# ZUNI FARMING
## FOR TODAY & TOMORROW

*An Occasional Newsletter of the Zuni Sustainable Agriculture Project and the Zuni Folk Varieties Project*

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## The Nutria Irrigation Unit, the Zuni Sustainable Agriculture Project, and the Nutria Pilot Project

*Fred Bowannie, Jr. and Andrew Laahty, interviewed by* Zuni Farming

*The Zuni Sustainable Agriculture (ZSAP) and Zuni Folk Varieties (ZFVP) Projects, as part of the Zuni Conservation Project, are working on the Nutria Pilot Project. At Nutria ZSAP and ZFVP are collaborating closely with the Nutria Irrigation Unit (NIU) of the Zuni Irrigation Association (ZIA) to develop a plan to increase farming. Fred Bowannie, Jr., and Andrew Laahty are president and vice-president of NIU.*

*Zuni Farming* (**ZF**): How did you first get involved in the Nutria Irrigation Unit?

Fred Bowannie, Jr. (**FB**): There's been lack of participation in any irrigation project that's been going on in Nutria for last 15, 20 or 30 years. Our fathers tried to do something like that, but there was not that much backing from the community at Nutria. There was Patterson Peynetsa and Scotty Kaskalla who started almost everything. Trying to get pipeline, and irrigation ditches, but mostly trying to get people together. It was pretty hard for them, when people didn't have the interest in participating. All these years it hasn't really succeeded until last March when they

*see Nutria Irrigation Unit, page 3*

## Peach Tree Care and Propagation: Building on traditional knowledge

*by Daniela Soleri with Lygatie Laate*

Many people in the Zuni community are interested in revitalizing the peach orchards at Dowa Yalanne and elsewhere This renewed interest seems to come just in time to benefit from two essential resources. The first resource is the knowledge and skills of many of the experienced Zuni farmers who have or have had peach trees. Donald Eriacho, assistant director of the ZFVP, with the assistance of Lygatie Laate and Harry Chimoni, are interviewing many of

*see Peach Tree, page 2*

*Lygatie Laate prunes a peach tree he started with* ***dabatchishna*** *in his orchard.*

*Peach Tree, cont. from page 1*

these farmers to gather information about peach trees at Zuni. (*See* "Zuni Peach Orchards, Part II", p. 13).

The other valuable resource for the revitalization of peach orchards at Zuni are the Zuni peach varieties that are adapted to growing under the conditions at Zuni. These trees can grow without any irrigation water other than the rainfall runoff that farmers direct to them through the use of berms and basins. The average timing of their flowering makes sense at Zuni; flowering too early in the season would mean that all the blossoms would be frozen off and no fruit produced later on, flowering too late would run the risk of tender blossoms drying up, or fruit getting frozen before it was ripe. They are tough and hardy trees, able to withstand the windy, dry days of spring and early summer.

While Zuni peach varieties can all survive under Zuni growing conditions they are not all the same. They are known for their different types of fruit and they are probably different in other ways as well.

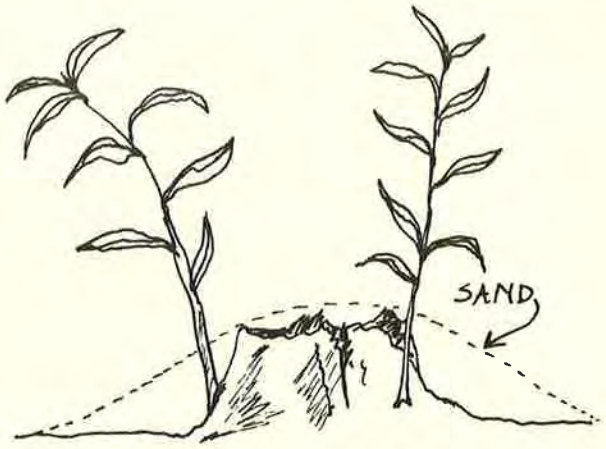
The Zuni Sustainable Agriculture Project is working to help the Zuni community revitalize its peach orchards. The Zuni Folk Varieties Project is also helping in this effort. In July the ZFVP staff was assisted by Roy Keys, an agroforester from Tucson, Arizona. Roy came for two days to look at the living peach trees that remain in Zuni orchards.

There are two ways to ensure that Zuni peach trees will be around in the future. The first is to care for the trees still living in Zuni orchards today. As Roy pointed out, a good first step would be to prune these trees. Pruning can make a tree more vigorous, help it combat disease, encourage more fruit production, and make the trees less vulnerable to damage by wind or animals.

Peaches are only produced on last year's growth, so healthy trees need to keep putting out healthy new shoots so next year there can be a harvest. This is why pruning could produce noticeable results by the next year. ZFVP is looking into to organizing a pruning workshop, contact us if you are interested.

The other way to ensure that Zuni peach trees will be around in the future is to start more trees. ZSAP and ZFVP worked last year with a class at A:Shiwi Elementary School to start trees from seed (*See* "The Zuni Sustainable Agriculture and Zuni Folk Varieties Projects in Zuni Schools", p. 16). There are other methods for starting new trees as well.

We learned from Lygatie Laate that some Zuni farmers traditionally started new peach trees by




*Two shoots growing from a stump that will be split and replanted as two new trees using* ***dabatchishna.*** *D. Soleri*

splitting up old stumps that contained healthy, young shoots. This is called ***dabatchishna***, and is a way to get new trees from those that were old but known to have good fruit. In English this technique is called "field rooting" of hardwood cuttings, and is used for peaches and some other kinds of fruit trees.

How does ***dabatchishna*** work? During the spring and summer Lygatie checks his orchard for stumps or trees that are old and doing poorly. If it is still firmly rooted, that is it cannot be pushed over, he cuts the tree back to a short stump. He then covers the stump with soil. As new shoots sprout from the stump and grow up through the soil, he keeps piling more soil up around them. This encourages the shoots to grow long.

The next year, in early spring, Lygatie uses a saw or ax to split the stump. If there were two good shoots he would split the stump into two parts. Good shoots are those that are at least 10-12 inches long, and growing vigorously. He then plants the shoot attached to a piece of the stump in a deep, moist, hole where he wants the new tree to grow. Over four inches of the shoot should be buried under the soil.

As the weather and soil get warmer, the shoot will grow roots. By the time the shoot starts to leaf out it should have grown enough roots to gather water to support this new little tree.

When he first heard elders describing ***dabatchishna*** Lygatie didn't believe that it would work, but then he tried it and it did! Lygatie is still starting new trees from old ones in his orchard using ***dabatchishna.*** This traditional technique and the knowledge of the farmers who practice it are based on the

same biological principles as those underlying field rooting. What is especially valuable about ***dabatchishna*** is that we know it works in the Zuni environment and we have local experts like Lygatie to give advise on how to go about it.

ZFVP can help interested community members combine the expertise of knowledgeable Zuni farmers and some outside assistance, such as advise about how to increase and improve the quality of the root system produced, encourage shoots appropriate for ***dabatchishna***, and care of the transplanted shoot to improve chances of the shoot surviving.

*If you are interested in either a pruning workshop or in assistance at starting new peach trees using **dabatchishna**, please get in touch with Daniela, Donald, or David at the Zuni Conservation Project Office, 782-5851/5852.*

*Nutri Irrigation Unit, cont. from page 1*

started electing new officers for all these irrigation units. Our elders in Nutria voted us in, saying they needed new people in there.

Andrew Laahty (**AL**): As long as people back us up, and make a general plan and stick by it, instead of saying, "Oh, we're going to have this thing done." Without the plan we're nowhere, we're still in the same spot. I don't care if its 1993, we're in 1935.

**ZF**: You've been in office over one year now. What are some of the biggest problems, the biggest successes you've had so far?

**FB**: Getting information. When we first got into office, about a month or month and a half later, there was a proposal for an irrigation pipeline system. So we started to ask questions, "Why is it going to be put here instead of there? What are the alternatives for installing that pipeline? We also asked "How good is our dam?" Because we talked to Patterson, and he told us how the dam was built, how its been all the years he's been there. Getting information, getting answers to these questions, its been pretty hard.

