

KNOWLEDGE OF THE LAND

NATIVE AMERICAN CULTURES AND SUBSISTENCE

Suggested Activity

Cadaval's article contains vocabulary and concepts that will be unfamiliar to many students. However, these difficulties can be used to engage students in identifying questions and principles that will guide their study throughout this unit. A strategy for promoting active reading of the article follows.

Set a Purpose for Reading

“Land and Native American Cultures” contains several statements describing values and beliefs held in common by the Native American groups introduced by the author. Instruct students to highlight or underline these statements as they read. Some sample statements are below:

At the core of most Native American cultures are concepts of land, which shape all facets of political, social, economic, and symbolic life.

Native American cultures have generally perceived land as part of their cultural environment as well as the source of nourishment and shelter.

The natural and spiritual relationships between humans and land are central to the world order of many Native Americans.

Discuss and Apply

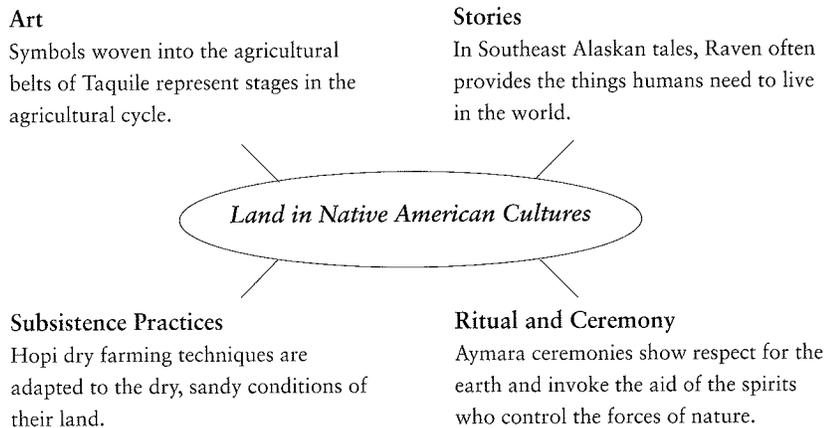
Give students time in small groups to discuss their selected statements. Students should work together to justify their selections. This process will help less capable readers arrive at meaning. You may want to help students rewrite the statements in their own words.

Follow up with a full class discussion and select several statements the students feel are the most “telling” about Native American beliefs and attitudes. Write out these statements on a length of newsprint or on individual tag-board strips. Hang them prominently on a classroom wall or bulletin board.

Follow Through

As study of Native American cultures continues, direct students to collect quotations, drawings, diagrams, cartoons, etc., from their reading and research that support and illustrate the general statements. These supporting data can be written on index cards and placed on the bulletin board to create a concept map, a graphic display of a central idea and relationships among supporting or qualifying ideas. Figure 1 below provides an example.

Figure 1



KNOWLEDGE AND POWER

LAND IN NATIVE AMERICAN CULTURES

OLIVIA CADAVAL

The encounter between the peoples of the eastern and western hemispheres that began nearly 500 years ago has had a dramatic effect on the way land and natural resources in the Americas are thought about and used. Exploration and colonization led to land use practices foreign to those developed by indigenous societies and compatible with the existing ecosystem. Almost 500 years ago, newcomers failed to learn from those who understood their home environment. The European campaign of “discovery” and conquest made this exchange impossible. Native populations of the Americas continue to pass on their systematic knowledge about their environment, but usually only within their own communities. This year’s commemoration of the 500th anniversary of the year before Columbus’ voyage has been undertaken in the belief that it is possible for our present society to learn and profit from indigenous knowledge about the lands of the Americas. Conserving the earth in the present, as in the past, is as much about indigenous knowledge and society as it is about ecology and economics.

Since 1492, Native American lands and ways of life have been under siege. Native populations were enslaved, exploited and nearly exterminated, systematically driven off their lands, isolated in ecologically marginal reservations and largely disallowed social existence in the contemporary world except as subjects of ethnographic studies. The colonial despoilment of lands and resources, the cultural domination and distortion of native societies, the extinction of entire

populations and the conversion of people into second-class citizens was a prelude to the current onslaught of modern economic expansionism.

Today, Native Americans continue to be exploited and their lands continue to be to be expropriated while their cultural values and symbolic universes are denigrated and denied.

At the core of most Native American cultures are concepts of land, which shape all facets of political, social, economic and symbolic life. To Europeans, the 15th-century conquest of the Americas simply provided land to be exploited for the enrichment of European royal states. In contrast, Native American cultures have generally perceived land as part of their cultural environment as well as the source of nourishment and shelter. Land sustains Native American communities. At the 1990 Continental Conference, "500 Years of Indian Resistance," held in Quito, Ecuador, participants formally declared: "We do not consider ourselves owners of the land. It is our mother, not a piece of merchandise. It is an integral part of our life. It is our past, present and future."

The intruders' strategies to control Native Americans and their lands obscured the diversity of indigenous cultures; they defined European life as the only ethical model and classified all Native Americans simply as "savages," who had no valid culture of their own and who needed to be "civilized." The newcomers' lack of respect for the land was matched by the lack of respect they showed Native cultures. Diversity was excluded, and Native Americans were categorically called "Indians," ignoring the distinct cultures, histories, languages and ecological circumstances that have shaped Native American experience.

The first Europeans to come here encountered a world populated by many ancient and complex societies. The chronicler Bernal Díaz del

Castillo writes of Tenochtitlan (the Aztec urban complex that has become Mexico City),

When we saw all those cities and villages built in the water, and other great towns on dry lands, and that straight and level causeway leading to Mexico, we were astounded. These great towns and cues and buildings rising from the water, all made of stone, seemed like an enchanted vision from the tale of Amadis. It was all so wonderful that I do not know how to describe this first glimpse of things never heard, seen or dreamed of before (Díaz del Castillo 1963).

The Aztec city of Tenochtitlan had a population larger than any city in Europe at that time.

The conquest succeeded in undermining political organization but not in eradicating cultural pluralism. Distinct, unique cultures continue to define the Native American landscape, in spite of profound transformations caused by particular histories of colonization, imposed patterns of settlement, missionary intrusions, and the more recent immigrations and forms of exploitation.

Native horticulture has depended upon crop variety and genetic diversity for maintaining successful food production in different environments. At the base of both Native American culture and horticulture is the concept of living in harmony with the diversity of the natural world. The Mexican anthropologist Arturo Warman uses the analogy of corn, which is native to the Americas. “Maize is our kin,” he writes. Like American culture, he continues,

. . . maize was not a natural miracle; maize was a human creation made possible through human intervention. Maize was the collective invention of millions of people over several millennia on this continent. So we have maize as a cultural product. But maize is also diversity and diversity means knowledge and experimentation. Diversity was the way to live near the natural environment and not to fight with it . . . (Warman 1991).

Contemporary Native Americans do not claim to have retained without change the cultures that existed prior to the European conquest. Much has perished, much has been destroyed and all has changed. In many cases, Native communities have been able to absorb and restructure foreign elements to respond to new situations. The Mayan anthropologist Jacinto Arias explains, "In our stories, we tell ourselves our way of being did not die; nor will it ever die, because we have special virtues that compel us to defend ourselves from any threat of destruction." These moral virtues combined with thousands of years of knowledge of land, cultural pride and struggle for self-determination have forged cultures of resistance.

Oriented both by the Smithsonian's overall concern for the conservation of cultures and by global attention focused on the meaning of the Quincentenary, this program will be an opportunity to hear the voices of members of Native American societies that have persevered for 500 years and have maintained an ancient care for the earth and the continuity of their own cultures.

This program samples the cultural and ecological diversity of Native American societies. The groups selected have for centuries continuously inhabited the regions presented. It is worthy of note that the continuity of their land tenure has depended in large part on the marginality of the land they inhabit. The Amazonian rainforests, called by the Shuar "the lungs of the world," are almost impenetrable and until recently were ignored by the outside world. The Andean highlands are harsh and inhospitable, as is the arid desert of the Hopi in Arizona. The steep and eroded Mexican mountains of Chiapas and Oaxaca are a challenge to native agriculturalists. The sandy dune country of the Ikoods is blighted alternately by drought or flood. Although rich in resources, the coastal rainforest of southeastern Alaska is almost inaccessible from the interior because of mountains. Communication even between communities is difficult due to the

impenetrable rainforest and has been limited to boats and more recently airplanes, weather permitting.

The program will present Native American knowledge about land as it informs sacred and secular practices, which are often inseparably intertwined. The natural and spiritual relationships between humans and lands are central to the world order of many Native Americans. As Chief Robbie Dick of the Cree Indians in Great Whale, Quebec, succinctly states, “It’s very hard to explain to white people what we mean by ‘Land is part of our life.’ We’re like rocks and trees.” In Hopi tradition, physical and cultural survival derive from the unity of land and corn. Emory Sekaquaptewa explains how the “Hopi language and culture are intimately intertwined, binding corn, people and the land together” (Sekaquaptewa 1986).

The program is about land, ecosystems and cultural knowledge that have sustained Native American cultures before Columbus and in the present. Each culture represented has a vision of the cosmos and the world as a system of dynamic and interconnected processes. Research for the program examined how domestic, economic and ceremonial processes are connected through material and expressive culture to form a social fabric of productivity and meaning. Agricultural and ritual cycles often coincide in Native American cultures and echo seasonal rhythms of the land.

Participants in the Quincentenary program come from 15 different cultural groups in six different ecological areas, including northern and tropical rainforests, Andean highlands, Arizona desert, and Sierra Madre Mountains and coastal dunes of the Isthmus of Tehuantepec in Mexico.

The Tlingit, Haida and Tsimshian participants come from the Southeast Alaskan rainforest. They represent distinct but related cultures that form part of a broader cultural region extending from Alaska to the Northwest Coast. The Canelos Quichua, Shuar and

Achuar participants come from the rainforest region of eastern Ecuador, which forms part of the northwestern region of the Amazon river basin. Canelos Quichua have settlements in this area among the foothills of the Andes, while the Shuar live in the region's swampy lowlands, which extend beyond the Ecuadorian borders into Peru. The Achuar are the Shuar's neighbors to the east. The Lacandón participant comes from the rapidly disappearing rainforest region of eastern Chiapas in Mexico. Although different in history, social organization and cultural patterns, these northern and tropical rainforest societies often parallel one another in their management and understanding of the land.

The Andes mountains rise above much of Colombia, Ecuador, Peru and Bolivia. They form high plateaus where the climate is cool even at the equator, which passes through the highlands of Ecuador and Colombia. This region has altitudes ranging from 6,600 to 14,600 feet and an impressive diversity of terrains, microclimates and distinct cultural groups that live here.

Andean participants in our Festival come from three different cultural and ecological areas. The Aymara-speaking participants come from communities in the high pampas of Tiwanaku, which slope gradually into Lake Titicaca of Bolivia. Members of these communities are currently engaged in the Wila-Jawira Project to recover the ancient raised-field, or *suka kollus*, farming technology of the pre-Inca Tiwanaku society. The Jalq'a participants, who are also from Bolivia but speak Quechua, live in communities in a remote, rugged mountainous area south of Tiwanaku. Jalq'a cultural identity emerged among groups relocated by the Inca empire to be frontier outposts; links with their original communities were later completely severed by Spanish settlers. The third group of participants are Quechua-speaking Taquileños, who live on the island of Taquile in the Peruvian part of Lake Titicaca.

Hopi participants come from the high, arid desert of Arizona. Here the land has been eroded into buttes and mesas cut by deep canyons. Rivers flow only during snow melt or after a rainstorm, and streams flow underground. As in the Andean highlands, people can live in this dry region only with sophisticated agricultural techniques.

Participants from the multiethnic highlands of Chiapas in Mexico come from the Tzotzil-speaking community of San Pedro Chenalho and the Tzeltal-speaking community of Tenejapa. Communities in this Mayan cultural region renowned for its textiles distinguished themselves from one another by characteristic styles of dress. Weaving and natural dyeing traditions in the area are currently being revitalized by state and private self-help projects.

Like Chiapas, the state of Oaxaca in Mexico is also multiethnic. Zapotec participants come from the farming communities Zoogocho and Tenejapa in the northeastern mountainous region of the state. They differ in culture and dialect from the Zapotec communities to the west and the south. Ikkood participants come from the fishing community of San Mateo del Mar in the dunes on the Pacific coast of the Isthmus of Tehuantepec. Although remaining culturally and linguistically distinct from nearby societies, they have long engaged in commercial trade with the dominant Zapotecs, who inhabit the surrounding area, and in bartering relationships with the Chontal, who live just north of them along the coast.

