Climate Change & the Impacts to Food & Agriculture

It is widely agreed that climate changes are already occurring. Food and agriculture are particularly vulnerable to these changes. Experts predict that the impacts within tropical regions, such as Hawai`i, will be especially harmful.

How is Hawai`i's Food Being Threatened by Climate Change?

- **Increasing Global Temperatures.** Higher growing season temperatures can have dramatic impacts on agricultural productivity, farm incomes, and food security. For example, rice yields have been shown to decline by 10% for each 1°C.

- **Increased Carbon Dioxide (CO2) Levels.** CO2 is the main contributor to climate change. In some crops, such as tropical fruit plants like mango, high levels of atmospheric CO2 create a dilution of nutrients which may result in lower crop yields and other deficiencies. In addition, as average temperatures continue to rise, the short-term benefits from CO2 enrichment will likely dwindle resulting in crop yield decline.

- **Soil Changes.** Flooding and erosion caused by severe weather events can cause serious declines in soil organic matter. Soil organic matter is necessary to stabilize soil structure, adequately absorb water, and provide required nutrients for plants and crops.

- **Rising Sea Levels.** Sea level rise not only decreases the land available for farming, it also increases the salinity of water necessary for irrigation.

- **Reduction in Water Availability.** Tropical regions, such as Hawai`i, are particularly susceptible to long-term water resource shortages.

- **Potential for Drought.** Climate change is likely to lead to an increase in the frequency of drought conditions affecting local food production and available water resources for farming.

- **Increase in Severe Weather Patterns.** Increased storm activity as a result of climate change can create significant damage to farming infrastructure and destroy crops.

- **Damage to Fisheries.** Climate change effects from rising sea levels, increased CO2 levels, and increases in ocean temperatures can seriously undermine marine ecosystems and the food web leading to a decline in fisheries as a protein-rich food resource. Rising sea levels may drown slow growing reefs, increased CO2 levels may lead to ocean acidification, while increasing ocean temperatures may result in coral "bleaching" respectively.

- **Increase in Pests & Invasive Species.** Elevated levels of atmospheric CO2 are projected to fundamentally alter the relationship between plants and insects, potentially accelerating feeding by insects and creating threats from new invasive species.

How Can We Best Adapt to Meet Hawaii's Food Needs?

• **Increase Biodiversity.** Mixing different crops and varieties within our fields is a highly effective strategy in increasing resilience to erratic weather changes, genetic erosion, diseases and pests, and decreased soil fertility. Over the long-term, a diverse, more localized agricultural sector, used in the past throughout the Pacific, will provide an important framework to combat the effects of climate change.

• **Change Management Practices.** Crop farmers can adapt to climate change by altering the mix of crops grown, seed varieties, planting and harvesting dates, crop rotations, fertilization practices, and pest management practices.

• **Restore and Regenerate Soils.** High temperatures, increased carbon dioxide levels, and the potential for increased flooding and soil erosion will likely reduce the levels of nutrients necessary to maintain crop yields. Planting cover crops, utilizing no-till farming, and efficiently irrigating and fertilizing will enhance food security in Hawai`i by maintaining soil quality.

• **Diversify Crops Being Grown.** In addition to continuing to grow fruits, nuts, and vegetables, consider increasing locally adapted high-nutrient and high-protein food sources. Utilize adapted varieties of plants that can withstand conditions involving high temperatures and decreased water needs.

• **Shift Crop Production Inland.** Rising sea levels are going to significantly impact current coastal farmland. With the sea level projected to rise .5 to 1 meter by the end of the century natural flooding and coastal erosion will result.

As a Matter of Fact:

• Between 85-90% of Hawai`i's food is imported, which makes it particularly vulnerable to fluctuating oil prices, rising food costs, and severe weather patterns resulting from climate change.

• Replacing just 10% of the food we currently import would approximately amount toan economy-wide impact of an additional $188 million in sales, $47 million in earnings, $6 million in state tax revenues, and more than 2,300 jobs.

For More Information:

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