**AL**: I think our biggest success was getting the people involved. That was our main goal, to get the people involved first, then to set up a plan. And with the help from the Sustainable Agriculture Project, Conservation Project, Soil Conservation Service, and others on the Nutria Pilot Project that we're in now, we're like 20 steps ahead of where we were in March of last year. We've also been cleaning the silt out of the lower diversion dam, and the BIA Zuni Agency has provided a bulldozer and operator which has really speeded it up.

**ZF**: There have been three general meetings of the Nutria Irrigation Unit since you became involved with the Pilot Project. At the last meeting on June 4th there were over 70 people and a lively discussion that lasted over two hours. What has been the effect of these meetings?

**AL**: The meetings provide for a lot more input from the people, rather than just the officers.

**FB**: We're not trying to exclude anybody from planning. We want their opinions about any projects that may be coming to Nutria. We'll ask them if its good. If somebody else in our irrigation unit has a better idea, we'll listen to it. "You'll have a voice in it. Its not up to us, its up to our people," we've been telling them. People are starting to understand that even though we are their voice in the irrigation committee, its not up to us to say "Yes, we will go with this plan." We have to ask them, have to inform them about what's going to happen. That's why I think people are backing us, because we keep them informed. Its also a way for people to put pressure on other people in Nutria who are doing things against the wishes of the community, like grazing livestock in fields.

*Lower diversion dam at Nutria in Spring 1993, before repairs started.*

**ZF:** When both of you first started doing surveys people were a little suspicious. How did you handle that?

**FB:** We told them "We're here to talk to you personally as Nutria farmers. We're not from the BIA. We're new, we're trying to rehabilitate our irrigation unit, the Nutria Valley. We want to talk to you, to find out your needs, your problems. Maybe we can get rid of some problems that will help you and everyone else in that irrigation unit." We're going to talk to everybody so we can all work together, like when our fathers were there, when we were one big family.

It's been real good because people are starting to open up to us, telling us things that we didn't know, informing us of other people that have land out there that we didn't know. So our list of Nutria families is growing, its getting bigger. Especially

*Andrew Laahty and Fred Bowannie, Jr. use the Global Positioning System (GPS) to map field boundaries in Nutria.*

when we talk to elders, they are our main source of information. The land they own will go to their daughters or sons or grandchildren. So its sort of like starting a new generation, and I think they are getting more interested in it. We explain, "If you don't rehabilitate your land, if your elders are no longer around, or your father and mother are no longer physically fit where they can stay out there and farm the land, or if their interest is somewhere else instead of farming, there are some people out there who do want to farm. They can come in and say you're not working on this land, let's give it to somebody else, another relative who wants to grow something.

If they do give it to someone else, then the original owners come back, but then there's nothing they can do. In order for that not to happen, we tell them "You should try to get your family involved with their lands." If there's an elder there who says "My son's not into this," we ask, "Is there another relative who would be interested in doing it?" A daughter might get interested and get her husband to go out there and work the land. It takes time, but some people are beginning to understand that they should work their lands, because in the long run its going to benefit them.

We've been talking to a lot of people, telling them that the price of crops is going up, especially for salad and necessities. Its a lot cheaper when you grow it yourself rather than going into town and buying it. Especially the little ones, when they plant a seed and see that little seed come up and start to grow, they're fascinated by it, they want to learn more.

**ZF:** Why is the mapping of fields that you are doing with ZSAP fields valuable?

**FB:** What our grandfathers used in past years was natural boundaries. My dad over in the lower village showed me a boundary line that started at "mouse rock" and went way across to the south side to another mound of rocks. They didn't use tapes or transits. Mostly it was verbal agreement, respect, "His boundary's right here, I will respect his boundary because I see this rock and that rock over there, I won't go past that."

**AL:** Right now there are fences that are down and some people are in a big mess, because most people don't remember or respect the natural boundaries that the elders made. No one has ever gone out and gotten the proper acreage of each field, and established the boundaries and ownership before. People can take advantage of the Nutria Pilot Project to have their land surveyed and get proper boundaries set up like there used to be. This mapping has already helped us to resolve several disputes that had been going on for a long time.

**ZF:** Has it been difficult for you to learn how to use the Conservation Project's Global Positioning System (GPS) equipment to do the mapping?

**AL:** We have been working with Wilbur Haskie and Anders Hustito of the Conservation Section of the ZCP. Along with Stan Lalio of the ZCP GIS (Geographic Information Systems) Section, they have

helped us to learn to use the GPS. Now we can use it on our own. So far we have completed about 20 fields. Eventually we will have a map of all the fields in Nutria with the size and family member in charge. We have also worked with Andres Cheama, Sheldon Lalio, and Vanissa Laahty of the ZCP Hydrology Section to measure water used for irrigation, by installing, calibrating and reading a staff gauge.

**ZF**: When Walt Coward of the Ford Foundation was here, he asked, "What would you like to see 5 or 10 years from now in Nutria?

**AL**: Electricity, because that's what I think is the most valuable type of thing that we can acquire for the people, so that way they won't have to go back and forth, they might even spend nights there. Telephone and drinking water are other things we would like to have out there, so everyone will benefit. So people will see something, after all these years of talking about doing this and doing that. People would start living there year round.

**FB**: I would like to see pipeline come in, especially have our Nutria people work on it, so that way if there are any problems we can fix them ourselves, we won't have to rely on someone else to fix them. They'll be more interested if they do it themselves, than have somebody just do it for them and say "OK here it is, its all yours now." Mostly it's seeing our people get back into farming, seeing crops, alfalfa fields, people working together like a family, that's the thing I would like to see. In 25 years from now I don't know how its going to look, but if I could see corn fields growing, alfalfa fields, people walking around, having tractors moving around there, bailing machines going around, livestock around, not in the ag fields, but in the pastures, it'll look nice. There's some gray spots now, but back in the early 1950's it was green, nice and green, everybody was usually watering their fields. But maybe within the next 20 years it might be like that again.

**ZF**: Do you foresee a time when the Nutria Irrigation Unit could write up plans for a project, get money and implement it?

**FB**: I think we could. We're breaking the ground, getting the information together, getting our people involved, but after a certain time period we will step down, and what we learned we can teach them, and it will go on further. We can say, "We've got some money that we can use to send you for training," and it will keep on going on as long as our people get interested. Because its going to involve mostly our younger kids, we're trying to leave something for them, where they can keep on going, But its a long road, it can't be done within this short period of time, you know.

**ZF**: When people in Nutria get back into farming, will they be interested in marketing?

**AL & FB**: Yes. I think so, we can have a farmers' market, or at least start looking into it, so we'll have a better understanding when that time comes. We would be really interested in seeing a farmers' markets in other places. There's all these things we can learn through other programs, and it will benefit everybody. If you actually go out there and see the farmers like us doing it, and actually talk to them and get their input it will be a lot better. Although the New Mexico State University (NMSU) people told us about the way to do it, they have big farms, big chili fields. Those corn and onion fields are big, we don't have resources like that, especially water.

**ZF**: So you'd be interested in visiting small-scale family farmers in other communities?

**AL & FB**: Yes. If we can visit in the fall we can ask them "How much did you harvest? How much did you irrigate? What did you do to your field to get a bigger yield compared to last years'? What are you going to do next year to get an even bigger yield?" Farmers usually don't keep information to themselves. They usually tell each other. You could actually see how they work, how they irrigate, even though they might not be irrigating at the time you can still see how they line them up, how their furrows are going, how deep they are, and many other ideas we all can share with each other.

If we can show slides or pictures of farming at Nutria, someone sitting next to a person whose field is being shown might say "I didn't know you planted that much!" and it'll encourage the other guy to grow more next year. It'll be like a growing contest: "I'm going to grow more than this guy because he grew more than I did." Maybe we should start something like the Zuni Tribal Fair was when it first started. It was held in mid-September. Farming communities showed their crops and you saw corn stalks piled to the ceiling or higher, oats about 5-6 feet tall, garden vegetables. We would like to see the Zuni Tribal Fair moved back from August where it is now, to mid September, so there would be crops coming in. People will wonder "Where was this grown?" It could be between the different districts, with Ojo over here, Nutria over here, Pescado, so on, and see who's going to win the most ribbons. People would say "Yes, those crops are mine. My livestock won that blue ribbon. Smile! Next year bigger and better."