Participants will demonstrate subsistence activities and craft skills, present parts of ritual performances and narrate oral histories. These cultural elements have been passed from generation to generation and speak eloquently of the connections Native Americans have constructed between land and society. Discussion sessions will focus on some of the major issues which confront Native American cultures today. These include: natural resource management, traditional technology, maintenance and destruction of ecological equilibrium and questions of

monocultivation, property titles, national parks, transnational corporations, military zones, economic development models, agrarian reform laws, foreign debt, political repression, self-determination, cultural identity, intrusion of religious sects, fragmentation of lands and human rights.

Citations and Further Readings

- Arias, Jacinto. 1990. *San Pedro Chenalhó: Algo de su historia, cuentos y costumbres*. Tuxtla Gutiérrez, Chiapas: Talleres Gráficos del Estado.
- Barabas, Alicia M., and Miguel A. Bartlome. 1986. *Etnicidad y pluralismo cultural: la dinámica étnica en Oaxaca*. México, D.F.: Colección Regiones de México, Instituto de Antropología e Historia.
- Bazua, Silvia. 1982. *Los huaves*. México, D.F.: Instituto Nacional Indigenista.
- Buechler, Hans C. 1971. *The Bolivian Aymara*. New York: Holt, Reinhart and Winston, Inc.
- Díaz del Castillo, Bernal. 1963. *History of the Conquest of New Spain*. London: Penguin Classics Edition.
- Gómez Pérez, María. 1990. *Bordando milpas*. Chiapas: Taller Tzotzil, INAREMAC.
- Holm, Bill. 1987. *Spirit and Ancestor: A Century of Northwest Coast Indian Art at the Burke Museum*. Seattle: University of Washington Press.
- Johnsson, Mick. 1986. *Food and Culture Among Bolivian Aymara: Symbolic Expressions of Social Relations*. Stockholm: Almqvist & Wiskell International.
- Mashinkias, Manuel, and Mariana Awak Tentets. 1988. *La selva nuestra vida: sabiduría ecológica del pueblo shuar*. Instituto Bilingüe Intercultural Shuar Bomboiza. Morona Sanitago, Ecuador: Ediciones ABYA-YALA.
- México Indígena*. México: Instituto Nacional Indigenista No. 24(IV).
- Morris, Walter F., Jr. 1987. *Living Maya*. New York: Harry M. Abrams, Inc.
- Napolitano, Emanuela. 1988. *Shuar y anent: el canto sagrado en la historia de un pueblo*. Quito: Ediciones ABYA-YALA.
- Pellizzaro, Siro. 1990. *Arutam: mitología shuar*. Quito: Ediciones ABYA-YALA.
- Ramírez Castañeda, Elisa. 1987. *El fin de los montiocs*. México, D.F.: Instituto Nacional de Antropología e Historia.
- Rasnake, Roger Neal. 1988. *Domination and Cultural Resistance: Authority and Power Among Andean People*. Durham: Duke University Press.

Signorini, Italo. 1979. *Los huaves de San Mateo del Mar*. México, D.F.: Instituto Nacional Indigenista.

View from the Shore: American Indian Perspectives on the Quincentenary. *Northeast Indian Quarterly* 1990 (Fall).

Warman, Arturo. Forthcoming. Maize As Organizing Principle: How Corn Shaped Space, Time, and Relationships in the New World. In *Seeds of the Past*.

Whitten, Dorthea S. and Norman Jr. 1988. *From Myth to Creation*. Chicago: University of Illinois Press.

Wyckoff, Lydia L. 1985. *Designs and Factions: Politics, Religion and Ceramics in the Hopi Third Mesa*. Albuquerque: University of New Mexico Press.

Teacher Preparation

“Knowledge and Power: Land in Native American Cultures” is an introduction to Native American groups participating in the “Land in Native American Cultures” program at the 1991 Festival of American Folklife in Washington, D.C. Olivia Cadaval eloquently describes diversity among indigenous groups, their shared respect for the land, and the impact of European settlement and domination on the indigenous people of the Americas.

This article can serve as background information for teachers or as a class reading assignment that will provide a starting point for class inquiry and discussion of Native American attitudes and values.

S U B S I S T E N C E

To stimulate initial discussion of the concept of subsistence, ask students to consider a food staple such as bread. Conduct a brainstorming session about the topic, encouraging students to contribute words and phrases associated with making and eating bread. You may want to provide a recipe for homemade bread and the ingredients list from a package of commercially baked bread as prompts. After brainstorming, divide the class into three groups. Provide each group with lengths of newsprint and markers. Each group will be responsible for “mapping” the production of a loaf of bread as follows:

Group A

Your culture makes bread as well as all of the ingredients and implements required to make it.

Group B

Your culture makes bread from ingredients purchased in bulk at a wholesale food cooperative.

Group C

Your culture purchases commercially baked bread from a retail grocer.

Students should be encouraged to work cooperatively to include as much detail as possible, including identifying the production and purchasing roles of various members of each culture. Stages of production can be represented with colors or graphic symbols. Once the maps are completed, they should be hung for the whole class to view and compare. Guide students to make comparisons regarding the involvement of the consumer in the production cycle and the use of natural and human resources. Finally, invite students to speculate on the meaning of the “distance” between production and consumption graphically represented on each of the maps and on how that distance might influence other aspects of daily life, including the way each culture views itself in relation to the land and its resources. How do you think the situations illustrated in Figure 2 influence the ways the people involved view the land?

LAND, SUBSISTENCE, AND VALUES

Teacher Preparation

The following readings describe the subsistence practices of several distinct Native American groups — the Hopi of Arizona; the Tlingit, Tsimshian, and Haida of Southeast Alaska; and the Aymara of Bolivia. The practices of each group are discussed within the context of their environments and their spiritual relationships to the land. Although these groups occupy very different physical environments (see Figure 3), they share a vision of the world that places humans in a connecting, rather than controlling, position among the components of the natural world. Each of these groups has experienced extreme challenges as a result of the European conquest. Exploitation of land, disruption of

Figure 2

Figure 2 illustrates three ways of getting bread. Do you think our experiences with buying, preparing, or growing food influence the way we think about the land?



spiritual practices, and destruction of social structures are the legacies of colonization. These groups — along with other Native American participants in the Festival of American Folklife — are meeting these challenges with the power derived from cultural pride and knowledge of the land.

Focus Questions

What is subsistence? What are the characteristics of subsistence cultures?
 How does geographic location influence subsistence practices?
 What are the subsistence practices of the Hopi, Southeast Alaskan, and Aymara people? How are they related? How are they different?

Suggested Activity

These readings are occasionally interrupted with **TIME OUT** activities

designed to give students opportunities to recall prior knowledge, reflect on their reading, and apply their understanding.

What Is Subsistence?

In the United States most people participate in a wage economy. In return for providing a service, using a skill, or making a product, an employee receives a set amount of money. With this money, the worker purchases food, shelter, transportation, and other necessities. In a wage economy, most workers do not *directly* participate in producing food, shelter, and clothing for themselves. An auto worker in Detroit with no gardening skill can enjoy a tomato from Florida in January if he is willing and able to pay the cost of growing, packaging, and transporting the fruit from one climate to another. His ability to purchase the tomato depends on his employer's continuing need for his skill, which, in turn, depends on the nationwide demand for new automobiles.

Subsistence economies function differently. Production and consumption are geared to the survival of the local group, rather than to the demands of a state or national market. Traditionally, subsistence cultures extracted all of their needs from the environment in which they lived or from trade with other groups. In the past, a traditional Hopi family's day-to-day survival depended on extensive knowledge of the natural world and skillful use of its resources to produce food, shelter, clothing, medicine, and tools for the group's immediate needs. Because of this direct dependence on the environment, survival required careful use and maintenance of natural resources as well as teaching these skills to Hopi children. Most Native Americans today participate in the wage economy to some degree, but subsistence practices are still important ways of acquiring food and shelter. They are also important ways of preserving and sharing cultural knowledge.

As you read about the subsistence practices of these cultures, search for clues about how their ways of using natural resources are tied to the environments they occupy and their beliefs about the natural world.



Figure 3

The Native people of Southeast Alaska, northeastern Arizona, and the Andes live in three distinct environments. In what ways do you think these environments influence subsistence practices?

H O P I : P E O P L E O F T H E C O R N

The Hopi people live in northeastern Arizona on the high, dry Colorado Plateau (see Figure 4). Buttes and mesas rise out of the Painted Desert, which is cut dramatically by deep canyons. Hopi land is bordered by the San Francisco Mountains to the southwest, the Grand Canyon to the west, the Colorado River to the north, and the Chuska Mountains to the east. Only the Colorado and San Juan rivers have continuously flowing water; other rivers and streams flow only during spring snowmelt or after a rainstorm.

T I M E O U T

Look at the photos on the next page. Work with your classmates to:

- ◆ List as many words as you can think of to describe the physical characteristics of this location.
- ◆ Describe how this place differs from the place where you live.
- ◆ How is it similar?
- ◆ What geographic factors (rainfall, temperature, elevation, latitude, etc.) are responsible for these differences and similarities?

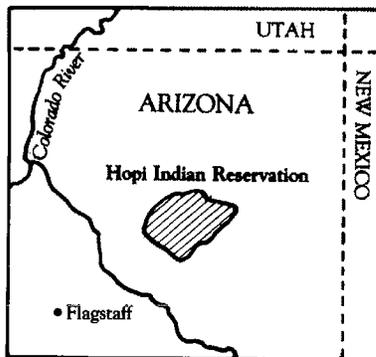


Figure 4

The Hopi people live in northeastern Arizona on the high, dry Colorado Plateau.

The Hopi people have occupied this environment for thousands of years. Anthropologists believe the modern Hopi are descendants of people who lived in the San Juan Valley until around the 13th century, when a drought drove them to move southward. But there is evidence that Hopi ancestors occupied the mesas and surrounding countryside long before — as early as 900 A.D. Clan stories refer to travelers from the Pacific Islands. Clan markings and ruins can be found from the Grand Canyon to the Arizona/Mexico borderlands. Hopi traditional history indicates that several groups and clans migrated from the north, east, and south, joining and integrating with the Hopi.

Twelve villages are located below or at the tops of three “fingers” which project out from the huge Black Mesa — First, Second, and Third Mesas (Figure 6). Oraibi, located on Third Mesa, is believed to

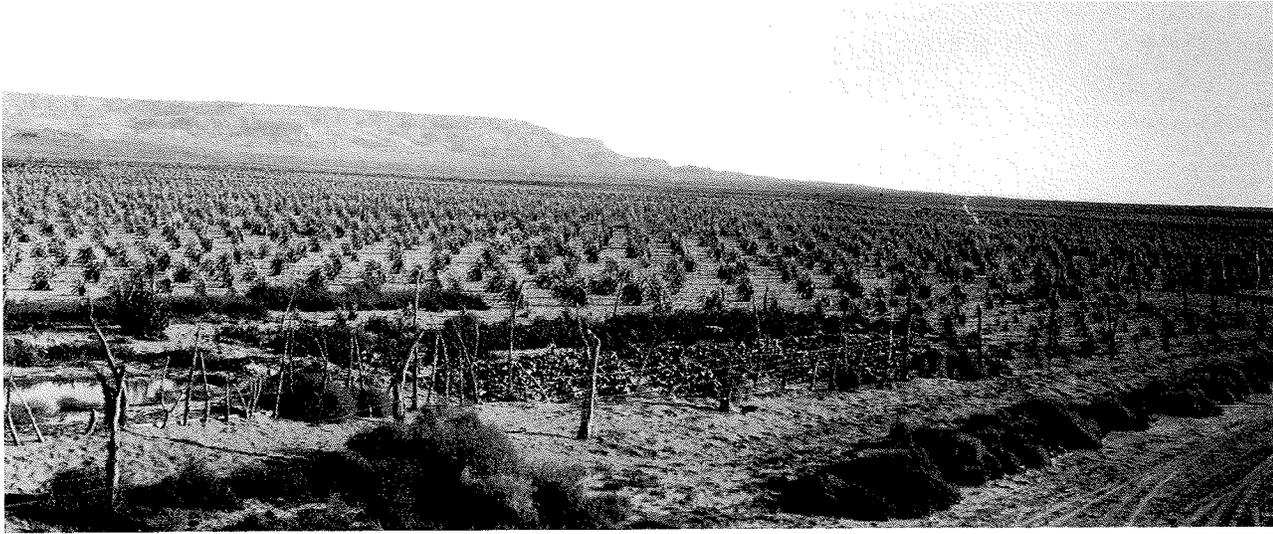


Figure 5

The Hopi developed special farming techniques suitable to the unique conditions of their environment. Photo courtesy Smithsonian Institution.

