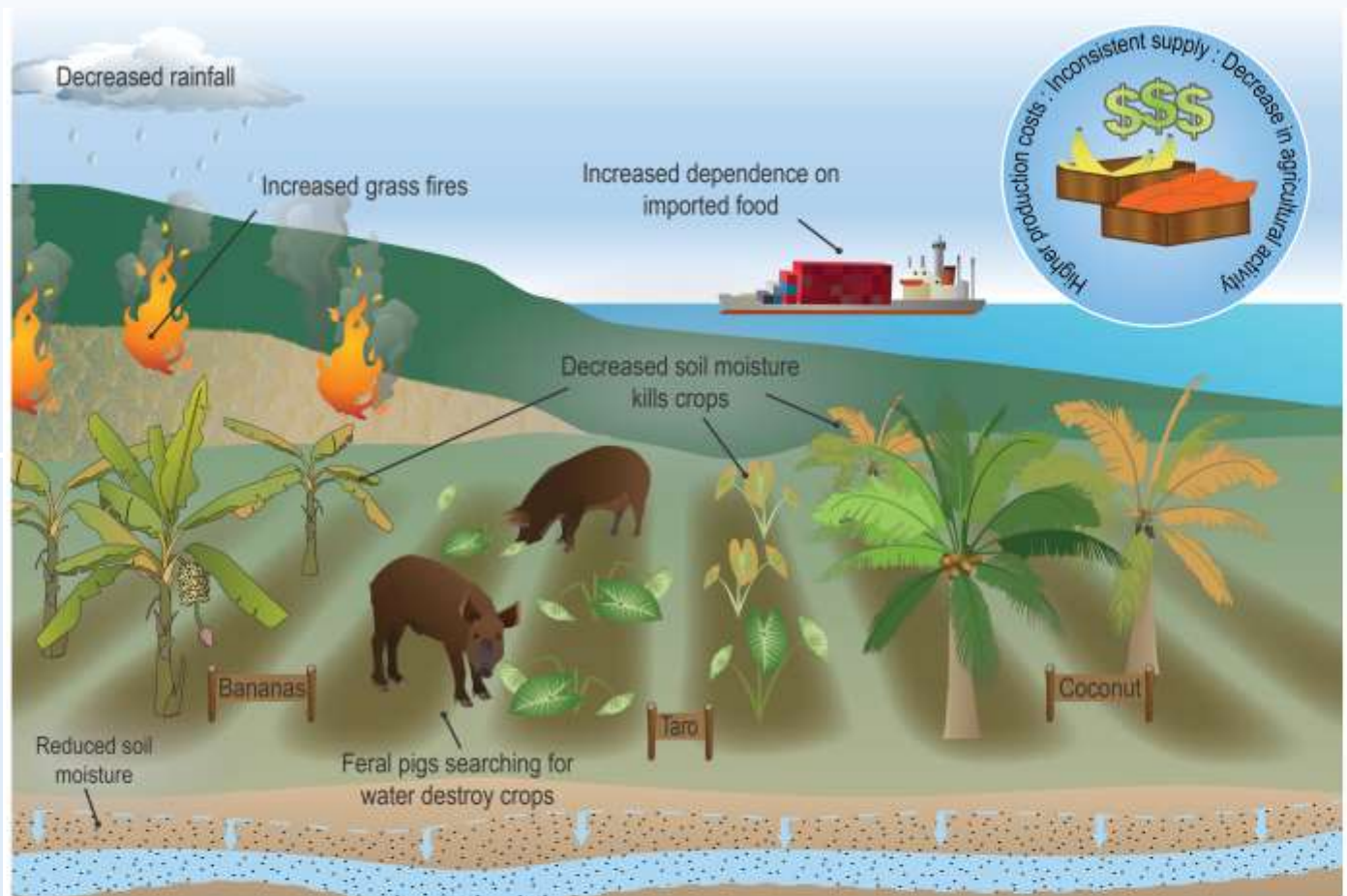


Drought in the U.S. Affiliated Pacific Islands: Impacts to Agriculture



By: John Borja (Guam Department of Agriculture), Jonathan Deenik (UH Manoa), Abby Frazier (East-West Center), and Christian Giardina (USDA IPIF)