# Soil Management for Sustainable Zuni Agriculture: A Nutria example

*by Deborah Prevost, David Cleveland, Fred Bowannie Jr., and Andrew Laahty*

Life could not exist without soils. The soils at Zuni are the foundation of Zuni farming. But soils are fragile, and can be destroyed without good management.

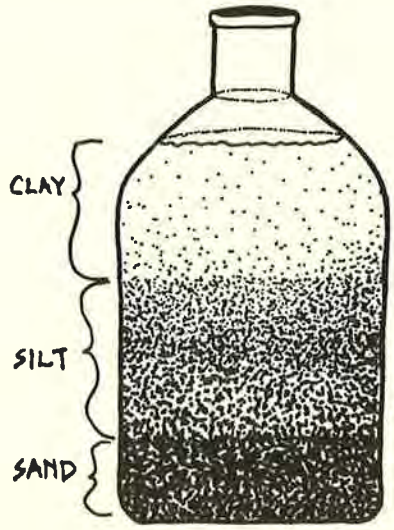
For many, many generations Zuni farmers have been managing soils here in ways that seem to conserve them for the future. According to Zuni Conservation Project hydrologist Allen Gellis, soil erosion and down cutting of arroyos has accelerated during the last 100 years, due in part to excessive tree cutting, overgrazing and road building on the watershed. This is probably an important cause of the decline of rainfed ("dryland") farming in the last several generations. In turn, this decline in rainfed farming has probably caused more erosion as farmers abandoned their check dams and other water management structures. Soil erosion in the watershed has also led to rapid silting-in of reservoirs developed for irrigation, contributing to a decline in canal irrigated farming.

As farmers plan for increasing sustainable farming, modern science and technology offer new options that can be combined with traditional Zuni knowledge of water and soil management. For example, two surveys have recently been done of Zuni soils by outsiders. We are working to combine the information from these surveys with Zuni farmers' scientific understanding of soils to develop a plan for increased farming at Nutria.

## What are Soils?

Soils are a combination of many different sized mineral particles, mixtures of air and water, decaying organic matter, and millions of living microorganisms. Waste products from plants and animals are recycled in the soil into nutrients used by plants.

Combinations of different sized mineral particles (sand, silt and clay), give soil its texture. Soil texture determines many of the properties and behaviors of soil. Most soils in the Nutria Irrigation District are composed of 40-50% clay, combined




*When mixed into a bottle of water the large heavy sand particles sink to the bottom, smaller silt particles form the layer above the sand. Clay, the smallest particles, are in the top layer, or may remain suspended in the water for days.*

with smaller amounts of sand and silt. These clayey soils are called ***he'epikya*** by Zuni farmers. The high clay content means that these soils can hold a lot of water and nutrients for plants to take up through their roots.

However, because the clay particles are so much smaller than the sand particles, the spaces between the particles are very small. This means that water moves very slowly into the soil, unless there are big cracks or clods on the surface. It also means that water moves very slowly within the soil.

## Irrigation, Waterlogging and Salinity

Irrigation of clay soils requires careful management. Water should be applied slowly over a long period of time to allow it to wet the soil to the bottom of the root zone. However, too much irrigation water in poorly-draining clay soils can lead to waterlogging and salinity that can lower yields or even kill plants. "Waterlogging" is when the water table rises into layers of the soil where plant roots are growing, and can drown them, because it pushes out the air they need to breath. Waterlogging occurs when too much irrigation water is applied, and when irrigation water drains very slowly out of the root zone because of heavy clay soils, contrasting soil layers, or bedrock. Salt build-up occurs when the salts that occur naturally in all water are left behind as water

is lost from the upper layers of the soil by uptake through the plant roots and through evaporation. When soils have good drainage, these salts are moved below the root zone by extra water (a process that is called leaching). When soils become waterlogged, salts build up above the water table.

## The SCS and Water Rights Surveys

Two soil surveys by outside scientists have been done at Zuni which complement Zuni farmers' knowledge of soils. The Soil Conservation Service (SCS), under the direction of Steve Park in Grants, has provided soils maps, descriptions, and interpretations for many different land uses at Zuni using a system developed by the US Department of Agriculture. This system describes natural soils as they occur on the landscape, and uses observable or measurable soil properties to predict soil behavior and management needs for specific land uses.

To support Zuni claims to water, the US Department of Justice is working with the Albuquerque Area Office of the Bureau of Indian Affairs to classify Zuni soils according to their potential for intensive irrigation. This study is under the direction of Chris Banet at the Area Office. Hank Waugh, an independent soil scientist, has been carrying out the field survey intermittently since 1987. He is still working here at Zuni to finish the survey, but most of the work at Nutria has been completed. The water claims survey uses soil properties to predict long term suitability for irrigation.

Since the purpose of the Department of Justice survey is to maximize Zuni water claims, it makes the assumption that the total amount of water applied will be large, that sprinkler irrigation will be used, and that short-term economic profits will be maximized. Both of these surveys provide valuable information for planning sustainable agriculture at Nutria and other farming districts at Zuni.

## Soils and Farming in the Nutria Irrigation District

As discussed in the first issue of *Zuni Farming*, the Zuni Sustainable Agriculture Project (ZSAP), along with the rest of the Conservation Project, is focusing on the Nutria area in the Nutria Pilot Project. ZSAP is collaborating with the Nutria Irrigation Unit of the Zuni Irrigation Association on the Pilot Project. Understanding soils in Nutria will help us to work with farmers in other areas of Zuni to plan for the future.

Some areas of the Nutria Irrigation District already have a build-up of salts. Farmers recognize an area from the lower diversion dam to the old school house as ***ma:k'osin'e***, or salty. White layers of salt can be seen on the surface of the soil, or along the sides of ditches. This is also an area where the water table is within several feet of the surface during part of the year.

The water rights survey classified all of the Nutria irrigation district as "not for farming" because of the heavy soils, lack of drainage, and danger of salt build-up. This is because in test holes drilled 8-10 feet deep, Hank Waugh often found heavy, clay soil that doesn't let water drain out very quickly. He also found water tables within 10 feet, and some build up of salts.

However, remember that the water rights survey classification is based on heavy, continuous irrigation of large areas. Furthermore, Zuni farmers have been irrigating from reservoirs and springs at Nutria for over 100 years with no signs of salt build up in most areas, for example the garden area of Upper Nutria. One of the reasons why farmers have been so successful in managing soils for crop production at Nutria is that water from the springs and the Rio Nutria is high quality, that is it contains very few salts. Another reason may be that farmers did not irrigate all fields every year, but left some unirrigated, in rainfed pasture or feed crops, or fallow. During these periods water can drain slowly out of the clayey soil layers.

Another reason could be that very deep layers of sandy soil are rapidly draining away water seeping in from heavy layers above. To see if this was the case, Hank Waugh tried to drill two holes to 25 feet deep in Nutria in late June. One was in the Upper Nutria garden area, and one in the center of the irrigated area, between Upper and Lower Nutria. He found a hard layer, possibly soft bedrock, at 23 feet, and no significant sandy layers. The blue and grey color of the clay soils below 8 feet was evidence that this layer is saturated with water for much of the year, and that deep drainage is poor.

## Soil and Water Management for Sustainable Farming

There are many ways of using and managing soils for sustainable agriculture. Irrigation systems need to be designed for specific types of soils and crops. Water application rates and total amounts should be matched to the ability of the soil to hold water, and

the crops' need for water.

Given the danger of salt build up and waterlogging in the Nutria Irrigation District, it is important to slowly increase the amount of water applied, and to monitor for changes in soil salinity and the water table. ZSAP will work with the Nutria Irrigation Unit to set up pipes to monitor the water table, use electroconductivity (EC) meters to measure the salt content, and send samples for laboratory determination of sodium (the sodium adsorption ratio, SAR). When farmers start applying more water to their fields, they will be able to see the effects on the soil. As long as the water table and salt level stay the same or go down, they can continue to apply more water. But when they start to rise, it is a sign that the amount of water applied should be decreased to prevent a reduction in crop yields, and permanent damage to the soils.