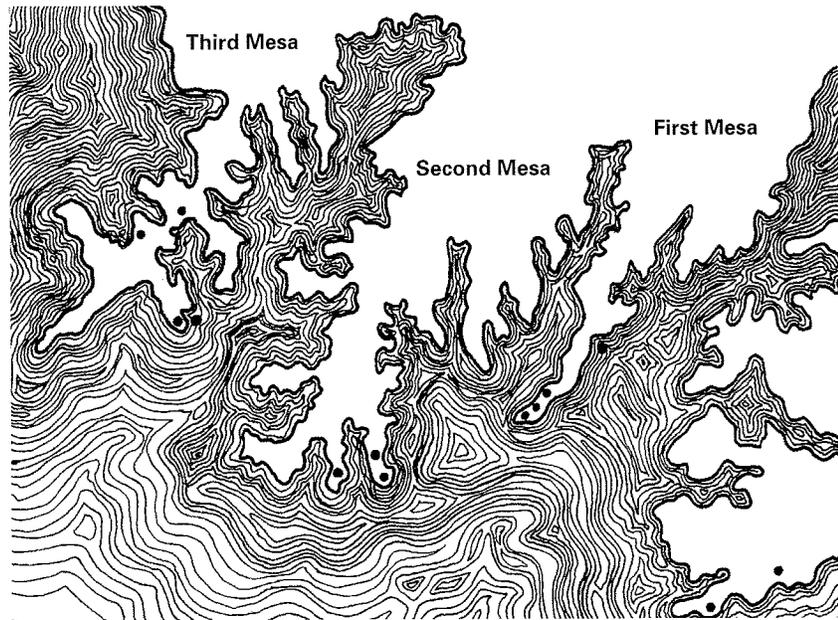


Figure 6

Hopi communities are located below or at the tops of three mesas.



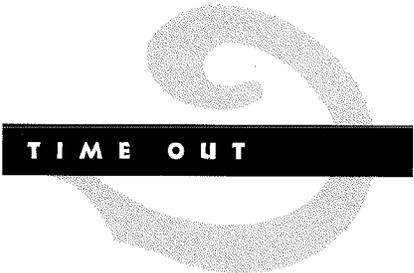
Figure 7

Traditional Hopi dwellings were built on top of mesas overlooking the desert. In recent years, more and more Hopi have built homes below the mesas, closer to roads and services. Photo courtesy Smithsonian Institution.

be the oldest continuously inhabited settlement in the United States, dating back to at least 1150 A.D. Figure 7 shows a traditional mesa-top community overlooking the northeast Arizona desert. Today most Hopi live below the mesas, closer to schools, community centers, and highways.

Because of the climate, the 4,000 square miles of Hopi land are frequently described as “inhospitable” or “harsh.” In this region, water for farming is supplied through summer rains and winter snows, but in very small amounts. The area receives an average of only 10-13 inches of rain annually. In comparison, farmland in the midwestern section of the United States receives about 40 inches of precipitation annually. Over half the rain falls in torrential summer downpours that flood the washes surrounding the mesas and sweep away topsoil and crops. Washes are areas where stream beds widen and the water flow ceases during dry periods.

The northern Hopi lands reach to 7,500 feet above sea level. In this area, the average winter temperature is about 32 degrees. Here, killing frosts threaten to ruin crops and diminish the already short growing season. The lowest part of the land lies at 4,500 feet above sea level. Higher temperatures and lower rainfall characterize this area. Periodically, the gusty winds that sweep over the land stir up sandstorms that seriously damage crops.

**TIME OUT**

What natural elements or forces can jeopardize crop production in other parts of the world?

These conditions present the Hopi people with extreme challenges. Yet their land is one of profound beauty and diverse microenvironments. The Hopi make the most of this diversity. Men collect herbs and aspen from the distant San Francisco peaks for use in ceremonies. Yellow pine and Douglas fir from these mountains were once used for house

construction. Women collected green vegetables such as mustard greens, which grow wild throughout Hopi lands, as a food source. Other gathered plants provide material for making baskets and medicinal and ceremonial herbs. Sunflower seeds and other plant products are used for making dyes. Seepage springs located along the bases of the mesas create oases that support the growth of cottonwoods, whose roots are used to make Kachina dolls (see Figure 8).

Over the centuries, the Hopi have developed specialized agricultural methods that maximize the positive aspects of their land. In fact, the Hopi people believe they were led to this land of scant rainfall so they would have to rely upon the Creator, as well as on their own knowledge and power, to survive. According to Hopi belief, humans were brought to this world after they failed to heed the directives of their Creator (Taiowa) in three previous worlds where everything they needed was provided for them. Upon emergence into the Fourth World they were told:

The name of this Fourth World is Tuwaqachi, World Complete It is not all beautiful and easy like the previous ones. It has height and depth, heat and cold, beauty and barrenness; it has everything for you to choose from. What you choose will determine if this time you can carry out the plan of Creation on it or whether it must in time be destroyed too (Waters 1963).

Therefore, Hopi agricultural activities are one way of acknowledging and praising the supremacy of Taiowa.

Black Mesa lies on top of a subterranean reservoir that holds a small but relatively constant water supply. Moisture seeps through the sandstone surface to the underlying bedrock and emerges from the faces of the mesa's southern cliffs in the form of springs. The sand dunes on top of and along the mesa slopes hold moisture, preventing

Figure 8

Kachina dolls, traditionally made from cottonwood roots, are given to Hopi children to help them learn about the supernatural beings that are part of Hopi religious beliefs. These dolls are simple representations of the Kachina figures that appear during Hopi ceremonies. Kachina dolls made for sale to collectors are more elaborate. Photo by Carmelo Guadagno, courtesy National Museum of the American Indian, Smithsonian Institution.



rapid run-off during rains. This water also seeps into the sandstone, providing good land for dry farming. The dry farming method involves planting seeds deep (8-18 inches) in the soil so plant roots can reach the underground moisture (see Figure 9). Hopi farmers take great care to protect the durable and ancient seed varieties that produce plant shoots strong enough to grow through the earth to the soil surface.

Crops are also planted in small fields below the mesas near washes. During the heavy rains of late summer, rain water flows through the streams and moistens the fields.

Because of the uncertain soil and weather conditions, a Hopi farmer plants a number of plots of land that have different soil types. This way, if a crop in one location is destroyed by drought, flood, or pests, another may survive, protecting the farmer against the loss of an entire harvest.

TIME OUT

Find out what geological and environmental characteristics influence farming methods in the area where you live.

Corn is central to the Hopi way of life. Corn, which is native to the Americas, was grown and eaten by the prehistoric ancestors of the Hopi and is still considered their primary source of sustenance. According to Hopi tradition, corn was made available to the people upon their emergence to the Fourth World, when the god Masauwu granted them the privileges and responsibilities of living with the land. Its cultivation is both an agricultural and a spiritual process, a life-sustaining labor and a ritual that celebrates and confirms the Hopi partnership with the earth. Some form of corn is used in every Hopi ceremony. Newborns are given an ear of corn equating the loving

Figure 9

Hopi farmers use planting sticks to place seeds 8-18 inches below the soil surface.



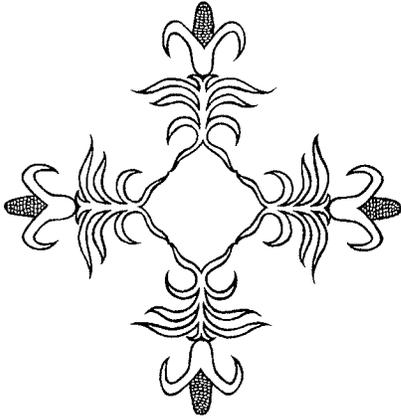


Figure 10

The cardinal directions of the Hopi world have significance in Hopi history, agriculture, and religious life.

sustenance provided by a nursing mother with the nourishment provided by Mother Earth. The words for mother, for the corn given to a newborn, and for the earth are the same in the Hopi language — *itangu*. The Hopi agricultural cycle is closely linked with the ceremonial cycles that enact the traditional religious beliefs of the Hopi people.

The planting season begins in April and lasts through July.

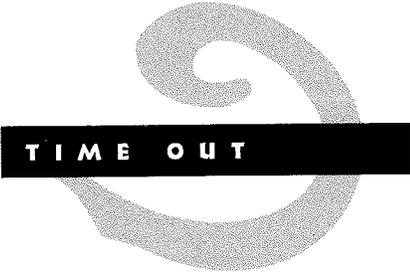
Everyone is involved in some way. Traditionally, Hopi women become the caretakers of corn once it is harvested, so at planting time, they select the seeds to be used for new crops. The men usually determine which fields will be used. Working either alone or in work groups, the Hopi men and boys plant their corn, using a stick or metal pipe to make the deep holes that insure the seeds will have enough moisture for germination. Six to twelve kernels of seed corn are planted in each hole.

Six principal types of corn are grown, each associated with particular cooking qualities. Four of these varieties symbolize the four cardinal directions of the Hopi world (see Figure 10). Red corn is southeast, blue is southwest, white is northeast, and yellow corn is northwest. These directions are sacred, representing the directions traveled by the people as they searched for a common homeland. They are also related to the directions from which the wind and rain come and the places of sunrise and sunset at the summer and winter solstices. In addition, purple corn represents zenith (above), and sweet corn represents nadir (below).

Once the fields are planted, the men carefully tend to their crops, nurturing the individual stalks of corn as if they were children. The corn plants are called by family names such as “sister” and “mother.” The men sing songs to the plants that encourage them to grow faster, taller, and stronger. The farmer must clear weeds and pests from his field each morning and evening. As Merwin Kooyahoema, a Hopi participant in the 1991 Festival of American Folklife, explained, “. . . A lot of people now . . . talk to their plants and whatnot. The Hopi have done that a long time You kind of encourage your corn as it

grows We treat [the plants] like they're children."

The first corn is gathered in July and is given to the Kachinas (spirits) during the Niman or "Home Dance" ceremony. This corn is not eaten. The entire corn plant is pulled from the ground and offered in repayment to the Kachinas — who are present in this world for six months of the year to bring fertility and growth — before their annual return to the underworld. In September, sweet corn is ready to be harvested. Some sweet corn is eaten fresh, but most of the ears are roasted in underground ovens and stored for future use. The remaining corn crops are harvested in October. The corn is picked, husked, and hauled to the villages where it will be separated by color. The corn is laid out to dry on the rooftops. It is turned frequently for thorough drying, then stacked in colorful rows in sheds. As a precaution against famine, many families store enough corn to last for several years. After they have completed this hard work, they hold ceremonial dances to celebrate a successful harvest and to begin another cycle of fertility, germination, and growth.



TIME OUT

Interview a gardener or a house-plant enthusiast. Find out if he or she follows a specific "agricultural cycle." Some people name or sing to the plants they grow. Ask the subject of your interview about these techniques.

OR

Interview a farmer who works in your area. What is the cycle he or she follows for planting, growing, and harvesting? Are there any special celebrations or rituals that accompany the process?

Although planting and tending crops is primarily the work of men, Hopi women also devote a great deal of time and energy to corn. Most women have household gardens where some corn is grown, but women are most actively involved in preserving and cooking corn once it is grown and harvested. White corn is the most important Hopi crop and

is used for flour and *tamales*. Blue corn is a common ingredient in breads, sauces, and drinks. It is essential for making *piki* bread, a papery, flaky bread eaten as a daily staple and used in ceremonies. Both types of cornmeal are used as prayer offerings. More than thirty dishes whose main ingredient is corn or cornmeal are served at Hopi meals on a regular basis. It is important that a supply of cornmeal is readily available at all times.

Grinding corn into meal is hard work (see Figure 11). Today, most corn is ground at village mills, but traditionally, Hopi women ground corn on grinding stones in their own homes. A woman's industriousness was often judged by the amount of cornmeal she was able to grind.

