

# The Resiliency of Hopi Agriculture 2000 Years of Planting

## COMMUNITY-FIRST AGRICULTURE THE HOPI WAY

Hopi agriculture is a way of life. For us, farming is not just a physical action, it is also an act of faith that has sustained us for generations. We practice community-first agriculture. What we raise goes directly back to the community's households and ceremonies.

At Hopi, everyone in society has a role in farming—from preparing the fields, to planting, harvesting, storage, and eventual use. By participating in farming, Hopi youth learn our traditional values: respect, giving back to the community, caring for others, and reverence for the land.

We consider ourselves stewards of the land, not owners of it. Our farming techniques are environmentally friendly, low impact, and have sustained generations of our people. Hopi farmers continue to plant using traditional techniques honed over centuries.

### GUEST CURATOR



Michael Kotutwa Johnson is a Hopi farmer. He is also a PhD candidate in the School of Natural Resources and the Environment at the University of Arizona. He is devoted to supporting the continuation of traditional values and practices associated with Hopi agriculture.

This exhibit expresses the value of Hopi traditional knowledge about farming in an arid environment.

Michael's photographs of his own fields, combined with historic photographs from the collections of the Arizona State Museum and other institutions, illustrate the resiliency of Hopi agriculture. He is donating his photographs documenting Hopi agriculture to the Hopi Cultural Preservation Office. They will also be archived at the Olive Library at Northern Arizona University, where they will be accessible to the Hopi and other researchers.

## Who Are The Hopi?

Since time immemorial, the Hopi people have lived in *Hopitutsiwa* and have maintained our sacred covenant with *Másaw*, the ancient caretaker of the earth, to live as peaceful and humble farmers, respectful of the land and its resources. Over the centuries, we have survived as a tribe, and to this day have managed to retain our culture, language, and religion despite influences from the outside world. (The Hopi Tribe, [www.hopi-nsn.gov](http://www.hopi-nsn.gov))

- Hopi ancestors have lived in northeastern Arizona and surrounding areas for more than 2,000 years.
- Hopi live in the northern part of what is today called Arizona.
- Hopi has a population of 14,127.
- There are 13 villages at Hopi.
- The Hopi reservation consists of 1.6 million acres of arid land.

Hopi agricultural knowledge is passed from one generation to the next. In this photograph, from left to right are: my father, Caleb Hocketewa Johnson, great-grandfather, Polkeyewa, and grandfather, Fred Apti Johnson. This exhibit is based on my family's experience and my academic work. It does not necessarily reflect the views of all Hopi people.



Family photograph, 1930s, courtesy of Michael Kotutwa Johnson.



Traditional government planting field.



Desert landscape, 2010s, courtesy of Michael Kotutwa Johnson.

Unless otherwise noted, all photographs are by Michael Kotutwa Johnson, circa 2010-2017.

## Fitting The Environment

*Hopi is the only place I know where corn is planted to fit the environment; the environment is not manipulated to fit the corn.*

— Michael Katausa, Hopi

Over thousands of years, Hopi farmers have figured out methods for farming in an arid environment. These include placing fields in areas where they will receive the most moisture, specific planting techniques, and protecting plants from wind and pests.

Traditional Hopi agriculture is an example of dry-land farming. Snow and rainfall are vital to the success of our crops. Snow provides the soil moisture necessary for planting in early spring. It is the only moisture available until the monsoon rains arrive in late July. The summer rains bring supplemental moisture that results in corn ears and bean pods filling out.



Field sizes are determined in accordance with location. The average size of a Hopi field is between one and five acres.

The natural environment gives us clues that indicate the amount of moisture in the soil. In the spring, the presence and condition of certain wild plants signal the availability of soil moisture. Based on what we see, we decide how deep to plant and how far apart to space our crop plants.

### WHERE WE PLANT



Topsoil is scarce in the desert. In early spring, the beginning of April, we look for the first signs of green in the desert shrubs.



We look for green in the desert shrubs. When we see green, we know it is time to plant.



We plant in washes or channels to take advantage of potential soil moisture resulting from upstream monsoon rains. However, fields are often at risk if a major rain event occurs upstream. Fast moving floodwater can easily wipe out a field.



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When choosing a field location, we look for places that will protect crops from strong winds and aid in capturing water from monsoon rains.

Hopi beans, squash, and melons are also planted on sandy slopes. The sand acts as a mulch, maintaining the underlying moisture that comes from winter snow.

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Two farmers, one who grows corn and one who grows beans, are digging a hole and planting seeds. Photo credit: Hopi Farmers, photographer, Hopi, Arizona



## PLANTING METHODS

We adjust our planting depths based on available soil moisture. For example, corn may be planted between six and 24 inches deep. We plant up to 20 corn seeds in one hole. Planting multiple seeds together allows corn to be grown in clumps that are spaced out. This helps protect the plants from sun and wind, as well as crows and other predators. Later, we thin the plants, pulling up all but the strongest six or seven in each clump.



Young corn plants growing in clumps.



Young corn plants growing in clumps. Photo credit: Hopi Farmers, photographer, Hopi, Arizona



Young corn plants.

We space our plants for beneficial use of available soil moisture. Corn is planted three paces (about nine feet) between clumps. Beans are planted one pace (about three feet) between plants.



