



NSF NRT-InFEWS: Indigenous Food, Energy, and  
Water Security and Sovereignty

Presents:



# Food, Energy and Water (FEWS) Learning Modules

June 2021





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# MODULE INTRODUCTION:

DR. MURAT KACIRA - DIRECTOR, CONTROLLED ENVIRONMENT AGRICULTURE CENTER

## MODULE 1: DINÉ FOOD SOVEREIGNTY & AGRICULTURE

JAYMUS LEE - PSM IN CONTROLLED ENVIRONMENT AGRICULTURE, UNIVERSITY OF ARIZONA

- Lecture
- Zoom Poll Question
- Jamboard (Slide 1)
- Lunch Break Discussion Prompt

## MODULE 2: CONTROLLED ENVIRONMENT AGRICULTURE & GREENHOUSE DESIGN

AMY PIERCE, MS BIOSYSTEMS ENGINEERING

- Zoom Poll Question
- Jamboard (Slide 2)

## MODULE 3: HYDROPONICS & GROWING SYSTEMS

ALEXANDRA TRAHAN, MS, ENVIRONMENTAL SCIENCE

- Lecture
- Jamboard (Slide 3)

## MODULE 4: CEA PLANT NUTRITION

RUTH PANNILL, MS NATURAL RESOURCES AND ENVIRONMENT

- Lecture
- Zoom Poll Question

## MODULE 5: DINÉ COLLEGE HOOP HOUSE PROJECT

JAYMUS LEE - PSM IN CONTROLLED ENVIRONMENT AGRICULTURE, UNIVERSITY OF ARIZONA

- Lecture
- Application and Review

## REVIEW: INTRODUCTION TO HOMEWORK & EQUATIONS

AMY PIERCE, MS BIOSYSTEMS ENGINEERING & JAYMUS LEE - PSM IN CONTROLLED ENVIRONMENT AGRICULTURE, UNIVERSITY OF ARIZONA



INDIGE-FEWSS FOOD MODULES

DINÉ FOOD  
SOVEREIGNTY &  
AGRICULTURE



*Presented by: Jaymus Lee*



# Learning Objectives

- 1. Students will be able to identify what “food sovereignty” means in their own life.**
- 2. Students will be able to identify challenges & barriers to food access on Navajo.**
- 3. Students will be able to name basic plant needs for development.**

## Presentation Outline:

1. Introduction
2. Food Sovereignty & Security on Navajo Nation
3. Food on Navajo Nation
4. Challenges & Barriers
5. Diné Knowledge & Food
6. Tribal Community Programs
7. Navajo Cultivation Methods
8. Basic Plant Needs



ZOOM POLL

**How far do you have to travel to get to a grocery store?**



# Food Sovereignty

**“The ability to feed your own people and communities is a basic tenant of sovereign governance.”**

Diné Food Sovereignty: A Report on the Navajo Nation Food System and the Case to Rebuild a Self-Sufficient Food System for the Diné People | First Nations Development Institute



# FOOD ON DINÉTAH



*"traditional ecological knowledge bridges together people, land, food, and culture."*



*"Diné people have a sacred obligation to respect, protect, and preserve all beings that were placed on earth for them as people are stewards of these relatives"*





As most of the Navajo Nation's land base is more than 20 miles away from a grocery store (USDA marker of an extreme rural food desert), lack of vehicle access has particularly significant implications for the Navajo Nation food desert.