Hopi girls learn how to grind corn from their mothers, aunts, or grandmothers. Instruction begins at an early age. In the past, corn grinding was often the backdrop for social activities. An uncle or grandfather might sing while a group of young girls ground corn. The grinding stones were often located near a window, providing a way for a boy to court a girl while she was grinding. If the boy's attention was welcome, he and the girl would visit through the window; however, if he was not welcome, the girl would throw cornmeal at him (Kavena 1980).



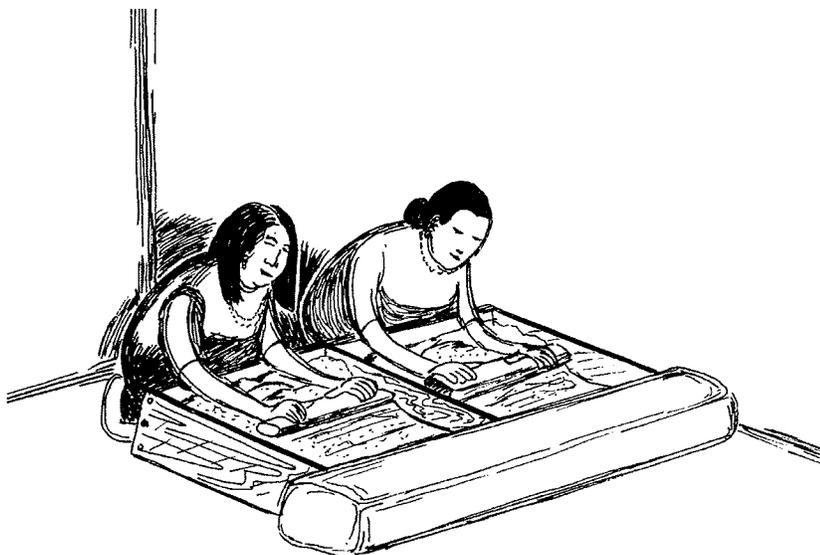
TIME OUT

Hopi finger bread, or *huzusuki*, is more like pudding than the bread you use to make sandwiches, but it is eaten with the fingers. It is served with roasted meats and stews. Leftovers are sliced, fried in hot shortening, and served for breakfast with syrup or jelly. Many cultures have a similar dish. In Tanzania it is called *ugali*; in Italy it is *polenta*, and American Southerners know it as mush.

You can make the following recipe with yellow or white cornmeal, but blue cornmeal is not hard to find and will give your *huzusuki* a traditional Hopi flavor.

Figure 11

Grinding corn is hard work. For Hopi women, grinding corn is both a social and a spiritual activity. Women talk and sing during grinding. The work of preparing cornmeal for cooking and for sacred rituals is also an act of gratitude for a bountiful harvest.



Hopi Finger Bread (Huzusuki)

1 and 3/4 cups blue cornmeal (available at natural food stores)

2 cups water

Bring the water to a boil, then reduce the heat to low. Gradually add the cornmeal to boiling water, stirring constantly. Stir until all cornmeal is mixed in. This makes a very stiff dough. Spoon the bread out onto a plate and serve. To eat, each person breaks off a piece, using the thumb and forefinger to hold it.

From Juanita Tiger Kavena, *Hopi Cookery* (1980).

OR

Scavenger Hunt

Corn kernels can be processed into alcohol, sugar, or starch to make an amazing variety of products (see Figure 12). Some of these products are used as ingredients in foods we eat. Some are used in things you would never think of eating. For example, corn syrup is used in fruit drinks as well as shoe polish. Dextrose is used to make a fuel to power cars. Corn starch is used to make gravy . . . and glue! The germ of the corn kernel is pressed to get corn oil, which we eat regularly in salad dressing. It is also used in some insecticides. Conduct a search for corn products in your house. Check product labels to find all the ways you depend on corn.

In addition to corn, the Hopi plant a variety of other plants, some native to the region and others introduced from various sources over the years. An excellent source of protein and carbohydrates, beans are an important staple and are usually eaten in combination with corn. Today, the Hopi grow over twenty different types of beans. Most of these varieties were introduced to the Hopi through trade with other Native groups. Like corn, beans are used in Hopi ceremonies.

Beans may be eaten fresh or may be dried and stored for future use. Hopi green beans are the only beans eaten in the pod. To dry them, the Hopi tie the pods together on strings of fiber from the yucca plant and then hang them out in the sun. For other types of beans, such as kidney, pinto, and tepary beans, harvest is delayed until the bean pods fully mature and the vines become brittle. The whole plants are then uprooted and carried back to the village, where they are stacked in heaping piles. Women then form a “work party” to shell the beans. While the pods and vines are set aside to be burned for culinary ashes (specially prepared ashes which are added to dishes to add color, flavor, and essential minerals), the shelled beans are laid out in the sun. After several days, the beans are completely dry and ready to be stored

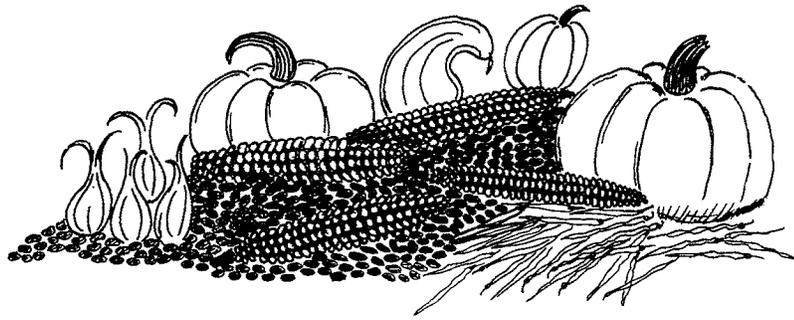
Figure 12

All of these household items contain corn products. Can you find others in your home? Photo by Jym Wilson.



Figure 13

Hopi farmers grow a variety of food crops native to the Americas.



away. Eventually, these dried beans will be boiled and served as part of a meal.

Other Native crops include pumpkins, squash, melons, and gourds (see Figure 13). A favorite Hopi squash is the green striped cushaw. Melons are eaten as they ripen, but squash and pumpkins can be sliced into thin strips and sun-dried to last throughout the winter. Although they are not edible, hard-shelled gourds can be fashioned into spoons, bowls, water dippers, baby rattles, and containers.

Contact with Spanish missionaries in the 16th century resulted in the introduction of new crops. Among these were wheat and fruit trees. Because of killing frosts in the high altitudes, Hopi orchards do not produce fruit crops every year. In good years, the trees yield peaches, apples, apricots, and pears. The fruits may be halved, pitted, and spread out on the rooftops to dry in the hot Arizona sun, providing sweet, nonperishable treats for children. Wheat is used primarily in the baking of breads, although corn breads continue to be more popular.

Terraced gardens, owned and managed by women, are irrigated to insure the availability of fresh produce for the household. Women inherit these fields from their mothers. They raise chile peppers and garden vegetables such as tomatoes, carrots, onions, and cucumbers.

T I M E O U T

How has the physical environment influenced Hopi food preservation techniques?

OR

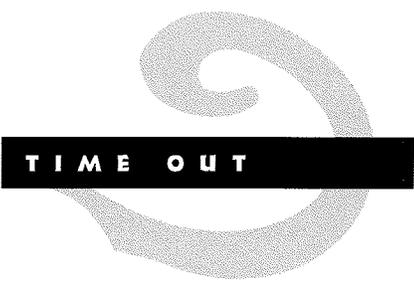
Try drying some fruits and vegetables at home. What special techniques or equipment are necessary in your climate?

Over the past 500 years, the Hopi people have maintained a fierce defense against the intrusion of Spanish colonialists, Christian missionaries, and others who have attempted to undermine traditional beliefs and practices. In 1680 the Hopi and other Pueblo Indians fought a successful rebellion to drive the Spanish out of their lands. Although the influence of outside groups is apparent in Hopi life, cultural pride has kept Hopi subsistence practices alive for centuries. The Hopi are the only North American Native group to never sell any of their land to the U.S. Government. However, traditional ways are threatened as each year fewer acres are planted in corn and more, and more young people choose other ways of living. Hopi people fear that if agricultural practices are lost, spiritual practices and beliefs will be lost as well. For traditional Hopi, agriculture is the center of physical and spiritual life.

An ancient Hopi prophecy predicts that Hopi corn will supply the seeds that will save all of humankind from a terrible famine. Many Hopi feel a responsibility to maintain traditional practices for this reason. Tasawytewa of Bacavi village described his feelings in 1982:

I am old, my eyes are failing me; but I must plant my corn fields again. At my age I have but a small field, but it is my duty to plant the corn. It is spoken by our forefathers that one day the Hopis will once again experience starvation. It will not matter if you are rich (materialistically), for when we get to this period, you will also be going door to door begging for food. Now I want to have some corn seeds for the people; for it is also spoken that the person(s) who have seeds will enable the people to survive They will become like fathers to the

people. It is for this reason that I must farm . . . for my people (Hopi Health Department 1984).



TIME OUT

Today's large-scale, "industrial" farming methods rely on hybrid seeds, irrigation, pesticides, fertilization, and nonrenewable energy to maintain production. While these methods produce astonishing harvests, they are dependent on a delicate balance of natural circumstances and technology. This balance is vulnerable to large-scale disasters such as widespread, long-term drought, economic collapse, and war. Hopi farmers use seeds and methods that are naturally adapted to severe conditions. The nutritional content of Hopi blue cornmeal has been shown to be superior to that of commercially prepared white flour. Many environmentalists believe that Native agricultural practices produce better food with less damage to soil and surrounding ecosystems. Why is this the case? How does this information relate to the Hopi prophecy?

TIWANAKU: A HOPEFUL FUTURE FROM THE ANCIENT PAST

The Andes Mountains extend 4,500 miles north to south, paralleling the Pacific coast of South America and spanning seven countries from Venezuela to Chile. This vast mountain system dominates diverse cultures and ecosystems. In Peru and Bolivia, the mountain system widens to form multiple ranges and a high plateau, or *altiplano*. The *altiplano* stretches 74-100 miles from east to west and is over 500 miles long from north to south (see Figure 14). Valleys and ravines wind down to the Amazon jungle to the east and to the desert coast of the Pacific to the west. Cradled on the *altiplano* is Lake Titicaca, the largest (about 3,200 square miles) freshwater lake in South America.

This environment is one of astonishing diversity. Over 13,000 feet above sea level, the region is alive with sparkling streams and mountain flowers during the wet seasons. In dry periods the land is cold and parched. Frequent frosts or flash floods can kill crops overnight.



Figure 14

In Peru and Bolivia the Andean mountain system widens to form multiple ranges and a high plateau, or altiplano.

Figure 15 provides a view of this landscape.

Diversity also characterizes the various cultural groups that live throughout the region. Like the Native people of the southwestern United States and the coastal groups of Southeast Alaska and British Columbia, the people of the Andes have many things in common. The general term “Andean” is used to refer to a number of different groups who have distinct languages and cultural traditions, such as the Taquile from the Lake Titicaca region in Peru and the Jalq’a and Tarabuco from the lower regions in Bolivia.

The *altiplano* is home to the Aymara people, whose ancestors domesticated the South American *camelidae* (alpacas, llamas, vicuñas, and *guanacos*). These species provided wool for clothing, meat for food, and dung for fuel. They were also used as pack animals. The people were nomadic, following the herd animals in search of fresh pasture land in the highlands during the warm seasons and crossing the mountains to the valleys in the colder months. With the introduction of agriculture around 1800 B.C., people established permanent communities.

The people of these communities, or *ayllus*, developed occupations suited to their location on a particular mountain. Diverse temperature and soil conditions (conditions change with every 600 feet of elevation) prevented any single *ayllu* from producing all of its necessities. Therefore, the people organized trading networks linking the highland potato-growing regions with the lower areas where corn and other grains could be grown. These products were traded for fish from Lake Titicaca. Likewise, some communities became known for specialties such as pottery and jewelry and traded these goods for food from other communities. These networks were strengthened by the exogamous traditions (meaning marriages between members of separate communities are the norm) of the people.

Over time, a small market village called Tiwanaku grew to become a bustling trade and ceremonial center, linking the agricultural

Figure 15

The altiplano is home to diverse people and ecosystems. Photo by Nancy Rosoff, courtesy Smithsonian Institution.



and spiritual lives of more than 100,000 inhabitants as well as those of the farmers and traders from the outlying areas. Eventually, Tiwanaku became the capital of a vast pre-Incan state that included portions of what is now Peru, Argentina, Chile, and Bolivia.