Young corn plants growing in clumps. Photo credit: Hopi Farmers, photographer, Hopi, Arizona



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# Challenges For Hopi Farmers

For over 2,000 years, we have tested and adapted our agricultural techniques. Our knowledge of the environment enables us to overcome the many challenges of farming without the use of pesticides, herbicides, and man-made irrigation systems which, today, are common components of commercial agriculture.

Long ago, Hopi farmers figured out how to overcome environmental challenges, such as drought, sand storms, wind, insects, and animals that threaten our plants.



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Young plants are like children; they need to be protected up to a certain age. Once they reach maturity they can look after themselves.

## CHALLENGES



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## Hopi Ingenuity

Over thousands of years, Hopi farmers have honed methods for planting and protecting our crops. Notice the continuity of these techniques as shown in both the historic and contemporary photographs.

### TOOLS

Hopi farmers have learned to adapt traditional and modern tools to fit our farming needs.

### PLANT PROTECTION

Hopi farmers protect plants from wind, heat, small animals, pests, and soil erosion. We use what is available to us, including stones, dried vegetation, and cans.



traditional Hopi planting sticks are made of greenwood



look at Hopi government planting sticks, some planting sticks, some, and some Hopi planting sticks



we use a straight stick to make a hole in the ground, to make a hole in the ground like a hole in the ground and to make a hole in the ground



the Hopi farmers use a straight stick to make a hole in the ground, to make a hole in the ground like a hole in the ground and to make a hole in the ground



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## Resiliency Of Traditional Knowledge And Practices

*The land is very fertile for maize and cotton and everything sown in it, because it is [a] temperate land. With little toil, the natives cultivate the sandy places that greatly conserve the moisture from the snows.*

— Diego Pérez de Luján, 1597, recorder of Antonio de Espejo's Entrada to the Hopi Pueblos (Translated by The Hopi History Project, University of Arizona Southwest Center and Arizona State Museum.)

Our way of farming continues to be well suited to our environment. Despite Western influence, Hopi traditional farming practices and crop storage methods have not changed much. We continue to rely upon our holistic knowledge of the environment. This same knowledge in Western society encompasses the diverse scientific disciplines of agronomy, hydrology, ecology, and genetics.

For more than 2,000 years, Hopi farmers have saved the seeds from our ancient corn. Each year the seeds are planted in our fields using traditional techniques, resulting in beautiful multi-colored ears of corn. These are harvested for food, ceremonies, and seed. Hopi agriculture produces an abundance of diverse crops. Through careful selection of seeds and storage, this biodiversity is preserved for future generations.



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– *Uto Tanga Wondimu, 2015, Ethiopian farmer (Story Center, [www.youtube.com/user/CenterOfTheStory](https://www.youtube.com/user/CenterOfTheStory))*

A photograph showing a vast vineyard with rows of grapevines stretching across a dry, hilly landscape. The vines are green and appear to be in the early stages of growth. In the background, there are rolling hills and a prominent, rounded mountain peak under a clear blue sky with a few wispy clouds. The ground between the rows of vines is dry and sandy.

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salmon described in early literature (not growing in eggplants from wind and sunbaked, warm, brown, thin-skinned, semi-saline marshes, or salt-marshes, otherwise, and, as usual,

[illegible]

— Michael Kotutana Johnson

A black and white photograph of a person sitting on a rocky shore, looking down at their hands. The person is wearing a light-colored, long-sleeved shirt and dark pants. They are sitting on a large, flat rock. The background shows a body of water and some vegetation on the shore.

A. Bigal, *University of Pennsylvania*, 3630 Locust Walk, Philadelphia, PA 19104-6318, USA. E-mail: bigal@wharton.upenn.edu

corn is husked, spread out to dry, and then washed in cold water by dry processing.

[illegible]

starting now is critical to us.



## BENEFITS OF TRADITIONAL FARMING FOR THE HOPI COMMUNITY

Hopi agricultural activities serve to reinforce traditions and customs in each new generation. For us it is not about growing vegetables; it is about growing children.

Traditional Hopi farming:

- Helps reduce obesity because of the work required and the nutritional value of the food produced
- Reinforces Hopi culture by assigning every person a role in Hopi society
- Stabilizes families, because it increases sharing and no one goes hungry
- Is environmentally friendly
- Gives you respect for the land and what it provides



scarcity and the extreme dryness of the soil, which is why the Hopi, who have been farming for centuries, have developed a system of dry farming that allows them to grow crops in the desert. This is a traditional Hopi farming technique, and it is one of the reasons why the Hopi are able to grow crops in the desert. (photographer, 1981, 1982, 1983)



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## Planting Is An Act Of Faith

*To be a Hopi farmer means you plant regardless of the challenges you encounter. It is your faith, heart and dedication that will allow things to grow.*

— Michael Katsuna Johnson

I feel that the Hopi concept of sustainability and our crop diversity should be protected, preserved, and learned from. They truly are world heritage resources. Hopi agricultural knowledge is based on the place we live and time-honed techniques, which are reinforced by our community practices and spiritual beliefs. Hopi farmers care for the earth as we care for a relative. For us, planting is an act of faith; we are not just putting seeds in the ground. We are re-establishing our relationship with the land in hope that it will continue to provide sustenance for future generations of Hopi people.



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Case panel goes with object case