*Editors' note: Deborah Prevost is a soil scientist with the Soil Conservation Service in Rio Rancho, New Mexico. She has carried out soil surveys on Hopi and Navajo lands. She is helping the Zuni Sustainable Agriculture Project, especially on the Nutria Pilot Project, to evaluate soils to develop our plan for sustainable agriculture. We thank Hank Waugh and Chris Banet with the BIA Albuquerque Area Office for their comments on this article.*

# Soils in Zuni Rainfall Runoff Fields

*by Deborah Prevost, Fred Bowannie Jr., and Andrew Laahty*

Zuni farmers have provided food for many centuries in a climate that is often unfavorable for crop production. One of the keys to their success is ***kwa'k'ya:di' deyatchinanne*** or farming without canal irrigation. This is often called "dry farming" in English. At Zuni, however, this English term is misleading. In fact, farmers really do "irrigate" these fields, using different techniques to bring water that falls as rain outside of the fields, into the fields to water their crops. In other words, these fields are irrigated with rainfall runoff from surrounding areas, or by capturing water from arroyos.

For many generations, Zuni farmers have known how to select these sites for successful rainfall runoff fields. Most of these fields are located in areas that receive extra runoff water from nearby slopes or drainages. They are often areas where water washes in fertile soil that's good for crops. A combination of labor-intensive farming and conservation techniques together with proper site selection make the most of available water, and have made long-term farming in these rainfed fields possible at Zuni.

Zuni farmers have their own soil terms that they have developed and used for centuries. The soil washed in by water is called ***heyalo:we*** ("alluvial" soil). Fan-shaped deposits of alluvial soils occur where the slope changes from steep to gentle, and the water flowing in streams or arroyos drops its load of soil. Low terraces along streams (***kudela:we***) also frequently contain young, alluvial soils deposited by recurring floods.

## Soil Sampling

During the last several months we have sampled soils in a number of rainfed fields by making five-foot deep holes with a tool called a soil auger. It makes a hole about 4 inches wide. Each time the auger brings up soil from deeper and deeper in the hole, the soil can be laid out on the ground so that we can see what the soil looks like in the area where crops' roots grow. The soils are usually made of layers of contrasting textures. This is because the soils have been deposited over many, many years by water flowing at different speeds. The water also deposits organic matter along with the soil particles, increasing soil fertility and the ability of the soil to hold water.

These sites not only receive extra water from runoff, but actually provide more water to crop roots because the layered soils slow the downward movement of water. Soils contain a mixture of different sized particles: sand (the largest), silt, and clay (the smallest), which determine the soil texture. Soils with different textures have different sized spaces, or pores, between the particles, through which water and air move.

## Pros and Cons of Layered Soils

When soil texture changes abruptly from one layer to the next, the sudden change in pore space slows the downward movement of water. For example, when a 12-inch clay layer is on top of a sandy layer of soil, water is held up in the clay layer, and the upper root zone remains moist for a longer time. When a sandy surface layer is on top of a clay subsoil, water moves quickly down through the big pores in the sandy layer, and slows almost to a stop above the clay layer. The sandy soil above the clay acts as a mulch to slow down evaporation. Deep plowing which mixes up such layers may actually decrease the ability of the soil to hold water in the upper root zone.

These layered alluvial soils are a valuable part of good rainfall runoff farming. However, the same kind of layering in canal irrigated fields that receive much more water can be bad for crops. When too much water is applied to soils with layers of very different textures, waterlogging may occur and with time lead to high salt and sodium levels in the soil which are bad for plants. (*See* "Soil Management for Sustainable Zuni Agriculture," p. 6)

The Zuni Sustainable Agriculture Project will be buying two five-foot soil augers that will be available for Zuni farmers to borrow and test the soil textures and soil moisture content in the root zone of soils in their own fields. Call ZSAP at 782-5851/5852 for more information.

# *Update on the Pescado Irrigation Unit Activities*

*by Donald Eriacho*

Since March 19th a lot has happened in the Pescado Unit with every Sunday as work days for the Unit. We have worked on the existing pipe on both the south and north sides by installing turnouts for the fields so the farmers can irrigate on the northside by letting the water run into the open ditch from the pipeline. Before this it was impossible to irrigate any fields west of there. We also installed a shutoff at Mr. Ira Bowannie's field because water wouldn't come out from the pipeline due to the location of the existing turnout. Now four farmers can benefit from it.

With more people from the Pescado area getting back into farming and participating in the Zuni Irrigation Association, we are extending the area

*A check dam built by Jones Quam to stop erosion on his rainfed field in Nutria.*

irrigated. We have opened up an old ditch on the north side of the village where the pipeline ends. This ditch had not been in use since the 1940s according to one elderly farmer. We had to remove two culverts that crossed two main roads which had silted in and were buried underground. It took quite a bit of hand labor with picks and shovels to remove them. We arranged with the BIA Zuni Agency Natural Resources and Roads Maintenance Departments to put a new culvert in one of the main access roads leading to Nutria. This open ditch will accommodate at least ten families on that side. We also appreciate the cooperation of the BIA Zuni Agency's deep plow program. Deep plowing was completed in Pescado on the 16th of July and about 42 fields were plowed.

Everybody's got their first cutting of hay in, and are beginning their second cutting. We have tried something new this year with irrigation. We have limited the number of days to irrigate to seven. This was done so that everybody could have a chance to irrigate and to save the water, so that farmers might be able to irrigate a second time around, and maybe a third time. It seems to be working so far with only a few complaints. We'll find out the results at the next unit meeting which has not been scheduled as of this writing. We are hoping for an abundance of crops this year from all irrigation districts, and for a good monsoon season, but knowing that we will have to make do with whatever rain we receive from nature.

*Editors' note: Donald is the President of the Pescado Irrigation Unit as well as Assistant Director of ZSAP. In addition to news from the Pescado and Nutria Units, we would like to publish news from the Zuni, Ojo Caliente and Tekapo Units in future newsletters.*

# *Alfalfa: A crop for sustainable agriculture at Zuni*

*by Steven E. Smith*

Alfalfa was brought to the western US in the mid-1800s, although acreage did not expand much until the 1930s. In New Mexico, alfalfa is now the most important crop and is grown on about 250,000 acres. Alfalfa is so widely grown because alfalfa hay is an excellent source of high-protein feed for all types of livestock. In addition, alfalfa also provides valuable nitrogen fertilizer and soil organic matter for crops grown after the alfalfa stand has been plowed. This, along with the generally high value of the hay crop, make alfalfa a valuable element of sustainable agriculture in many areas of the southwestern US.

*Alfalfa plant and a close-up of a flowering stem. USDA drawing.*

## Improving Zuni Alfalfa Production

Improving alfalfa production at Zuni could be possible by experimenting with one or more of three factors: irrigation practices, harvest management, or alfalfa varieties. Irrigation is crucial for good alfalfa production in areas like Zuni that receive an average of less than 20 inches of precipitation each year. Since the 1950s there has been much research conducted on irrigation and harvest practices with alfalfa. Many new alfalfa varieties with higher yield potential and resistance to diseases and insects have also been released in the last 20 years. I am visiting Zuni in late July as a consultant for the Zuni Sustainable Agriculture Project to talk with farmers growing alfalfa about their production practices and varieties. We will discuss possibilities for experimenting with each of the three factors listed above. Below are some general comments about these factors for you to think about.

## Irrigating Alfalfa

Alfalfa tolerates drought well, but for good production it requires more water than most crops because of its rapid and heavy growth. Attention to soil moisture is especially important when establishing new stands of alfalfa. Drought kills more seedling alfalfa plants than any other cause. Seedlings require more frequent but lighter irrigations than mature plants. Alfalfa stands that do not establish well very often have more severe weed problems. Once stands are mature, less frequent, heavy irrigations will generally lead to higher levels of productivity than more frequent, light irrigations.