It was an empire established on the abundant produce of its agricultural systems. The surplus crops gave Tiwanaku the luxury of time and inclination to raise armies that began conquering the Andes before Jesus was born.

It was an empire that continued to grow until some time after 1000 A.D., establishing great agricultural colonies patterned after its own fields throughout the Andes. Its armies reigned supreme over people of many cultures and tongues. Its engineers built a vast system of paved highways over mountains and through deserts and jungles.

The highways enabled Tiwanaku to maintain a constant flow of goods throughout the empire. Royal bureaucrats traveled the highways along with the imperial armies and the endless chains of llama caravans. These bureaucrats kept tabs on far-flung imperial outposts, spreading Tiwanaku's considerable technology and artistry that was

unsurpassed by any other pre-Columbian Andean culture and even by the Incas.

And as with ancient Rome, all the highways eventually led to one place, to Tiwanaku

Someone visiting the capital city 1,500 years ago would have come to it by one of many paved highways over the mountains. Before descending into Tiwanaku's valley, he would have stopped to admire what lay before him, a city shimmering in the bright Andean sunlight, for much of it was covered with gold.

The Tiwanaku skyline was dominated by imposing pyramids, temples and palaces. The two largest, the Kalasasaya temple and the Akapan pyramid, ran some 600 feet long on each side and rose to more than 50 feet in height. They were constructed of huge granitelike stones called andesite, some weighing more than 160 tons, that were ferried to the city on reed boats from quarries across the lake.

Much of the exteriors of the city's grand stone buildings was covered with intricately carved friezes and bas-relief adornments. The finely carved surfaces, however, were not left bare but were covered with thin plates of gold that were formed to follow the contours of the carvings underneath. Portions of buildings not covered with gold were painted in varying hues of blue, red, gold and black. The effect was to give the imperial city a sheen of dazzling opulence (Mullen 1988).

Powerful societies like Tiwanaku cannot emerge and endure without steady agricultural production that not only meets the immediate needs of the people but also produces food surpluses to be stored and traded. On the Bolivian *altiplano*, this meant combating a climate where drought, floods, frosts, hailstorms, and windstorms create considerable risks for farmers. In fact, today, Bolivia is one of the poorest nations in the world, and many of its farmers are barely able to produce enough

food for the daily needs of their families. Agronomists and other specialists who work to find ways to increase food production have tended to believe that the *altiplano* region is not fit for agriculture. The hillside soil on which many Aymara farm is alarmingly devoid of nutrients. After three to four years of planting, the fields must lie fallow for ten to fifteen years to allow sufficient nutrients to return to the soil before cultivation can begin again. The lower wetlands, areas which are saturated with moisture, are richer in nutrients, but the marshy conditions make cultivation difficult, and crops are likely to rot. With these conditions, how were the farmers of the ancient Tiwanaku state able to grow enough food to feed its citizens for over 1,000 years?

The answer may lie in the work of archaeologists such as Alan Kolata and Oswaldo Rivera. As they worked among ruined temples (see Figure 16) in the early 1980s to learn about the ancient Tiwanaku civilization, they wondered how a region that barely supports the 7,000 people who live in today's village of Tiwanaku was able to produce harvests that supported an ancient population of over 125,000 people.

The valleys on which the Aymara people of the Lake Titicaca basin reside are marked by curious patterns of ridges and depressions. It was clear to Kolata and Rivera that these patterns were human-made (see

Figure 16

The ancient city of Tiwanaku was once the religious and economic center of a civilization that included portions of what is now Peru, Argentina, Chile, and Bolivia. Photo by Pete Reiniger, courtesy Smithsonian Institution.



Figure 17). In Central America, landscapes with similar features had been surveyed and reconstructed into agricultural fields. A similar reconstruction project was unfolding on the Peruvian side of Lake Titicaca. Could fields such as these have supported the ancient Tiwanakan empire? Kolata and Rivera looked for a community that would be willing to help them test this hypothesis by rehabilitating and planting a field.

Colonial interference and domination made the Aymara understandably distrustful of strangers. When Rivera and Kolata began work in the community of Lakaya in 1981, their presence was blamed for a severe drought, and the two archaeologists were pelted with stones and run out of the village. The farmers feared that these outsiders would rob them of land as Spanish settlers had before. Additionally, the Aymara had used dry farming methods on hill slopes for centuries. They believed these methods, introduced by the Incas and promoted by Europeans, protected their crops from frost damage. As far as they knew, the wetland areas had never been tilled, and they believed that breaking up this virgin soil could threaten their delicate relationship with Pachamama (Mother Earth) and invite drought. The Aymara retained no memory of the agricultural practices of their

Figure 17

Archaeologists saw evidence of long-forgotten farming techniques in the patterned ridges found in the valleys of the Lake Titicaca basin. Photo by Oswaldo Rivera Sundt, courtesy Smithsonian Institution.



Tiwanakan ancestors.

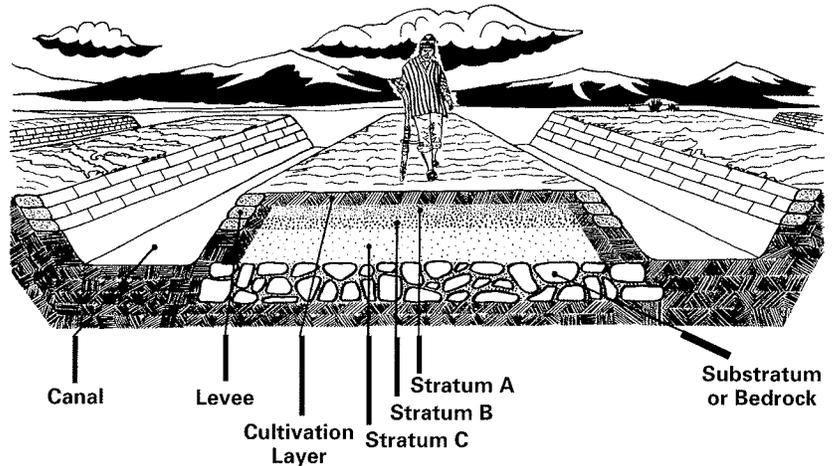
In 1987, Roberto Cruz Yupanqui from the community of Chukara braved public ridicule and the threat of banishment from his community to become a participant in the revitalization project. Cruz came to Washington, D.C, in 1991 for the Festival of American Folklife to tell the story of his role in the project. As he told the Festival audience, he found it hard to believe that his exhausted, boggy lands on the Pampa Koani were once fertile, and that they would produce once again if he reconstructed the system of raised fields and canals that Kolata and Rivera believed had supported the healthy agricultural lives of the Aymara “grandfathers.” Eventually, Cruz agreed to devote his fields to the experiment.

During the project’s first year of planting, Cruz saw his potato plants grow tall and strong. Then an amazing event occurred. One night, a killing frost swept over the *altiplano*. Throughout the freezing night, farmers kept watch over their fields, hoping to minimize the damage. As Cruz stood over his crops, he saw a cloud of mist covering his field like a blanket. He feared the worst, but when he surveyed his field the next morning, he found that most of his crops remained green and healthy. While the other farmers lost a devastating 90 percent of their crops to the bitter frost, only 10 percent of Cruz’s crops were damaged.

The system of agriculture that shielded Cruz’s field from the frost is called *suka kollu*, or raised field agriculture. Developed over 3,000 years ago by ancestors of the Aymara, the *suka kollu* system is characterized by a network of alternating canals and mounds. The crops are cultivated on five-foot-high mounds constructed of a cobblestone base, a layer of clay, a layer of coarse gravel, a layer of finer gravel, and finally a layer of topsoil (see Figure 18). The fields reach 50 feet in width and 600 feet in length. Crops are planted on these earthen mounds, but the secret of the system’s success lies in the canal system

Figure 18

Raised fields are constructed to prevent crops from rotting in boggy soil. Solar energy protects plants from killing frosts. Illustration by Hugo Saldin, courtesy Proyecto Agro-Arqueológico Wila Jawira-Rehasuk.

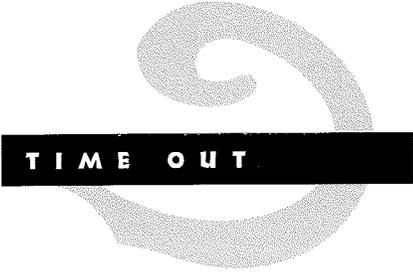


that surrounds them.

The *suka kollu* canals serve three key functions.

- ◆ The canals prevent frost damage by absorbing and storing heat during the day when the *altiplano* receives intense sunlight. During the night, when temperatures plummet, this heat is radiated out from the canal water. As Cruz observed on that threatening night in 1988, an insulating cloud of mist forms out of the warm moisture in the canals and raises the temperature of the air and soil, protecting plant foliage and roots. Thus, the ancient farmers of Tiwanaku were the first ever to harness the heat of the sun and use solar energy to shield their crops from frost.
- ◆ The canals act as an irrigation system and bring moisture to the soil. Water from local rivers, natural springs, and ground water is directed to the canals, creating manageable agricultural fields without destroying the natural wetland ecosystem.
- ◆ The canals generate a mineral-rich organic fertilizer. As algae and other plants colonize the surface of a canal, they form a thick mat of vegetation. These nitrogen-fixing plants can be harvested directly from the canal surface and incorporated into the planting beds. Plants left in the canals eventually decay, and their debris sinks and becomes embedded in the sediment on the canal bottom. Fish and other animal life living in the canals contribute additional nutrients. By cutting off the

water and drying out the canal, farmers can “harvest” the accumulated organic debris and use it as fertilizer. This organic fertilizer helps farmers produce healthy crops without the application of expensive chemical fertilizers. Cruz told the Festival audience, “In the old fields we used chemical fertilizers. It was more expensive and it did not yield [as large a harvest]. And in *suka kollus* the investment is little and it yields more for us.”


TIME OUT

Do farmers in your region use solar energy? In what ways?

OR

Why are chemical fertilizers harmful to the environment? What are some of the alternatives used by farmers in your region?

OR

Would raised field agriculture work for Hopi farmers? Make a chart to compare the characteristics of these two highland environments. What does this comparison tell you about the farming methods most appropriate for each location?

The successful first harvest from Cruz’s raised fields caught the attention of other farmers. Communities formed organized work groups to dig channels and build mounds. Power machines are not suitable for use in the wetland areas, so men and women labored together using foot plows, shovels, pickaxes, and hammers to construct the fields (see Figure 19). Farming is a community occupation for the Aymara, and the *suka kollu* project created an opportunity for community groups to work together to improve food production. As the head of an organization of mothers in Lakaya (the community that initially rejected the two archaeologists), Bonifacia Quispe Fernández used her position to influence and organize a group of eighty-five women for reconstruction of a field. Their first crop yielded an abundance of potatoes, carrots, and onions.

These projects demonstrated that *suka kollu* not only works, but is far more productive than the European methods used for centuries (see Figure 20). The *suka kollu* fields yielded an astonishing 40 tons of produce per hectare (2.5 acres), compared to the 2-3 tons of produce per hectare yielded in the fields that were dry farmed. Additionally, these fields were able to produce two crops per year. The potatoes cultivated in the raised fields grew larger, better, and were free of nematodes. Some of the potatoes were as large as grapefruits and weighed over two pounds. Potatoes are the principal staple crop of the Aymara; therefore their successful production in raised fields is a great source of hope for the impoverished inhabitants of the Bolivian *altiplano*. Other fields planted with lettuce, carrots, and onions also yielded bountiful harvests.

Today over 1,200 Aymara families participate in the *suka kollu* rehabilitation project. This project provides a model of how scientists and communities can work cooperatively to improve both the nutritional and economic status of indigenous people. Through experimentation, the Aymara have learned that they can grow all but the most frost-sensitive plants in the *suka kollu* fields. Farmers make maximum use of space and soil nutrients through multicropping, or planting several kinds of crops in the same fields.

The *suka kollu* project incorporates two principles of environmentally sound agricultural practices.