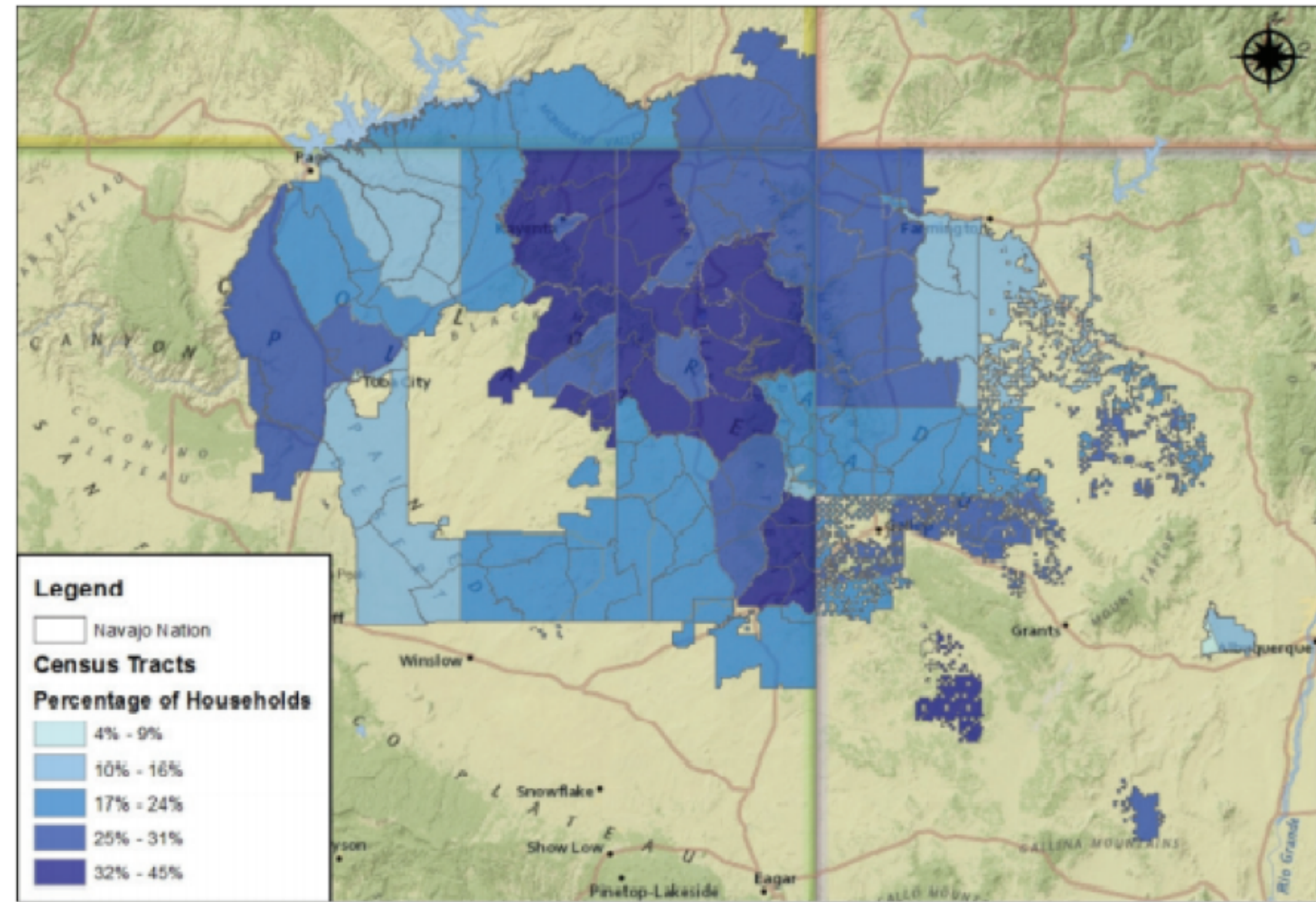