Drought has variable impacts on the agricultural sector in each of the 6 jurisdictions of the United States Affiliated Pacific Islands (USAPI). Traditional crops vary by island but some of the main commercial and cultural crops include taro, breadfruit, coconut, banana, sweet potato, yam, and citrus fruit (Polhemus, 2017). Drought impacts high elevation islands and low elevation atolls differently with certain crops more vulnerable to the impacts of drought (e.g., coconut production declined by 20% from 1998-1999 and did not fully recover for over 4 years in the Federated States of Micronesia during the 1997-1998 El Niño Drought) (Polhemus, 2017). Crops respond to drought through reduced growth, increased mortality, and reduction in overall production with rain-fed crops having higher vulnerabilities to drought compared to irrigated crops. In addition to affecting food production and availability, crop changes can have impacts downstream from agricultural systems. For example, drought effects on agriculture can increase the rate of erosion, forest cover loss, nutrient runoff into water bodies, and other aquatic and marine impacts. However, mitigation efforts and improving existing infrastructure can help increase agricultural systems' resilience and resistance to drought in the USAPI.



Closer Look: 2016 Drought Impacts in Guam

Guam is divided into the Northern, Central, and Southern farming areas. Most of the Northern farms (58%), where Guam supports the largest number of farmers, sit on the Island's most important aquifers, which are a primary source of fresh water to the Island's civilian and military residents. Northern commercial farms vary in size from 5 to 50 acres and are located closer to road and water infrastructure and markets, making this area the most suitable for crop production. The Southern farms (32%) make up Guam's second largest agricultural sector, and farmers in this area are highly dependent upon surface water from the Fema Dam and the Ugam River. Southern farms range in size from under 3 acres to over 60 acres. The Central farms (10%) are smaller in size and rely primarily on above ground production systems, especially hydroponic production of micro-greens and nursery based production of ornamentals.

Guam's weather differs strongly between its dry season, which runs from December through June, and the wet season, which runs from July to November. Importantly, most farming happens during the dry season. Non-irrigated farming during the dry season is highly sensitive to drought, as loss of access to rainwater poses many challenges to crop production, with 92% of all produce already being imported to Guam during low production periods.

During these periods, there also are compounding factors that affect crop productivity or cause crop loss. Drought imposes a range of constraints on crop production and has serious impacts on the environment. Without irrigation, crops suffer losses in productivity due to water stress and are also vulnerable to destruction by feral pigs in search of water and food. Most impacted are farm operations in the south where irrigation is limited and arson fires are wide spread. An increased incidence of grass fires and wind erosion negatively impact sensitive areas, including the steep sloping lands of southern Guam.

In 2016, Guam experienced a severe drought during the month of April, which received less than half the normal amount of rainfall (Daleno, 2016). This severe drought was linked to El Niño, reduced crop production, and most directly affected growers not connected to the civilian water supply (Daleno, 2016). Many of these farmers are dependent upon a "rain-fed" water supply because utilities and associated infrastructure that support irrigated farming are limited. In these areas, severe drought will impact farmers by reducing crop production, raising demand on imported crops, and so raising commodity prices. Critically, impacted farmers may be set back economically for months to years, while recovery of plant productivity for woody crops like breadfruit that survive drought can be delayed for years after normal rainfall conditions return.

SHORT- AND LONG-TERM IMPACTS

- Crop death from not enough water
- Crop damage from disease and ungulates
- Increased incidence of wild fires
- Increased erosion and impacts to downstream and coastal areas
- Decreased growth and fruit production
- Impacts to seed and soil conditions
- Reduced farm viability
- Inconsistent supply of products
- Reduced food availability
- Increased dependency on imports
- Higher commodity prices
- Degraded agricultural sector

Increasing Agricultural Resilience to Drought:

Opportunities exist to increase resilience in agricultural communities in the USAPI:

- **Agroforestry:** Diverse and traditional agroforestry provides resilience for communities and cultures.
- **Infrastructure:** Agricultural resistance and resilience to drought is highly dependent on existing water storage infrastructure and distribution, as well as access to natural and man-made resources.

References: Daleno, G. Dumat-ol. 2016. Severe drought hits region, El Niño the culprit. Guam Pacific Daily News (2016/04/13); Guam Department of Agriculture Farm Reports; Polhemus, D. A. 2017. Drought in the U.S.- Affiliated Pacific Islands: A Multi-level Assessment. <https://doi.org/10.21429/C9ZS74>.

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