- ◆ The method involves *sustainable* use of the land. This means that the health of the environment is not depleted in the process of farming it. This knowledge of sustainable agricultural use of wetlands can be applied in many regions of the world.
- ◆ Raised field agriculture preserves *biodiversity*, or the natural variety of native plant and animal species. This variety is vital to maintaining healthy ecosystems. As the Hopi and Aymara have known for centuries, healthy crops are the result of constant, balanced interaction



Figure 19

Farming is a community occupation for the Aymara. Here, community members work together to reconstruct an ancient field. Photo by Alan Kolata, courtesy Smithsonian Institution.

among plants, insects, climate, and soil. Native plants are naturally resistant to harmful insects and disease; they are naturally adapted to the altitude, temperature, and moisture of their native region.

By reclaiming ancient farming methods uniquely suited to their environment, the Aymara people increased food production. At the same time, they rediscovered cultural knowledge and pride lost to them during years of political and economic oppression. Now the Aymara are learning of the great achievements and contributions made by their ancestors. The architects of the Tiwanakan state were expert hydrologists who built great cities equipped with elaborate plumbing systems. Art, religion, and education flourished. Well-equipped armies established trade routes and expanded the state's boundaries.

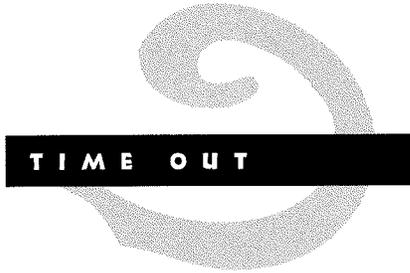
But agriculture was the activity that connected the people with the earth and with each other. This is true today as well. In the Andean highlands, food creates a bond between a community and its deities. Food links communities that grow potatoes in the higher-altitude regions with communities in lower and warmer lands that cultivate corn and other temperate-zone crops (see Figure 21). Fishermen trade with farmers. Family members who migrate to rainforest regions send tropical fruits and vegetables back home. Andean farmers are finding a market for quinoa (kee-no-wa), a protein-rich seed sacred to the Incas,

Figure 20

The suka kollu yields tons of potatoes, a staple food for Andean people. Photo by Oswaldo Rivera Sundt, courtesy Smithsonian Institution.



among health-conscious consumers (see Figure 22). Native American crops such as corn and potatoes now feed billions of people throughout the world.



Native American food crops such as corn, potatoes, sweet potatoes, tomatoes, peanuts, manioc, cacao, and many kinds of peppers, beans, and squash were unknown in other parts of the world before the 16th century. Make a list of all the dishes you can think of that use these foods.

OR

How did potatoes, a food crop unknown in Europe before the 16th century, become so important to the Irish? We know that after the Spanish conquered Peru in 1536, potatoes were used to feed sailors on ships that traveled from Peru to Spain via the Straits of Magellan. Little is known about how potatoes were introduced to Irish farmers, but what history doesn't tell us, your imagination can! Write a story, including maps and illustrations, that explains how potatoes got from Spain to Ireland.

Like the Hopi, Andean farmers take advantage of the unique conditions of their environment to preserve food for future use. Freeze-drying is a technique naturally suited to the cold, dry Andean highlands. Tubers such as potatoes and oca, leafy greens, and meats are preserved by freeze-drying.

Chuñu, freeze-dried potatoes used in many staple dishes, will keep for years if made well. In ancient times, *chuñu* were used as currency. The preparation of *chuñu*, like most Aymaran agricultural and food activities, begins with a ceremony asking for the assistance of the deities. In June or July, the months of coldest, driest weather, potatoes are laid out in a single layer on a clearing covered with dried grass. A paper flag marks the spot, calling the deities' attention to the process. A coca offering is made, and libations (offerings of wine specially made for ceremonies) are thrown toward the four cardinal points of the compass. The potatoes are turned occasionally during a 5-12-day period to insure uniform freezing. During this time, the potatoes become slightly watery, making it easy to separate the skins from the flesh by walking on the potatoes with a special twisting motion. After this, the potatoes are left for 3-4 more days to dry in the cold air. When completely dry, the cork-

Figure 21

The benefits of a bountiful harvest are two-fold: communities produce healthy food for their own use and for sale in regional markets. Photo by Kevin Healy, courtesy Smithsonian Institution.



like potatoes are kept in thatched storehouses. A meal is made by boiling the *chuñu* with water and salt until they are soft (see Figure 23).

Then the water is poured off, and the potatoes are eaten with cheese.

TIME OUT

Quinoa is the seed of the goosefoot plant. It is used like grain. You can find quinoa in many natural food stores. The following recipe, which contains several Native American foods, is an example of how this ancient food is being used by health-conscious cooks. Several of the ingredients are not common foods in the Andes. Black beans and jalapeño chiles, for example, are used mostly in Mexico.

Quinoa and Black Bean Salad

1 and 1/2 cups quinoa

1 and 1/2 cups cooked black beans (rinse if canned)

1 and 1/2 tablespoons red-wine vinegar

1 and 1/2 cups cooked corn (frozen or cut from about 2 large ears)

3/4 cup chopped green bell pepper

2 pickled jalapeño chiles, seeded and minced (wear rubber gloves to do this)

1/4 cup finely chopped fresh coriander

Figure 22

Quinoa is a protein-rich seed. Andean farmers have found a market for this native crop as consumers have grown more health conscious. Photo by Jym Wilson.



For the dressing

5 tablespoons fresh lime juice

1 teaspoon salt

1 and 1/4 teaspoons ground cumin

1/3 cup olive oil

In a bowl, wash the quinoa in at least 5 changes of cold water. Rub the seeds gently and let them settle before pouring off most of the water. Repeat until the water runs clear, then drain in a large, fine sieve.

Cook the quinoa in a saucepan of salted boiling water for 10 minutes. Drain quinoa in a sieve and rinse under cold water. Set the sieve over a saucepan of boiling water (don't let the quinoa touch the water), cover with a kitchen towel and a lid, and steam until fluffy and dry, about 10 minutes. Check the water level occasionally and add more water if necessary.

While the quinoa is cooking, toss the beans with vinegar, salt, and pepper in a small bowl.

Transfer quinoa to a large bowl and cool. Add beans, corn, bell pepper, jalapeños, and coriander, and toss well.

Make dressing: In a small bowl whisk together lime juice, salt, and cumin. Add the oil in a stream, whisking as you pour.

Figure 23

Andean participants in the 1991 Festival of American Folklife prepare food made with chuñu, freeze-dried potatoes. Photo courtesy Smithsonian Institution.



Drizzle dressing over salad and toss well. Add salt and pepper to taste.

The salad may be made one day ahead and chilled, covered. Bring the salad to room temperature before serving. Serves 4 to 6 as an entree or 8 as a side dish.

Adapted from the July 1994 issue of *Gourmet Magazine*.

TIME OUT

The news article below describes how traditional knowledge is being applied to modern environmental problems in sub-Saharan Africa. As you read the article, compare water and soil conservation efforts in Africa to the *suka kollu* projects in Bolivia.

What do you think an Aymara farmer from Bolivia and a Dogon farmer from Mali would say to each other about the “rediscovery” of these ancient techniques? Would the farmers be male or female? Write a dialogue between the two farmers that reveals their thinking about how these projects affect their families and their communities.

THE WASHINGTON POST
5/12/95

ANCIENT METHODS TO SAVE SOIL:

“ A NEW WAY OF THINKING ”

BY BOYCE RENSBERGER
Washington Post Staff Writer

Between 20,000 and 27,000 square miles of fertile soil, an area roughly twice Maryland and Delaware combined, turn into barren wasteland each year in food-short sub-Saharan Africa, according to a report by the International Fund for Agricultural Development (IFAD).

Reduced rainfall is the leading cause of land degradation in some parts of Africa. But in all parts, a major contributor is the loss of many successful land-management practices that African farmers developed over millennia, including ways to cope with drought. These ancient methods of conserving soil and “harvesting” water were largely stamped out—first by colonial masters who thought they knew better, and more recently by wrong-headed advice from outside experts.

Now, however, the Rome-based IFAD, which is supported by many governments, has begun a major effort to rediscover the old ways and promote their adoption, often with locally relevant modifications and improvements, throughout the continent.

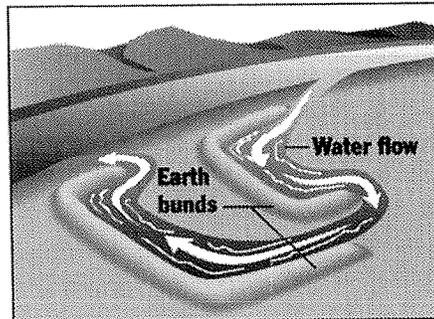
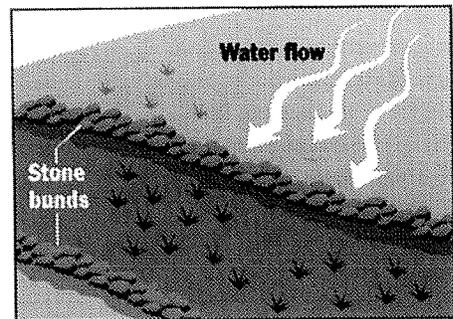
“There is a revival of trust in African farmers and their abilities,” said Bahman Mansuri, director of IFAD’s Africa division. “This is a new way of thinking. We’re not developing these approaches in big research centers. We’re looking for them in farmers’ fields.” And IFAD

HARVESTING WATER IN AFRICA

Farmers in sub-Saharan Africa are rediscovering ancient techniques of soil and water conservation—low-tech methods that work when fancy, high-budget methods usually fail. Among dozens of schemes are these, both of which allow bigger harvests from lands that would ordinarily not receive enough water for farming:

CONTOUR STONE BUNDS ▶ OF BURKINA FASO

Parallel lines of stones laid along the land’s contour slow the flow of rainwater down the slope, allowing more water to seep into the soil.



◀ THE CAAG SYSTEMS OF SOMALIA

A ditch diverts runoff from a gully toward a system of low earthen mounds. Each catches the water, slowing its movement, and then spills it to the next mound.

workers are finding them.

In Mali, the Dogon people have long made a practice of heaping weeds in many small piles among the crop plants and covering them with soil. The piles slow the rate of runoff and maintain soil fertility by acting as miniature compost heaps. Where the land slopes more, the

Dogon make rows of loose stones that follow the contour, much as tractors do in this country when “contour plowing.” These stone “bunds” slow the rate of runoff and let more of the scarce water soak into the soil.

In Niger and Burkina Faso, farmers know how to rehabilitate

barren land by digging numerous small pits about a foot wide and putting manure in each one. The pits catch water and the manure attracts termite species that make elaborate tunnels in the ground, helping break up crusted hardpan. The termites digest the manure and distribute its organic proceeds into the soil. In this way, fields that have been given up as useless have been restored to where they have yielded as much as 900 pounds per acre of sorghum or millet in years with average rainfall.

"There is much wisdom in the traditional practices," Mansuri said. "These are technologies that require no costly investment and they work."

Mansuri, who is in Washington for a workshop on IFAD's program for members of Congress and their staffs, said preliminary efforts have proven that they can stop land degradation and even reverse it, returning marginal lands to productivity.

Land degradation is a problem in many parts of the world, Mansuri said, but IFAD is focusing on sub-Saharan Africa because a higher proportion of Africans live and work on the land than do people of any other continent. More than 80 percent of Africans are

farmers and the rapid loss of arable land is a leading cause of poverty. And, on the whole, Africans are the world's most impoverished farmers.

Deterioration of soil also creates what Mansuri called ecological refugees—millions of people who leave their homeland seeking better lives in cities, in other countries or often simply on other land that is not yet useless.

IFAD surveys show that land degradation is most acute not in the sparsely inhabited arid zones, which have been the focus of earlier studies, but in the more heavily populated regions where there is enough rain to farm—but not always. It is also a problem in the highlands of more humid zones where simple soil erosion washes away soil fertility.

Mansuri said previous efforts to aid African farmers have failed for several reasons. The programs were too large and they tried to introduce unfamiliar concepts and practices with a "top-down" approach that ignored the opinions and attitudes of farmers. Some projects even imposed penalties on farmers who refused to go along.

For example, IFAD workers have found that if governments pay farmers to dig or build features intended to conserve land and

water, farmers tend to assume that the government is also responsible for maintenance. They regard themselves as laborers, not participants.

If heavy machinery is brought to build some structure, the interested beneficiaries often see the results as alien and refuse to maintain them by hand.