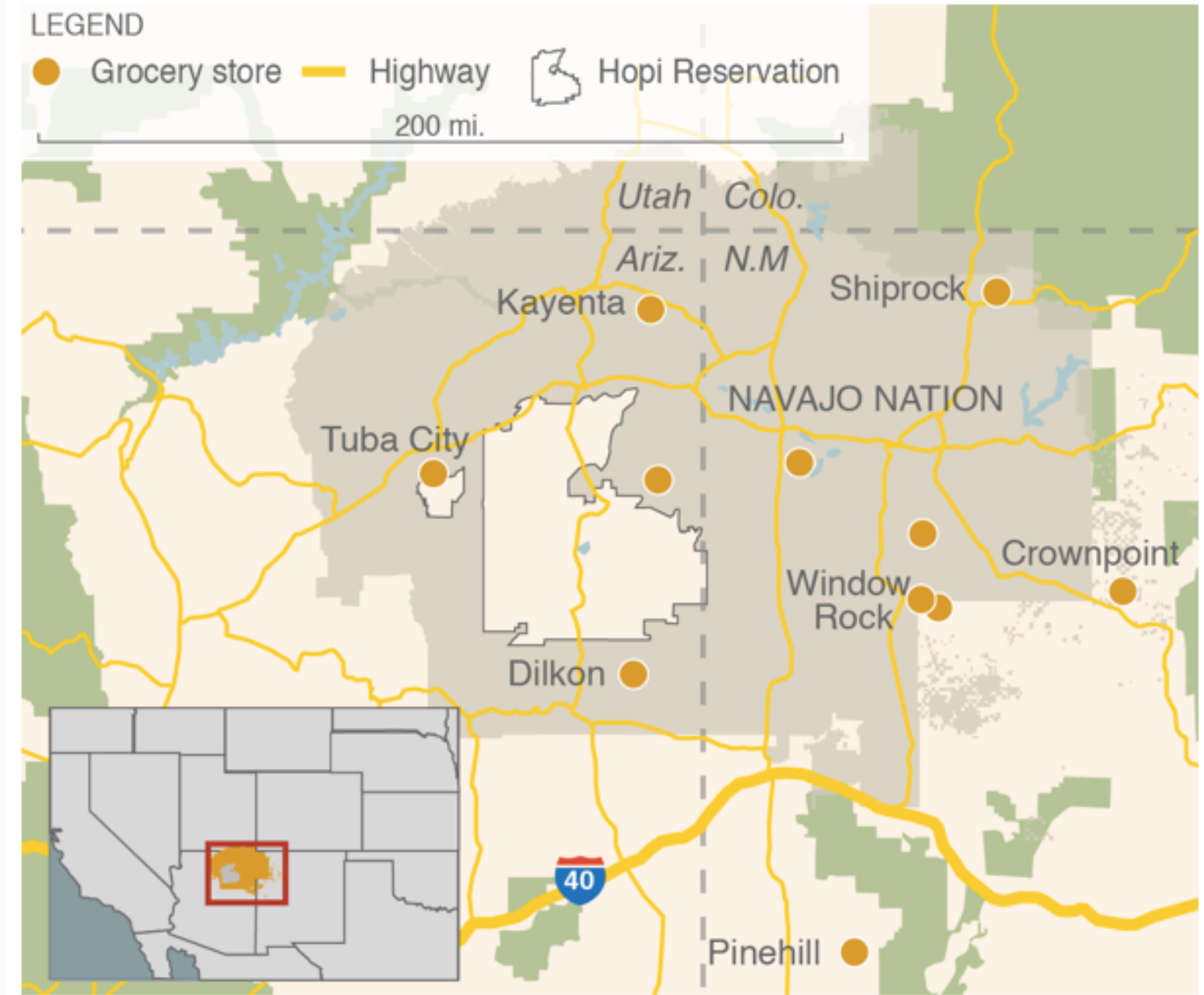


