climate event (ClimateAI). Through government subsidies and funding, this technology should be widely available to both small and large farmers; however, we must remember the failures of the Green Revolution to ensure effective integration of new technology. From Miguel A. Altieri's, an Emeritus Professor from UC-Berkeley, presentation, we can conclude that there should be constant communication between the developers and intended farming community and that new strategies should take into consideration the communities' socioeconomic culture.

We can design a resilient food production system that adapts to the effects of climate change, but the greater issue lies in the implementation of this new system. As explained by Dr. Eric Holt-Gimenez, former director of Food First, we must restructure the capitalist economic system which drives the current destructive industrial agriculture system for fundamental change. Instead, our new resilient food production system would thrive in a "doughnut economy" which considers our social and planetary boundaries or a circular economy which is regenerative, reduces waste, and eliminates the continual use of finite resources (Raworth, "Circular Economy"). Nevertheless, "coalitions of farmers organizations [like Campesino a Campesino and La Via Campesina], NGOs and consumer groups will be essential to put pressure on governments" and galvanize others into pushing for global reform in the food production system (Nicholls and Altieri 110).

Works Cited

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