"One of the greatest weaknesses of most large-scale soil and water development projects financed with international support is that they come to a grinding halt as soon as external project funding is withdrawn," Mansuri said. "IFAD's approach avoids this pitfall. It promotes structures which are easily managed and maintained by farmers. We therefore put a lot of emphasis on farmer-to-farmer extension and training."

Mansuri said IFAD's programs take account of the role of women in African agriculture. Traditionally men do most of the work to prepare a field for planting but women maintain the fields, doing virtually all the weeding. In some regions, however, women do virtually all the work.

"What I like to say," Mansuri said, "is that IFAD's role is to help African farmers and their husbands."

RAINFOREST GATHERINGS: TLINGIT, HAIDA, AND TSMISHIAN SUBSISTENCE

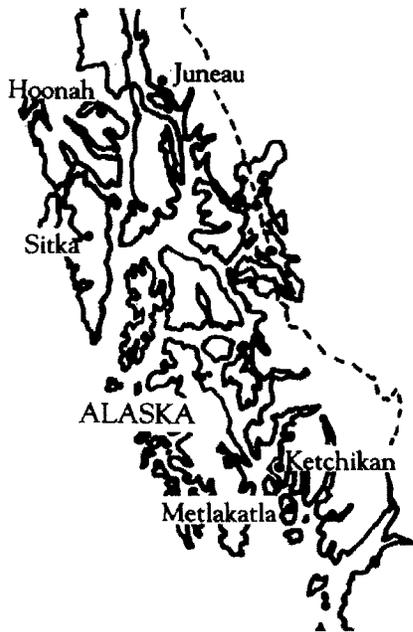


Figure 24

The Tsimshian, Haida, and Tlingit people live in the temperate rain forest of Southeast Alaska.

The mention of rainforests conjures up images of lush, hot jungles teeming with exotic plant and animal life. However, some rainforests exist outside the tropics. Like tropical rainforests, temperate rainforests are characterized by heavy rainfall and abundant plant and animal life. Temperatures are much cooler than in tropical areas, but not as cold as you might expect. The temperate rainforests of Southeast Alaska receive over 150 inches of precipitation annually. Winter temperatures usually stay between 35 and 40 degrees. There is little snow, and temperatures rarely dip below freezing. In summer the average temperature is 66 degrees.

Southeast Alaska is about the size and shape of Florida, but it is not a peninsula. It is an archipelago, or chain of islands, separated by straits and fiords (see Figure 24). The mountainous islands are covered with dense forests of spruce, hemlock, and red and yellow cedar. This is the site of the Tongass National Forest, which covers 17 million acres. A few lowland clearings and meadows dot the islands.

The forests, streams, and surrounding waters support many species of animal life. Salmon and halibut are two of the many types of fish found here. In the summer humpback and killer whales swim through the narrows. Black bears roam the woods. Mink, martens, and otters feed at river banks and beaches. Game animals include deer, moose, and mountain goat. Many bird species, including eagles, cormorants, and herons, inhabit mountains and shores.

Among the many indigenous people occupying Alaska's "panhandle" are the Tlingit (Thleen-git), whose traditional homelands range from Prince William Sound to the southernmost portion of the Alexander Archipelago; the Haida (High-duh), who migrated to Alaska from the Queen Charlotte Islands and the coast of British

Columbia; and the Tsimshian (Sim-shee-an), who migrated from British Columbia in 1887. While the three groups have distinct languages and cultures, they share similar subsistence practices and similar concerns about government policies affecting their use of the land and its resources.

Although Southeast Alaskan Natives do not grow crops like the Hopi and the Aymara, they are physically and spiritually connected to the land on which they live. Their knowledge of their habitat — its seasonal rhythms, the behavior of wildlife, the uses of plants, and the bounty of the sea — has provided these groups with the resources to develop strong societies. This knowledge is also the source of their profound respect for the natural world. Balanced use of natural resources and a social structure which emphasizes exchange of personal resources with relatives and neighbors are evidence of this respect in daily life.

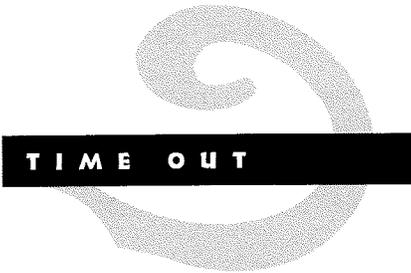
Tlingit, Haida, and Tsimshian people employ a variety of subsistence strategies, including hunting, fishing, and gathering. Ernestine Hanlan, a Tlingit basket weaver, explained during a presentation at the 1991 Festival of American Folklife that use of the abundant natural resources for food, shelter, clothing, tools, and art is so integral a part of the lives of Southeast Alaskan Natives that “. . . there is no word in the Tlingit language [for] ‘subsistence.’ To us, it is our traditional and cultural way of living, and it’s like breathing and sleeping to us.”

In fact, the Tlingit people define themselves by the subsistence activities they have practiced for centuries — the word *Tlingit* means “low-tide activity people.” “When the tide is out, the table is set for the Tlingit people” is a saying that underscores the importance of traditional knowledge of Southeast Alaskan waterways. In the spring, herring spawn their eggs on kelp (a kind of seaweed) which is gathered during low tides. Described as “Tlingit soul food,” herring eggs on kelp is a favorite Tlingit dish, and gathering the roe-laden kelp “is a cultural and emotional tie to fish, land, and game.”

Before contact with Europeans, marine fish, plants, and animals were the major food resources for Southeast Alaskan Natives. Shellfish, seals, sea otters, seaweed, herring, halibut, snapper, cod, and salmon were mainstays of Native diets. Salmon continues to be an essential staple of Tlingit, Haida, and Tsimshian diets. Five varieties of salmon are available in the region (see Figure 25). In early summer, schools of salmon begin to swim upstream to spawn and lay their eggs. This annual run of salmon provides a plentiful and dependable supply of fish. Some families establish riverside camps where they stay through autumn. These camps are convenient locations for catching and processing fish.

Many strategies and tools are used to catch fish, including line-and-hook, netting, spearing, and trapping. Traditionally, trapping was favored, since this method ensured a sizable haul that could be preserved for future use. Rectangular salmon traps were built with wooden slats set in a “V”-shaped weir, with the narrow end pointing upstream (see Figure 26). Heads of households supervised and regulated access to the weirs. Then, as now, fishermen were careful to trap fewer fish in years when the fish population seemed small, to make sure enough fish remained in the waters to breed in future seasons.

Traditionally, men hunted and fished, while women gathered, prepared, and preserved food. Once caught and killed, the salmon was turned over to the women to cook or preserve. Cooking, processing, and preserving the fish require considerable skill and labor. Today, catching and preserving enough fish to feed a family through the winter requires full-time labor from at least two people, frequently a married couple, for two months. A small portion of the salmon catch is cooked for immediate consumption. In the past, salmon was baked in earthen ovens, roasted over open fires, or boiled in bentwood boxes (see Figure 27). For this last method, rocks were heated in a fire, cleaned of ashes, then placed in a wooden box partially filled with water. When the wa-


TIME OUT

ter came to a boil, food was added. Watertight cedar-root baskets were also used in this manner. Today, fresh salmon is baked or broiled using conventional kitchen equipment.

Why was this indirect heat method used for boiling foods rather than placing cooking containers directly on the fire?

Much of the annual salmon catch is smoked to prepare it for winter storage. The fish is cleaned and deboned, then the fillets are sliced into 1/4-inch thicknesses. The slices are hung on racks (see Figure 28) above low-burning fires in specially constructed smokehouses. The spruce wood for the fires is readily available on the river banks. The smoke must be kept constant for 48 hours to ward off flies and dehydrate the fish. After the fish is thoroughly dried, it is immersed in seal or eulachon oil and used for meals throughout the winter. Smokehouses are less common than they once were, but families and communities do continue this tradition. More often, freezers are used to store fish.

Fish parts that are not preserved or eaten immediately are used in other ways. Backbones may be boiled in soup. Heads are baked or fermented to make a strong-smelling food known as “stink heads.” Fish

Figure 25

Five varieties of salmon are fished by the Tlingit, Haida, and Tsimshian — Chinook, Cobo, Pink, Chum (or Dog), and Sockeye. Illustrations courtesy U.S. Fish and Wildlife Service.

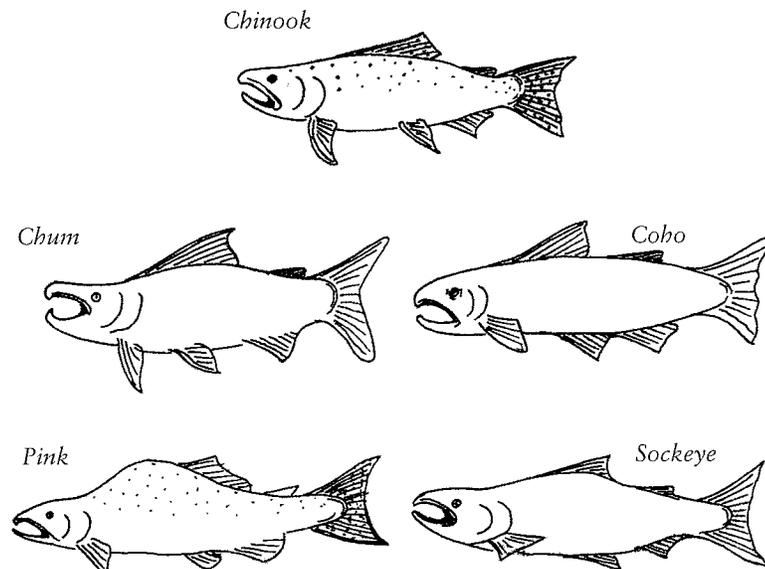


Figure 26

Weirs and traps are used to harvest salmon as the fish make their way upstream in early summer.

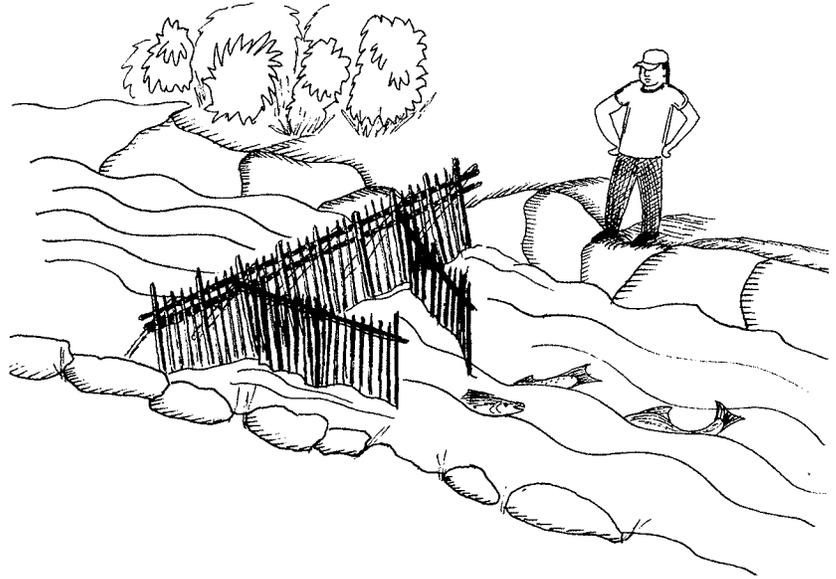


Figure 27

Undecorated boxes made of cedar can be used as containers for cooking.



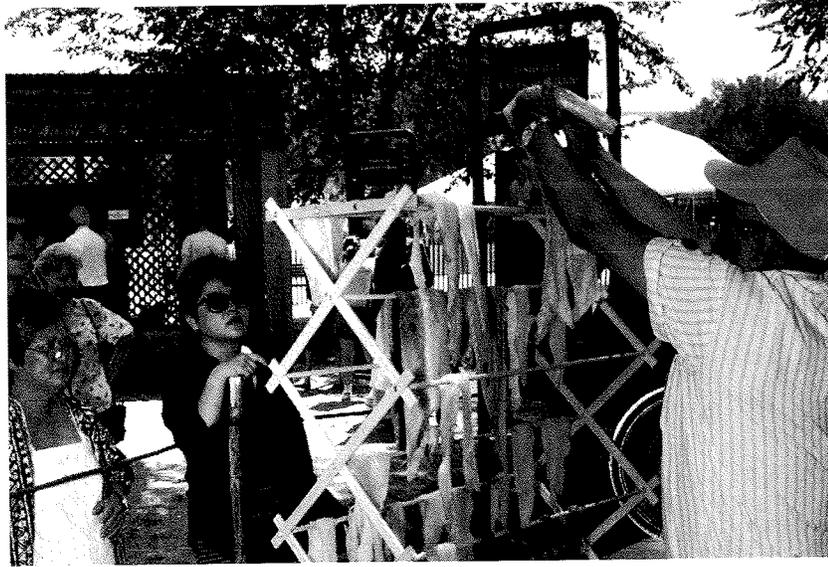
eggs are served in soup with seaweed or salted to make caviar.