Figure 5.3 American Indian Households with Annual Income and Benefits Less than \$10,000. Data Source: 2010 US Census, ESRI Tigerline. Author: Mariah Tso.

### HUNDREDS OF MILES, BUT ONLY 11 GROCERY STORES



Source: Diné Policy Institute. Map by Alex Newman/Al Jazeera America.

Diné Food Sovereignty: A Report on the Navajo Nation Food System and the Case to Rebuild a Self-Sufficient Food System for the Diné People | First Nations Development Institute (pg. 56)

# Food Sovereignty & Security on Diné'tah

## Challenges & Barriers to Growing:

- Water & Climate
  - Inefficient use of water present within the community
- Land Use & Animals
  - Complicated Federal and Navajo Nation land use policies
- Lifestyle & Cultural Shift
- Resources
  - Seeds (non-commercial, non-treated) hard to access
  - Lack of equipment



# Food Sovereignty & Security on Navajo Nation

## Challenges for Food Access on Navajo



- Foods unavailable in their home community
- Distance to access food
- Fixed income household budgets

Table 2.1 Round Trip Distance to Off-Nation Food Stores From Project Area Communities

	To Gallup, NM	To Farmington, NM
Tsaile, AZ	155 mi	174 mi
Round Rock, AZ	240 mi	236 mi
Lukachukai, AZ	173 mi	155 mi
Chinle, AZ	183 mi	225 mi
Many Farms, AZ	210 mi	218 mi

# FOOD

## Sovereignty

### Political

larger questions of social justice and the rights of farmers and indigenous communities to control their own futures and make their own decisions.

*"emphasizes local control and self-sufficiency"*

## Security

### Technical

the availability of food, regardless of the type, method or location of production, etc.

*Food and Agriculture Organization:*

*"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."*

# Food Sovereignty

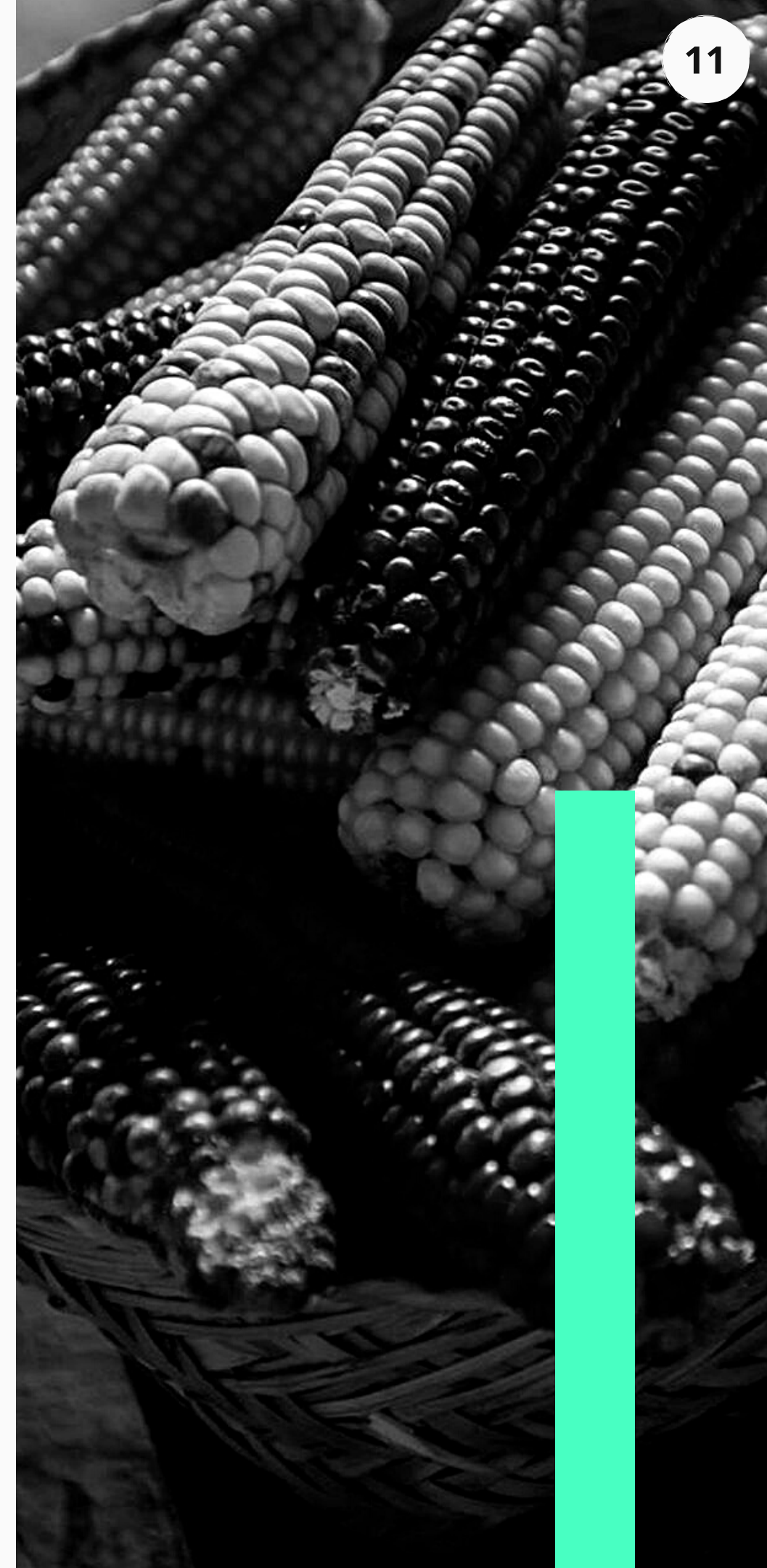
**“Food sovereignty is the right of peoples to define their own policies and strategies for sustainable production, distribution, and consumption of food, with respect for their own cultures and their own systems of managing natural resources and rural areas, and is considered to be a precondition for food security.”**