On most soils at Zuni, a heavy irrigation means applying about 4 to six inches of water. It is a good practice to irrigate as close as possible to the time of cutting to supply sufficient moisture for rapid growth of new stems and leaves after harvest. Typically, maximum growth of alfalfa stops sometime before plants begin to wilt. Moisture stress, indicated by a blue-green color of leaves, develops before severe wilting, and can be used to schedule irrigations. Salts may accumulate to dangerously high levels in soils irrigated over long periods of time or if low-quality water with a high salt content is used. Applying excess irrigation water once or twice a year will help to wash salts below the root zone, provided the soil has adequate drainage. (*See* "Soil Management for Sustainable Zuni Agriculture: A Nutria example", p. 6)

## Harvest Management

Alfalfa can be managed at Zuni so that harvests can be taken from late spring through the summer and into the fall. The stage of development of the plants should be used to determine when harvests should be taken. Ideally, the crop should be harvested when about 10% of stems have open flowers. Harvesting earlier will tend to lead to reduced plant life, while harvesting later will result in low-quality hay and perhaps fewer cuttings per year and lower total yields. Once the decision to harvest is made, all operations related to harvest (mowing, raking, baling, and bale removal) should be completed as quickly as possible. Leaving windrows or bales in the field longer than necessary will greatly reduce the growth of plants underneath.

## Varieties

Seeds for many, different alfalfa varieties could be purchased by Zuni farmers. However, some varieties should do much better than others. During the last 30 years there has been a tremendous effort by seed companies to develop alfalfa varieties adapted to many different environments, including those of northern New Mexico. Alfalfa is grown in areas with very short seasons (much shorter than Zuni's), as well as in regions with very long seasons.

One of the most significant differences between alfalfa varieties is in the length of growing season they are adapted to. The variety Ranger is now commonly grown at Zuni. Ranger was released by breeders to farmers in 1942, and is most common in areas where two or three harvests are taken in most years. It is possible that newer varieties may permit additional harvests and better use of the entire growing season at Zuni than Ranger does. Yield trial data from Farmington as well as Grand Junction, Colorado, which have climates very similar to Zuni's may help us to select different varieties for Zuni farmers to experiment with in plots in their own fields.

*Editors' note: ZSAP is bringing in some outside consultants to work with Zuni farmers and gardeners on specific topics. This article is a summary of some information about alfalfa by Steve Smith, ZSAP alfalfa consultant, before he visited Zuni.*

*Steve Smith is an Associate Professor of Plant Sciences at the University of Arizona in Tucson. He has been researching and breeding alfalfa for over 15 years and is the head of the US Department of Agriculture's national Crop Advisory Committee on alfalfa. Steve visited Zuni July 21-23 and spent one and one-half days touring large and small alfalfa fields in different areas of Zuni and talking with farmers. He gave a slide show followed by community discussion about alfalfa and alfalfa growing on Thursday July 22 in the Tribal Assembly Room. We will report on his visit in the next issue of* ***Zuni Farming****. For more information call ZSAP at the Zuni Conservation Project Office, 782-5851/5852.*

# *Western Sustainable Agriculture Working Group*

*by Donald Eriacho*

On May 7th and 8th I represented the Zuni Sustainable Agriculture and Zuni Folk Varieties Projects at an organizing workshop for a western Sustainable Agriculture Working Group Structure (SAWG). This meeting was organized by Paul Reichart of the Alternative Energy Resources Organization (AERO) based in Helena, Montana, and Nancy Taylor of the Palouse/Clearwater Environmental Institute (PCEI), in Moscow, Idaho. The first SAWG was established for the midwestern region of the United States four years ago, and one for the southern region last year. This meeting was a first for our western region. The workshop brought together organizations promoting sustainable agriculture from the western part of United States and Canada. We met in Park City, Utah. The twelve participants came from as far away as New Mexico and Alberta, Canada.

A SAWG for this western region would work on issues that improve rural economics, communities, family farms, ranches and the environment. The

purpose of this workshop was to see if there was interest among the different organizations represented in overseeing the development of a western regional SAWG, and to work with AERO and PCEI staff to survey and recruit other participants. We worked on a mission statement, a name for the Western SAWG, defining limits for our western region, a working structure for the SAWG, and how to deal with federal farm bill activities. We also considered issues facing farmers who are trying to farm more sustainably, including those growing crops organically, and how to empower grassroots organizations interested in promoting sustainable agriculture by sharing resources.

We shared common first-hand experiences about farming with heavy chemical use in our home areas. Everyone attending the workshop seemed to have a common goal: farming in ways that will not deplete our natural resources, or what is called long-term farming. This means farming in ways to get the best yield from mother earth and at the same time protect her from all harm, so that our children and their children and all humankind can benefit.

Here in Zuni our system of farming developed by our ancestors has been such that enough crops were grown to sustain the tribe, with enough surplus to trade with other tribes in the region, and with other people passing through Zuni on their way west. Even the US soldiers who established forts near the reservation depended on Zuni farmers for food. The rainfed ("dryland") type of farming that was practiced by them is still in use today here in Zuni (*See* "Soils in Zuni Rainfall Runoff Fields," p. 8). This system depends on directing rainfall into fields from surrounding areas and arroyos, and has worked well for centuries. Zuni farmers also successfully irrigated with canals fed by springs and small reservoirs, long before the US government built large dams here. (*See* "Soil Management for Sustainable Agriculture: A Nutria example," p. 6).

The two-day workshop ended with a commitment by participants to continue discussions, for example through conference calls. We have all reported back to our respective organizations, to see if there would be interest enough in our region to join such a western SAWG. It was very educational for me to meet and exchange ideas with the other participants at the workshop.

During our first conference calls in June and July we decided to conduct a survey of groups in the region with an interest in sustainable agriculture, and work was begun on a long range workplan. A draft mission statement was also produced which reads: To empower those with an interest in sustainable agriculture, by bringing them together to share resources and collaborate, to promote a greater understanding and use of sustainable agriculture options.

## Interviewing Our People about Our Peach Orchards

Since I started working with the orchard surveys in March, it has been rewarding to get reacquainted with a lot of the people I have not talked to in quite awhile. I have learned a lot of Zuni history, including the ways we have sustained themselves for centuries. One of these ways was by growing food and trading produce with other tribes. Dried peaches, for example, were often traded with Navajos for mutton. Many elders still remember the good and bad times that were had at the orchards, and the abundance of peaches produced in good years. During seasons of drought the people never gave up hopes of a better tomorrow, because as people closely tied to mother earth, we have all worked together in ways that will continue for generations to come. Today, people whose families had orchards at Dowa Yalanne and elsewhere are very interested in reestablishing them. Our hopes are high that we can work together to keep what has sustained our Zuni people for such a long time. We hope that it will do the same for our children and their children, and for many more generations to come. *Donald Eriacho*

# Zuni Peach Orchards, Part II

*by David Cleveland, Donald Eriacho, Daniela Soleri, and Lygatie Laate*

As part of both the Zuni Folk Varieties Project and the Zuni Sustainable Agriculture Project, we are working with the Zuni community to plan for reestablishing the peach orchards at Dowa Yalanne. If this is successful, it could lead to reestablishing orchards elsewhere at Zuni too.

So far, Donald Eriacho, working with Lygatie Laate and Harry Chimoni, has interviewed over 30 Zuni families that used to have orchards on Dowa Yalanne, and several others who had orchards in other locations at Zuni. (See interview form pp. 14-15) We've also visited five orchards in addition to Dowa Yalanne.

In this article we present some of the information people have provided so far. In the next issue of ***Zuni Farming*** we'll summarize all the interviews and present a plan based on these for reestablishing the orchards at Dowa Yalanne.

Most people remember three Zuni varieties of peaches. ***Ts'ikkwa batchi*** has white-fleshed which clings to the pit, and a dull orange skin which is tight to the flesh, ***Hekkwi ɬupts'i*** has yellow flesh and a free pit. ***Dowa mo:chikwa datdanne*** means ancient peach tree, and is said to be smaller than the other Zuni varieties, and fruits with lime-green skin with a little red, and orange flesh, which is very soft, so that the pit pops out easily when the fruit is squeezed. Most families believe that Zuni peach varieties are sweeter and smaller than commercial varieties, and are better adapted to the dry conditions here. They also believe that it is important to save these old varieties, and not give them to non-Zunis.