Traditionally, the people would return salmon bones to the river from which the fish came so they could float back to their spiritual home, coming back the following season to provide food.

Today, most fish are purchased from commercial fishermen, caught by family sport fishermen, or obtained on subsistence permits. Federal and state fishing regulations limit catches and frequently do not acknowledge that an individual fisherman may be providing food for an extended family. Areas that are designated for subsistence use are often distant from population centers, making those who can least afford it

Figure 28

Mark Jacob, Jr., demonstrates salmon drying techniques during the 1991 Festival of American Folklife. Photo courtesy Smithsonian Institution.



more dependent on retail purchases. Ketchikan has a population of only about 14,000 people. As the fourth largest community in Alaska, it is designated as an urban area, and subsistence fishing is not allowed. Commercial fish hatcheries sometimes give fish away after the eggs have been removed. However, these fish are not firm enough to smoke and become mushy after freezing (Dauenhauer and Dauenhauer 1991).

Fewer young people are learning the skills of catching and preserving fish. Like the Hopi, Alaskan Native elders fear that this lack of knowledge and experience prevents children from learning and practicing traditional respect for the natural world. As a countermeasure, Native and non-Native children can attend fishing camps in the Sitka area where they learn subsistence skills. Young people who comment that the process of catching and preserving salmon is “gross” are cautioned by their teachers “not to make fun of food or animals that are sources of food or you may lose your way” (*A Matter of Respect* 1992).

The indigenous people of Southeast Alaska are accomplished hunters. They skillfully hunt mountain goats, porcupines, bears, and deer as well as sea mammals such as seals and sea otters. The traditional deer-hunting method reveals the Tlingits’ familiarity with game

and the hunt. The hunting season begins in early fall. In order to attract deer into hunting range, the traditional hunter uses a deer call made from a dogwood tree leaf. The hunter places a leaf in his mouth and blows through it. The resulting whistling sound resembles the cry of a fawn and attracts mature female deer. Traditionally, hunters used a bow and arrow aimed at the neck or head. This shot caused the deer to die quickly, sparing it unnecessary suffering. As with fish, as much of the deer as possible is put to use. Deerskin is made into drums, moc-casins, and vests. Hooves are made into dance rattles.

Sharing resources is an important part of life. Many hunters give away their first kill of the season, believing that this generosity will bring them additional luck. Younger hunters share their meat with elders who are no longer able to hunt for themselves. Fulfilling this responsibility may put hunters at risk with the law. Legal hunting limits do not account for the possibility that the hunter may be providing food for other people. Federal regulations require the State of Alaska to manage subsistence resources. According to Mark Jacob, Jr., a participant in the 1991 Festival of American Folklife, “The State of Alaska developed a sportsman’s mentality. In that mentality, a trophy on the wall is more important than putting bread and butter on the table.”

While men traditionally do most of the hunting, women are primarily responsible for gathering shore and woodland food sources such as roots and shoots, fish and bird eggs, wild berries, and beach foods such as mussels, crabs, clams, and black seaweed.

Berry picking lasts for two to three weeks in late summer. While fish hang in the smokehouses, women and children spend the day picking in the berry patches. Among the berries collected are salmon berries, elderberries, strawberries, blueberries, and cranberries (see Figure 29).

One way of preserving berries is to use a traditional oven constructed by digging a shallow well in the ground and lining it with

rocks. A fire is made inside the pit, wild berries are put in, a layer of skunk cabbage is placed on top of the berries, and gravel is used to cover the top of the pit. Water is poured over the hot rocks, and the berries are left to steam overnight. The next day, the berries are removed and placed in seal-oil containers bearing clan emblems.

Berries can also be preserved as stew. The berries are placed on the stove in a large pot and stirred constantly. When the berries are almost done, silver salmon eggs, some of which are crushed, are added. Once the berries are soft, they are removed from the heat and poured into a bentwood box lined with skunk cabbage. A layer of cabbage is placed on top of the berries like plastic wrap. Then the box is sealed, bound with string, and kept in the storehouse with the preserved fish.

For Southeast Alaskan Natives, the lives of the people and the animals and plants of the rainforest are closely intertwined. The people do not view animals as lesser forms of life, but as fellow beings who have “body, soul, spirit, abilities and feelings” (Kirk 1986). Animals are “people” who take on their animal forms in the physical world and return to human form when they go back to their homes. Salmon People, Deer People, and Seal People arrive in the physical world according to the seasons, providing food for the humans. The Animal People do not resent this — after their bodies are eaten, their spirits return home where their physical bodies are renewed. Humans know that the Animal People willingly participate in this exchange. Therefore, great care is taken to make sure animals are treated with appropriate respect and reverence. When the salmon arrive in the rivers and streams, they are greeted with words of welcome, such as “We thank you for coming. We have waited a long time. We hope you will bring your brothers and sisters again soon.” The hunter always thanks his prey for providing for his family.

Likewise, the plants gathered for food, baskets, or medicines are given ritual greetings of respect and thanks. As she begins to gather

Figure 29

Berries gathered in late summer are preserved—canned, packed in oil, or frozen—for winter use. Photo by Richard Dauenhauer, courtesy Smithsonian Institution.



berries, a South Kwakiutl woman says, “I have come, Supernatural-Ones, Long-Life-Makers, that I may take you, for that is the reason you have come Look! I come now dressed in my large basket and my small basket that you may go into it I mean this that you may not be evilly disposed towards me, friends. That you may treat me well.” April Davis, Education Specialist for the Ketchikan Indian Corporation, explains such informal, personal ceremonies as “our way of remembering we are part of the earth.”

For Tlingit, Haida, and Tsimshian people, cultural identity is inextricably bound to the rainforest and coastal environments in which they live. They believe that when they live in balance with nature and treat the spirits with gratitude and respect, the forests and waters provide them with the resources they need. Today, the intrusion of Euro-American interests and the resulting depletion of fish, forest, and wildlife resources threaten not only the natural landscape but the reciprocal relationships among people, earth, and animals that are vital to these cultures.

TIME OUT

Read below the poem “In Praise of Maize,” which celebrates one of the world’s most important food crops and the Native people who grow it. Write your own poem about one of the other food staples discussed here. Try to capture the importance of that food to the culture with which it is most closely associated.

In Praise of Maize

BY YVONNE BARON ESTES

*We sing a song to the
Indian Farmer
ancient breeder of corn
and to corn herself,
Zea mays,
daughter of Teosinte*

*O Maize, you strange old grass
with your whispering
tassels, delicate silks
golden yellow seed-pearls
roasted at harvest,
here's to you*

*We honor your farmers
wielders of digging sticks
devoted selectors
of your seed:
Inca, Maya, Aztec
Olmec, Navaho, Hopi
and many more, for you fed a hemisphere
And we thank those who entombed you
beloved food for ghostly travelers
your ancient
tiny ears
at Tehuacan
growing century by century
to modern corncob size*

*We cherish countless
patient women
grinding
grinding
grinding
your grains
in heavy stone metates
all over the hemisphere
We see the ruins of Wupatki
abandoned a thousand years
ago, in a drought
only winds*

*and metates
inhabit them now
We sing praises to
Yum Kax, Tlaloc, Chac
deities of rain and maize
and offer libations of chicha
maize beer
as of old*

*And we celebrate
popcorn
ancient mountain
corn-feast
of high Andean peoples*

*Each year now
we anoint fresh sweet garden corn
with butter and salt
and sink into thankful bliss
as of old*

*We celebrate your many joys, O maize:
tortillas and beans
roasting ears
cornmeal mush
grits and hominy
corn bread
corn muffins
tamales with their corn-husk wrappers
of sweet messy succulence
dripping down our grinning chins
corn fritters
corn squeezin's
johnny cake
corn soup
and microwave popcorn
from Machu Picchu to microwaves —
Great McClintock Jumping Genes!*

*O Maize,
O lovely child of human care
Here's to you.*

From *Cultural Survival Quarterly* (1989).

Suggested Resources

General

Seeds of Change: A Quincentennial Commemoration, ed. Herman J. Viola and Carolyn Margolis (Washington, D.C.: Smithsonian Institution Press, 1991). Examines the dramatic economic, cultural, and biological changes that occurred throughout the world as a result of European contact with the First Americans. Contains excellent essays on pre-contact Native culture and the adoption of Native American food crops throughout the world.

Hopi

Pages from Hopi History by Harry C. James (Tucson: University of Arizona Press, 1974). An accessible history of the Hopi people from emergence through recent times.

Me and Mine by Helen Sekaquaptewa as told to Louise Udall (Tucson: University of Arizona Press, 1969). This life story of a Hopi woman provides a first-person view of Hopi daily life, tradition, and change.

Hopi: Songs of the Fourth World, a video by Pat Ferrero. Available from New Day Film Co-Op, Inc., 22-D Hollywood Avenue, Hohokus, New Jersey 07423 (Tel. 201-652-6590). This award-winning video is a portrait of Hopi people, land, and values. It examines the central role of corn and the land in the spiritual, artistic, and agricultural lives of the Hopi. A resource handbook is also available.

The Hopi is a 20-minute video from the American Indian Video Series by the Museum of Northern Arizona. Scenes of family life and work are accompanied by traditional music and straightforward narration. This video as well as books and recordings are available from the Hopi Arts and Crafts Cooperative Guild, P.O. Box 37, Second Mesa, Arizona 86043 (Tel. 602-734-2463).

Victor Masayesva is a Hopi artist whose videos incorporate computer animation and graphics to translate Hopi myths, rituals, and history. Five productions, *Hopiit; Itam Hakim, Hopiit; Ritual Clowns; Pot Starr;* and *Siskyavi-The Place of Chasms*, are available from Electronic Arts Intermix, 536 Broadway, 9th Floor, New York, NY 10012 (Tel. 212-966-4605, FAX 212-941-6118).

Southeast Alaskan Natives

Alaskan Native Cultures: Tlingit, Haida, Tsimshian, volume 1, ed. Angela Tripp (Santa Barbara, CA: Albion Publishing Group, 1994). This book, through text and beautiful color photographs, celebrates a renewal of interest in traditional dance, art, and ceremonies among Tlingit, Haida, and Tsimshian people of all ages. An excellent source of visual information for students.

Tradition & Change on the Northwest Coast by Ruth Kirk (Seattle: University of Washington Press, 1986). This book describes the history and culture of four Native groups from coastal British Columbia — the Makh, Nuu-chah-nulth, Southern Kwakiutl, and Nuxalk — who share many traditions and practices with Southeast Alaskan Native people. First-person accounts, traditional

narratives, and photographs accompany Kirk's insightful descriptions of life long ago and today.

The Tlingit: An Introduction to their Culture and History by Wallace M. Olson (Auke Bay, Alaska: Heritage Research, 1991). Describes Tlingit history, social organization, subsistence practices, language, and art. Olson's explanation of clan relationships is particularly useful.

During My Time by Margaret B. Blackman (Seattle: University of Washington Press, 1982). The life history of Florence Davidson, a Haida woman born in 1896. Davidson's narrative, along with Blackman's commentary, provides readable insight into changes in Haida culture over the past 100 years.

A Matter of Respect, a video available from New Day Films, Inc. (see *Hopi: Songs of the Fourth World* above), focuses on the subsistence practices of the Tlingit people. Elders and young people discuss efforts to preserve traditional ways in a changing economic and environmental landscape.

Aymara

Mountain of the Condor by Joseph W. Bastien (St. Paul: West Publishing Co., 1978). Bastien lived among the Aymara of Kaata, Bolivia, for one year. His book describes the Aymara people through examination of the religious symbols and metaphors that govern daily and ritual life. While Bastien observes life in Kaata as an anthropologist, his account is personalized and affectionate. Older students will enjoy excerpts that give names and faces to the people of the *altiplano*.