– Declaration of Atitlán, Guatemala, Indigenous Peoples' Consultation on the Right to Food: A Global Consultation, (2002)

# Diné Knowledge & Food

Diné Knowledge is rich with lessons for a healthy, balanced, productive and happy life. These lessons were learned in the ancient system of lifeway that was lived by Diné of generations past. This lifeway guided the Diné people through countless hardships and adversities to become a strong, resilient and grounded people. However, the lifeway that provided the guidelines to **Diné resilience was rooted in a food system that stressed the importance of a multitude of elements toward wellness that are not seen in modern mainstream American society's food consumption.** As we examine other aspects of food on Navajo Nation, careful consideration should be given to what ancient Diné teachings on food have to offer our present day situation. As elder Advisory Circle members in this study pointed out, **it is with our well-being in mind that they pray and hope that the younger generation will find ways to learn and draw from our traditional teachings for a positive future.**

Diné Food Sovereignty : A Report on the Navajo Nation Food System and the Case to Rebuild Self Sufficient Food System for the Diné People (p.42)



"Food has been a tool of American settler colonization and assimilation. Food has also been a source of health, sovereignty, kinship, and an expression of resistance"

"Interactions with food are supposed to be group efforts among local extended family and community members"

"Smaller scales of seeding food sovereignty can also look like family members teaching their children and grandchildren to cook and value traditional foods"

"Elders are keepers of traditional knowledge, these communal gatherings engage Diné youth with their elders, through observing, participating, and performing the proper interactions."

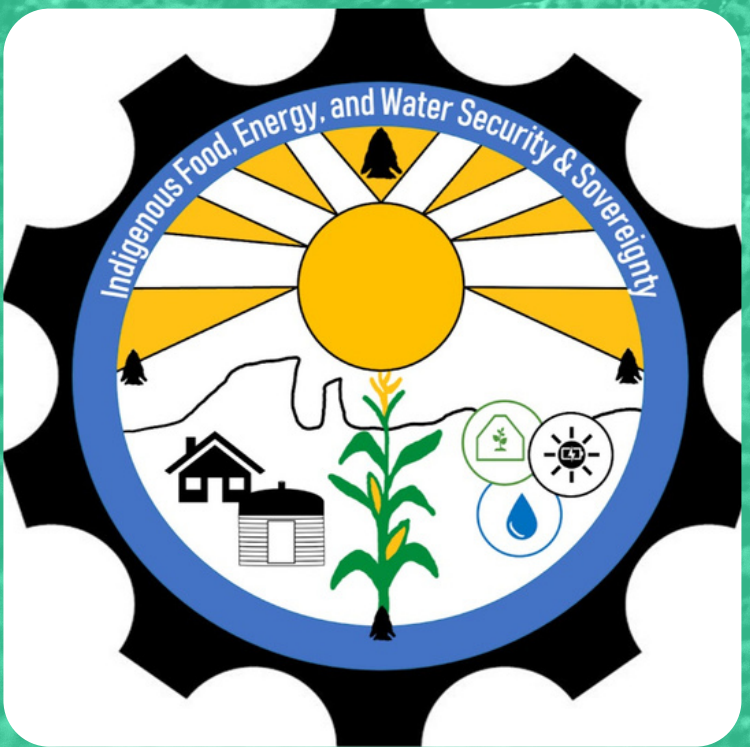
"Food sovereignty is an independent entity that reclaims cultural practices, involves tribal members in mutual aid efforts to keep each other food secure, and is built off traditional knowledge and wisdom that bypasses western science"