Most families started new trees from seed. The seed was usually left outside over the winter to freeze, which cracked the shell. Often the pits were thrown in piles as peaches were prepared for drying, and covered with dirt. The seedlings were later thinned out and then transplanted. A few people mentioned starting new trees by transplanting young branches they encouraged to sprout from the base of old trees that they cut down (*See* "Peach Tree Care and Propagation", p. 1).

Tending the trees included pruning, irrigating with rain or spring water, and protecting from wind, pests and freezing. Pruning was done by many of the families, usually just of dry branches, ***da k'us na:we.*** Piles of manure were set on fire on spring nights when a frost was suspected. One elderly Zuni man remembers directing water to the basins around the trees during an early spring thaw, then covering it with dirt when it froze. The dirt helped slow the melting of the ice, and the cold ice delayed flowering of the peach trees, which helped them escape damage by late frosts.

During ripening and harvesting people lived in the orchards in small stone houses or three-walled shelters. Many of the peaches were split and dried on flat rocks, boards, baskets or flour sacks, and carried back to the village by the people on burros or in wagons.

Most of the families we have interviewed are very interested in reestablishing the peach orchards at Dowa Yalanne and elsewhere at Zuni, and approved of mapping the orchards and settling any disputes, fencing them, finding seeds for Zuni varieties, and working with Zuni school students.

If you remember your family peach orchards on Dowa Yalanne or elsewhere, and have not been interviewed, you can contact us at the Zuni Folk Varieties Project (782-5851/2) to schedule an interview, or give input into the effort to reestablish the Dowa Yalanne orchards.

## *Reestablishing the Peach Orchards at Dowa Yalanne*

Name of person(s) interviewed_____ Est. age_____

Telephone # _____ P.O. Box # _____

Household #_____ Date:_____ 1993 Interviewer:___ ***Is confidentiality form signed?*** ____

The **Zuni Sustainable Agriculture Project** and the **Zuni Folk Varieties Project** are working with the Zuni Community to plan for reestablishing the peach orchards on the east side of Dowa Yalanne. We met in February to begin talking about plans. Before we meet again we want to talk with the families that had orchards on DY. We want to know if you are interested in working with others to start the orchards again, and your ideas about how to do it.

**But first we want to ask you some questions about the orchard and trees your family used to tend on DY.**

1. When did your family last tend their trees on DY? _____
2. Who was the last person in your family to tend the trees there? _____
3. When did your family last harvest fruit from the trees at DY? _____
4. Did your family own the orchard land, the fruit trees, or both? _____
5. What types (varieties) of peaches did your family grow on DY? _____
6. About how many peach trees were in your family's orchard? _____
7. What other kinds of fruit trees did your family grow on DY? _____
8. Did your family save peach seeds to plant?___ **[IF YES]** How did they save and plant the seed? _____

8a. Did your family start new peach trees in other ways (e.g. ***dabatchishna***)?___ **[IF YES]** How? _____

9. Did your family transplant peach trees?___ **[IF YES]** How?_____
10. Did your family prune the peach trees?_ **[IF YES]** How? _____
11. Did your family direct rainwater to the peach trees?___ **[IF YES]** How? _____
12. Did your family provide other water to the peach trees?___ **[IF YES]** How? _____
13. Did your family protect the peach trees from freezing?___ **[IF YES]** How? _____
14. Did your family protect the peach trees from insects and other pests?___ **[IF YES]** How? _
15. Did your family protect the peach trees from the wind?___ **[IF YES]** How? _____

*These are the questions being asked in the peach orchard interviews*

16. Did your family remove weeds from the orchard?___ **[IF YES]** How?_____
17. Are Zuni **peach trees** different than commercial peach trees when grown at Zuni? **[IF YES]** In what ways?_____
18. Are Zuni **peaches** different than commercial peaches?___ **[IF YES]** In what ways?_____
19. Did your family dry any of the peaches they harvested?___ **[IF YES]** How were they dried and used? _____
20. Did your family process or eat the peaches in other ways? ___ **[IF YES]** How?_____
21. Did your family sell or trade peaches from their orchard? ____ **[IF YES]** How?_____
22. Is it important to make sure that old Zuni peach varieties are not lost?____ Why?_____
23. Should non-Zunis be given seeds of Zuni peaches?___ Why?_____
24. Did your family have a house or shelter in the orchard?___ **[IF YES]** What kind?_____
25. Where was your family orchard located? _____
26. Would your family like to work with others to reestablish your orchard on DY?_____
27. What member of your family is now responsible for the orchard?_____
28. Did your family have orchards in **other places** at Zuni?___ **[IF YES]** Where?_____

**What do you think about the following ideas for starting the orchards on Dowa Yalanne again? Do you have specific suggestions about how to do them?**

29. Mapping the area (field houses, dead trees, roads, trails, springs):_____
30. Using the map to reach agreement on the areas each family has rights to, and mark these on the map: _____
31. Rebuilding the old road, and perhaps making new roads: _____
32. Fencing to protect the orchard from sheep and vandals: _____
33. Building of berms and other structures to channel rainfall runoff to the trees:_____
34. Development of springs and seeps for supplementing water for the trees: _____
35. Finding seeds for traditional Zuni peaches to plant at DY: _____
36. Starting traditional Zuni peach trees by cutting or grafting:_____
37. Working with Zuni school students on projects at the peach orchards:_____

# The Zuni Sustainable Agriculture and Zuni Folk Varieties Projects in Zuni Schools

*by David Cleveland and Donald Eriacho*

A major long-term goal of the Zuni Sustainable Agriculture and Folk Varieties Projects is to integrate Zuni farming into the Zuni schools at all grade levels. During the past year we made a presentation on the projects to the Vocational Agriculture classes at Zuni High School, a series of presentations to a class at A:shiwi Elementary, and helped with the Elementary Schools' Science Fair.

During the last school year David Cleveland and Donald Eriacho gave three presentations on the history and science of Zuni farming to the fourth grade class of Jennifer Dotson and Tanya Sheka at A:shiwi Elementary School. The purpose of the presentations was for our projects and the schools to have the experience of working together with students.

Our first two presentations focused on traditional Zuni farming, the affect of the European invasion from the 16th century to 1993, and the role of the Zuni Sustainable Agriculture and Folk Varieties Projects in the revitalization of Zuni farming. We worked with Jennifer Dotson to integrate our presentations into the history curriculum. We helped students to answer questions like

- What does sustainable agriculture mean?
- Where in the western hemisphere did Indians start farming and with what crops?
- What is farming, and why is it so revolutionary?
- What is the difference between a crop plant and a wild plant?
- Who were the ***awu:wu:na:awe:kwi:kowa*** (forefathers, also known as "Anasazi") and how did they first make a living?
- How did Zuni farmers work with the environment to produce abundant yields?
- How does Zuni religion work with farming and the environment?
- What effect did the Spanish invasion have on Zuni farming?
- Why did the Anglos move west and what did they do here?
- How did the US government treat the Zunis and other Indians?
- How did US government agencies contribute to the reduction of Zuni farming?
- How much Zuni farm land has been lost over the last century?
- How are the Zuni Sustainable Agriculture and Zuni Folk Varieties Projects working with the Zuni Irrigation Association and the community to increase Zuni farming?

Our third presentation and our work with students in the science fair focused on the science of Zuni farming, and we worked with Jennifer Dotson to integrate our presentations into the fourth grade science curriculum. We helped students to answer questions like

- What is a seed, and how is it formed?
- How does it germinate and grow into a plant?
- Where do Zuni folk crop varieties come from?
- Why are Zuni folk varieties important for the future of Zuni farming?
- How can Zunis protect their FVs?
- Where and how do Zunis plant rainfed (dry farmed) crops?

We helped students Ina Walters and Cassie Eploose to prepare science fair experiments to see the effects of different soils on the germination and growth of Zuni blue corn seeds. Donald collected soil of different textures from different places at Zuni. The students helped to identify the soils according to texture, and

*Donald Eriacho speaking about Zuni agriculture with Jennifer Dotson's fourth grade class at A:shiwi Elementary School.*

measured the progress of the corn seedlings in the different soils.

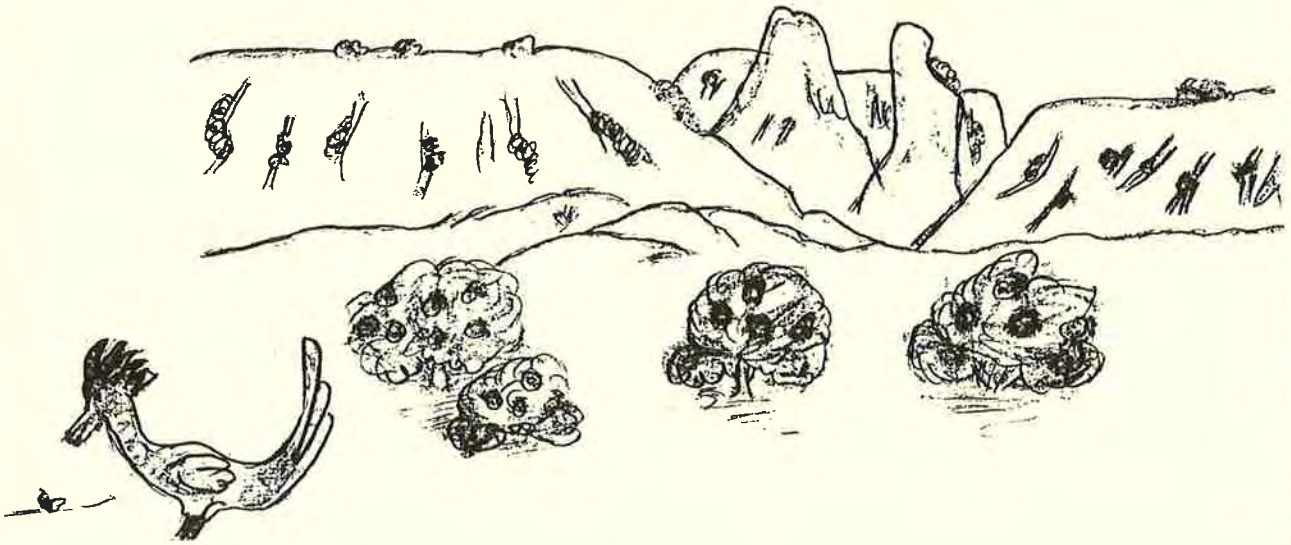
We also worked with Andres Cheama, hydrologist with the Zuni Conservation Project, to help Shelly Edaakie prepare an experiment to show the effect of check dams on soil erosion.

Lygatie Laate gave a presentation to the class on the history of Zuni peach orchards and how to plant them. Donald and Lygatie helped the students to plant peach seeds of Zuni peaches donated by Edison Lasilute. Each student wrote a paper about Zuni peaches (*See* Box below), and took one potted peach seed home for the summer. Before taking the planted seeds home, each student signed "Official Adoption Papers" which state "I solemnly swear to protect my seedling from the cold, wind & wild animals. I will give it lake or rain water & and patient loving care forever and always."

*Science Fair experiment on soil erosion by Shelly Edaakie.*

We will be involved with more Zuni school classes in the future. Neilly Buckalew is working with ZSAP from June through September. She is an elementary school teacher from Vermont who has worked with Foodworks, a nonprofit organization, to integrate Native American viewpoints into the classroom. At Zuni she will be networking with teachers and administrators of the Zuni Public Schools to help plan for integrating materials from the Zuni Sustainable Agriculture and Zuni Folk Varieties Projects into curricula at all levels. During implementation beginning next year we will be working with teachers in the Zuni School system to write curriculum materials.

At Dowa Yalanne there are dead trunks and stumps of peach trees. Now the place is covered with junipers, but there are a few trees and orchards. In 1928-29 there were about 14 families still taking care of the orchards that were on Dowa Yalanne. Over at Twin Buttes there were over 400 acres of peach trees planted. The reason why the peach trees died are probably because people wouldn't take care of them. The trees were adapted to live in the dry climate. The Kachinas gave the Zunis corn and other seeds. *by Kalani, fourth grade, A:shiwi Elementary School.*



# Zuni Farm Products: An informal survey of the opportunities

*by Daniela Soleri*

A number of Zuni farmers and gardeners have shown interest in the possibility of marketing some of their crops. Their customers could include other members of the Zuni community as well as the visitors who pass through Zuni. But what really are the opportunities? The Zuni community wants fresh, flavorful vegetables and dried goods such as beans and corn. Of course, the best source is your own garden or field. For those without a field or garden, or whose harvest isn't always enough, family, friends, local stores and street vendors are the source. What opportunities are there for Zuni farmers and gardeners to sell produce?

Did you know that here in the village, Halona Plaza store buys wholesale over $50 worth of cilantro, $143 worth of fresh sweet corn, and $190 worth of chiles from its produce distributor each week during the summer?

Another marketing possibility is selling to people outside the community. To start investigating this possibility the Zuni Sustainable Agriculture and Zuni Folk Varieties Projects are asking visitors to the Pueblo of Zuni Arts and Crafts Center to answer the short survey shown below. The purpose is to give Zuni farmers and gardeners who are interested in marketing an idea of what the potential might be for sales to visitors. This little survey won't give any firm numbers, but it will provide a feeling for visitor interest in purchasing Zuni agricultural produce. It is up to the farmers and gardeners to decide if they want to try marketing some of their harvest.

## ☆VISITORS TO ZUNI!☆

*Please take one minute to help us make your next visit more enjoyable. Did you know that the Zuni have long been famous for their farming skills? In the 1800s Zuni farmers grew most of the staple foods used by the US military at Fort Wingate. The Zuni Sustainable Agriculture Project, a program of the Tribe's Zuni Conservation Project is working with Zuni farmers to explore possibilities for commercial sales of produce from their fields and gardens. Your answers to the following questions will be a big help. Please mark the appropriate answer.*

As a visitor to Zuni, would you be interested in buying Zuni-grown fresh produce (cilantro, chiles, tomatoes, squash, melons, peaches)? YES ❑ NO ❑

As a visitor to Zuni, would you be interested in buying Zuni-grown packaged farm products such as whole blue or white corn, cornmeal, dried beans, or dried peaches?
YES ❑ NO ❑

If the products were grown from traditional Zuni crop varieties (as compared with standard commercial varieties) would you be:
- ❑ more interested
- ❑ less interested
- ❑ it would not make a difference

If the products were organically grown (without herbicides or pesticides) would you be:
- ❑ more interested
- ❑ less interested
- ❑ it would not make a difference

If they were available would you consider buying traditional Zuni foods made from Zuni-grown farm products? YES ❑ NO ❑

# *Zuni Crops and the Zuni Name: A survey of community opinion*

*by Daniela Soleri*

Have you ever been to the grocery store and seen "Zuni Gold Popcorn" on the shelf? This is a brand being sold by a company in Nevada. How about "Hopi Blue Popcorn", trademarked by a company in Michigan? There is no evidence that these are truly Zuni or Hopi products, but the names of the tribes are being used to sell them to people all over the country.

More and more people around the country and around the world are becoming interested in special and "traditional" food crops and foods. For some, the reason is the characteristic of the crops such as ability to resist drought or diseases. Others are interested in the special tastes, the health benefits, or the "novelty" of the crop or food.

Often the farm community that developed the crop and food is not asked for permission and is not given any of the profits. Some communities are responding. For example, Indian women from the White Earth Reservation in Minnesota formed the Ikwe Wild Rice Cooperative in 1987 in an effort to provide a surer income to their members harvesting wild rice in reservation lakes. They also wanted to counter the effects of some California companies that are growing large fields of rice and packaging and selling it as "wild rice", which it really is not.

For whatever reasons, Zuni seeds, Zuni foods, and even the name "Zuni" itself are used by people other than the Zuni. Many people in the Zuni community are familiar with this problem in the case of so-called "Zuni" jewelry being produced elsewhere and sold as a Zuni product. Zuni crafts people neither make the pieces or receive any benefits from such sales.