***"Fundamentally, the pathway to reclaiming food sovereignty in the Navajo Nation is through informal communal efforts that emphasize kinship ties with land, culture, and the keepers of traditional knowledge: Diné elders."***

***"Diné Food Sovereignty empowers Diné people by putting the Diné people, cooks, farmers, ranchers, hunters and wild food collectors at the center of decision-making on policies, strategies, and natural resource management"***  
***(Diné Policy Institute)***



# Tribal Community Programs



# Navajo Agricultural Products Industry

## ROLE OF CEA:

NAPI uses greenhouse for seed starting and crop production – soil based production

Recent discussions about using hydroponics for microgreen production – nutrient dense produce



NAPI CHILI PRODUCTION GREENHOUSE

# Other Tribal Use of CEA

## Diné College Land Grant Office

Utilizes 3 hoop houses and 1 greenhouse for plant production using soil and soilless techniques.

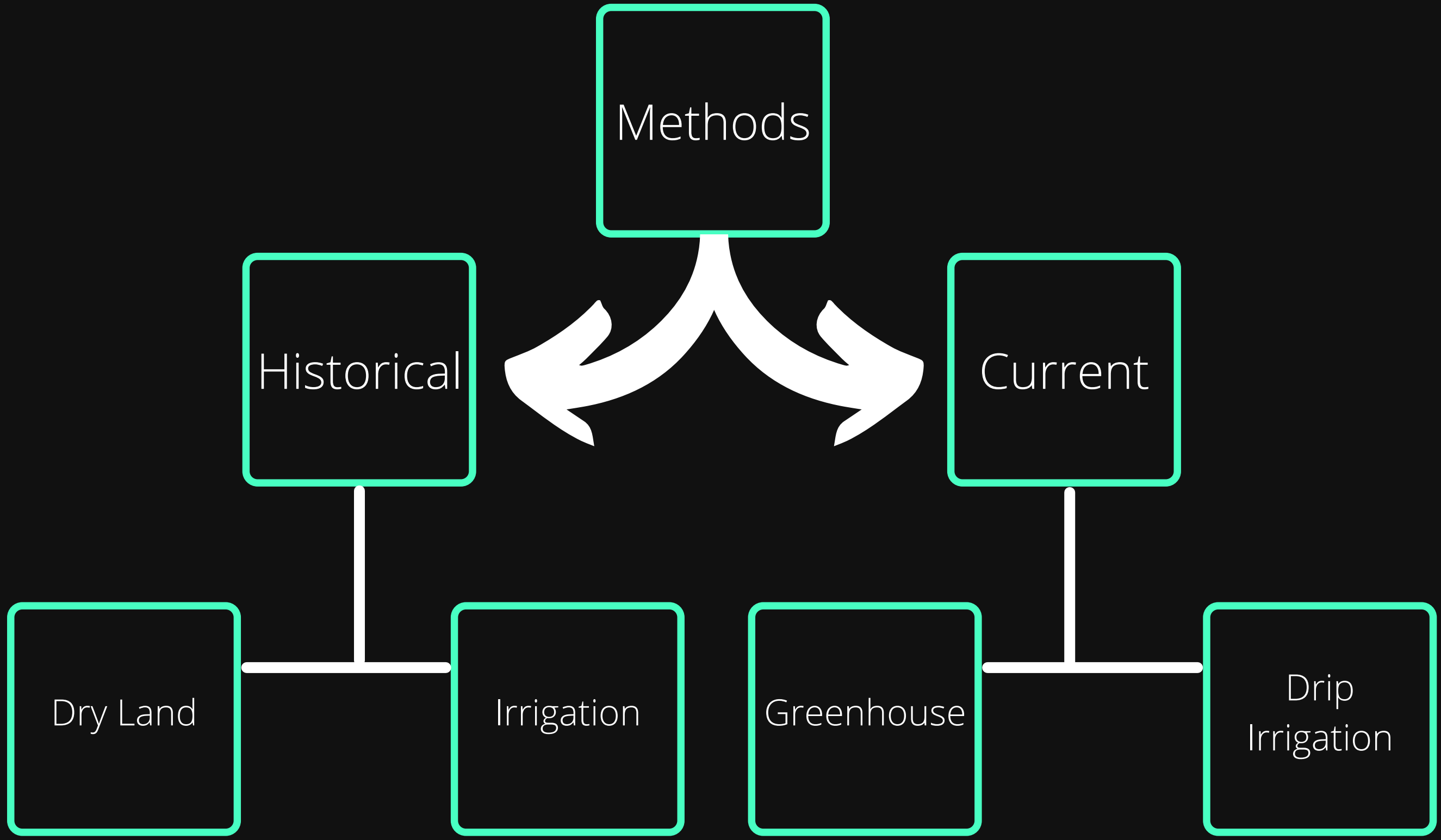


## Ch'ishie Farms - Tyrone Thompson

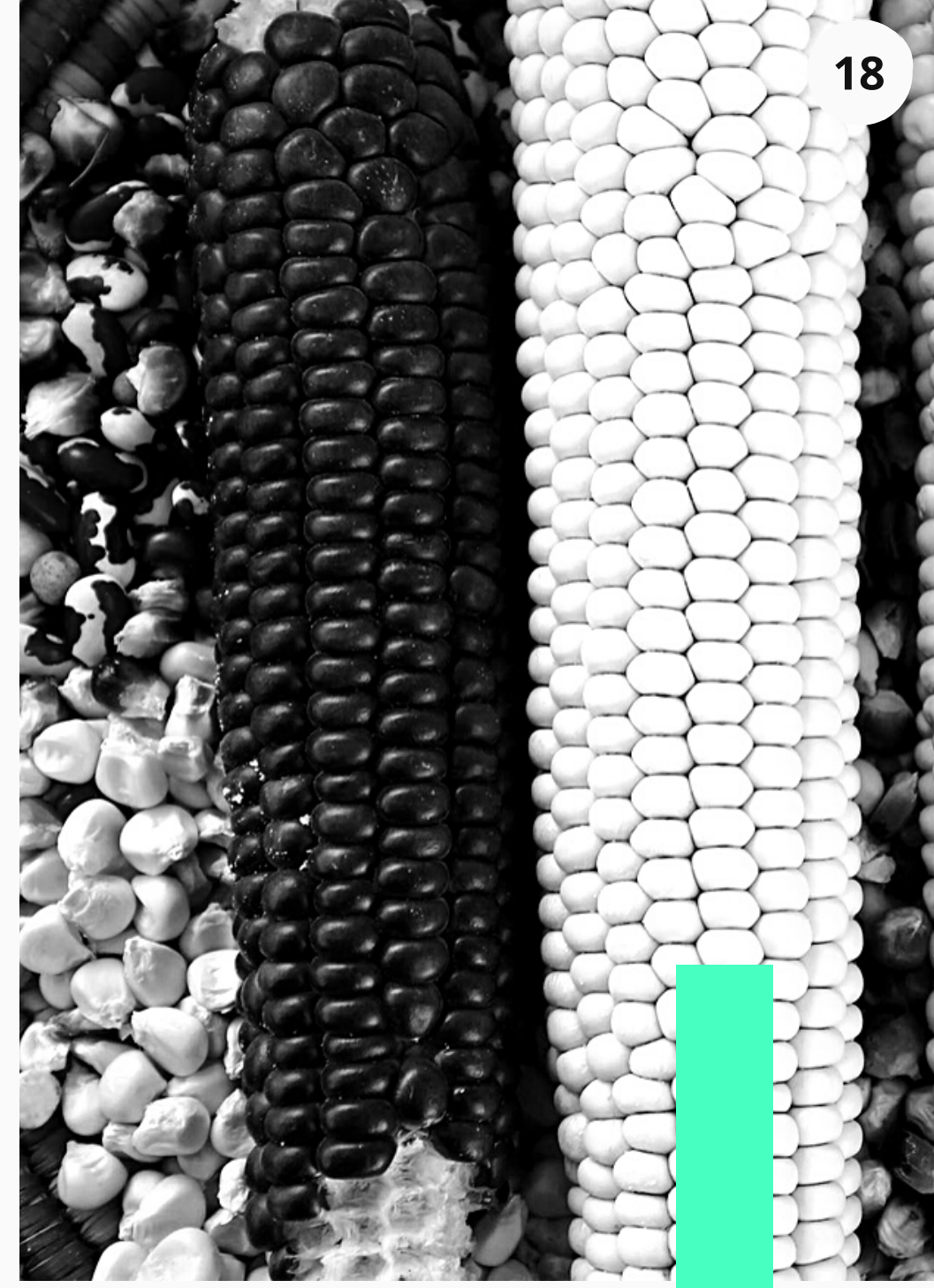
Use of hoop houses for seedling production; construction of a geodesic greenhouse for crop production.



# Navajo Cultivation Methods



# What kind of plants/crops have you grown, for food or fun?



Answer in chat or unmute microphone

A black and white photograph of a rural landscape. In the foreground, there is a field of crops, possibly corn, with a wire fence. To the right, there is a large, arched greenhouse. In the background, there are rolling hills and mountains under a cloudy sky.

**What are the basic conditions that a plant needs to grow?**

Answer in chat or unmute microphone

# What are the basic conditions that a plant needs?

## THINGS TO CONSIDER:

What kind of plants?

How many?

How will we grow them?



COLLEGE OF AGRICULTURE & LIFE SCIENCES  
COLLEGE OF ENGINEERING

**Biosystems Engineering**

# BASIC PLANT NEEDS

*Growing Plants - What's Important?*



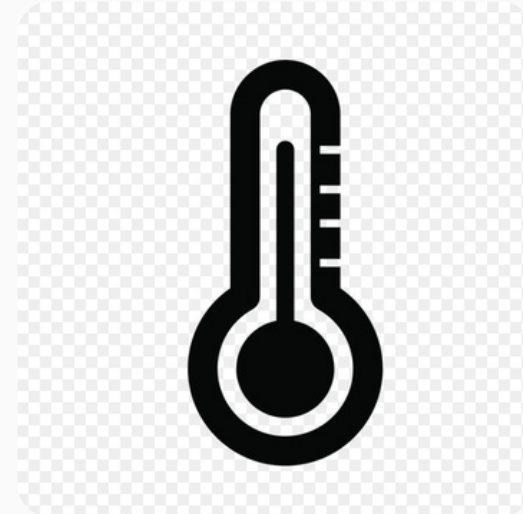
## Light

- quality
- quantity
- duration



## Water & Humidity

- photosynthesis
- turgor pressure
- transpiration
- stomatal regulator
- pressure for root movement
- relative humidity



## Temperature

- germination
- flowering
- crop quality
- photosynthesis & respiration
- breaking dormancy
- hardiness



## Gases

- oxygen (O<sub>2</sub>)
- carbon dioxide (CO<sub>2</sub>)



## Plant Nutrients

- fertilizers
- nutrient absorption





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RESEARCH, INNOVATION & IMPACT

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for Resilience

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