What do the Zuni people think about this in the case of agricultural products? Should Zuni seeds, foods and the Zuni name be shared with all people? What if those people want to make money from them? Should those profits be shared with the Zuni people? To find out Zuni opinions about these issues the Zuni Folk Varieties Project has written up four possible situations with three to four alternative responses (*See* pages 20-21). We are surveying Tribal Council members, members of the Zuni Cultural Resources Advisory Team, and members of the Zuni Irrigation Association, as well as other community members for their opinions of the responses. We will summarize these opinions in the next issue of ***Zuni Farming***, in other publications, and on a community radio broadcast. A summary of the responses will also be included in the ZFVP final report that will be used to suggest policy options for Tribal Council consideration. What do you think about these questions? Have a voice in this discussion, call Daniela, David, or Donald at 782-5851/5852 or come see us at the Zuni Conservation Project Office.

## A Zuni Harvest Fair?

Are you interested in participating in a ***Zuni Harvest Fair*** this fall? Farmers and gardeners could display and sell their produce or healthful foods they have made from their produce. Prizes could be offered for harvests of traditional Zuni crops, and other crops too, like alfalfa. The Fair could be advertised in the **Independent** and other papers in the region and good attendance from inside and outside the community could be expected. "Could, could, could...!" A ***Zuni Harvest Fair*** will only happen if the community wants it to. If you want to participate give Daniela, Donald, or David a call at 782-5851/5852.

## Zuni Folk Varieties Project

The purpose of the f*ollowing questions is to find out your opinions about how traditional Zuni food crops should be used and controlled. This will help the community in discussing and making decisions about those issues. The scenarios are fictitious, but all of them describe things that could easily happen here at Zuni, and some have already happened in other Native American communities. The answers we get to these questions will be summarized in the Zuni Folk Varieties Project Newsletter and other publications, and on a community radio broadcast. All of the individual responses are confidential. Thank you for your participation!*

**********

1. Bill Barker is a seed collector with Kaleidoscope Seeds in California, a company that specializes in selling "old-time" seed varieties. His company is looking for new corn varieties to sell to their customers. Bill visits Zuni in October to collect seeds of traditional blue and white corn. He drives around the fields and stops to talk with farmers while they are harvesting corn.

The first farmer, **Ted**, sells Bill five pounds of shelled Zuni white corn and five pounds of shelled Zuni blue corn that Kaleidoscope Seeds will plant on their California farm to get enough seed to sell. They will not need to return to Zuni for more seed.

The second farmer, **Elma**, sells Bill one fifty pound bag of shelled Zuni white corn and one fifty pound bag of shelled Zuni blue corn that Kaleidoscope Seeds will package into five ounce packets to sell directly to its customers. Elma also made Bill sign an agreement that any Zuni blue or white corn seed that Kaleidoscope sells will be purchased from Elma, not increased by Kaleidoscope on its California farm.

The third farmer, **Will**, refuses to give or sell any Zuni corn seeds to Bill, saying they are the gift of the creator and should not be taken away from Zuni.

The fourth farmer, **Evan**, takes Bill to the Tribal Council, and together they agree on a contract between the Zuni Tribe and Kaleidoscope Seeds that guarantees that any Zuni corn seeds sold by Kaleidoscope will be purchased directly from Tribal members and none of these seeds will be increased by the company.

***Which farmer do you think had the best response?***

***Why?***

***Is there another response not described above that you think is better? If so, what is it?***

2. Ed Jones, a scientist with Better Seeds International, a large seed company, visits Zuni in October to collect seeds of traditional blue and white corn. His company is looking for corn varieties that are resistant to drought, so that they can use them in breeding programs to develop commercial corn varieties that Better Seeds would then sell. Ed drives around the fields and stops to talk with farmers while they are harvesting corn.

The first farmer, **Dan**, gives Ed Jones seed only after he makes Ed sign a contract stating that if Better Seeds International ever makes any money from the seeds he has given, that they will pay Dan a fair share.

The second farmer, **Ethel** sells him 10 ears of white and 10 ears of blue for a total of $20.

The third farmer, **Mary**, takes Ed to the Tribal Council, and together they agree on a contract between the Zuni Tribe and Better Seeds International that pays the individual farmer

*The questions being asked in the survey concerning Zuni crops and the Zuni name*

for the seeds, and gives the Tribe a share of any profits made by the Company based on use of the Zuni seeds.

The fourth farmer, **Jerry**, refuses to give Ed Jones any seed, saying that they are a gift of the Creator, and should not be given to non-Zunis.

***Which farmer do you think had the best response?***

***Why?***

***Is there another response not described above that you think is better? If so, what is it?***

3. Four Zuni farmers have been enlarging the area they plant to Zuni blue corn over the last several years. They now have more than enough to satisfy the needs of their families and extended families.

The first farmer, **Grace**, says that she would rather earn a little extra money by farming than washing glasses at Witch Well every Friday, and she thinks they should sell blue corn in the village, but only to other Zuni people.

The second farmer, **Alfred**, agrees with Grace but says that there are a lot of outsiders and tourists who would be willing to pay for traditional Zuni blue corn, and that they should market it to these people also.

The third farmer, **Winston**, thinks that they should stop growing blue corn, since they have enough to meet family and extended family needs, and its not right to sell traditional Zuni crops.

The fourth farmer, **April**, agrees with Alfred about marketing to both Zunis and non-Zunis except that she thinks that only ground cornmeal should be sold to non-Zunis so that no traditional Zuni corn seed would be sold.

***Which farmer do you think had the best response?***

***Why?***

***Is there another response not described above that you think is better? If so, what is it?***

4. A group of four farmers has started a farmers' market at Zuni specializing in traditional Zuni crops like blue and white corn, chilies, string beans and squash. They have been very successful, selling to both Zuni and non-Zuni customers and some of them are selling some of these products off the reservation. A group of Anglo farmers in a nearby town has noticed the success of the Zunis, and they have begun growing Zuni crops and have started packaging blue corn meal and selling it as "Zuni Blue Corn Meal."

The first Zuni farmer, **Carol**, thought that they should apply for a trademark on the name "Zuni" for use with farm produce. Then their group would be the only one that could legally use the name.

The second Zuni farmer, **Bernice**, said that they should just ignore the Anglo farmers, and continue what they are doing.

The third Zuni farmer, **Victor**, agreed with Carol, but thought that they should work with the Tribe to get a trademark for use by any Tribal member.

The fourth Zuni farmer, **Neil**, said that they should tell the Anglo farmers to stop growing Zuni crops and selling them with the Zuni name, but if that didn't have an effect it wasn't worth doing anything else

***Which farmer do you think had the best response?***

***Why?***

***Is there another response not described above that you think is better? If so, what is it?***

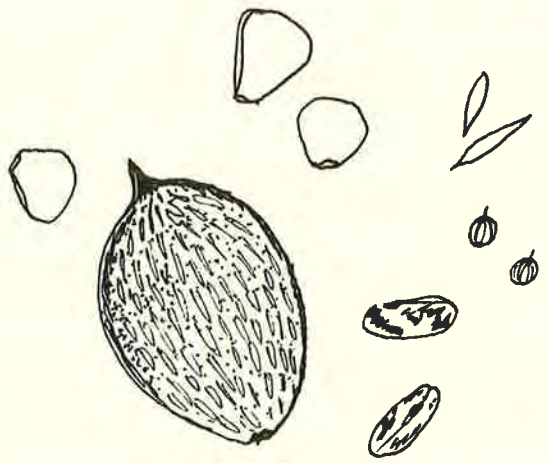
# The Zuni Community Seedbank (ZCS) and the ZCS Board

*by Daniela Soleri*

**What is the ZCS?** The Zuni Community Seedbank (ZCS) was originally established by the Traditional Crops Project of the Zuni Archeology Program (*See* "Birth of the Zuni Community Seedbank", below). The ZCS is a collection of small quantities of some Zuni folk crop varieties (also called traditional crop varieties) that were donated by members of the Zuni community. These collections were described and cataloged and then the seeds themselves put into plastic bags and placed in a freezer. Freezing them keeps the seeds longer and protects them from pests.

**Where is the ZCS located?** The seedbank is now being cared for by the Zuni Folk Varieties Project (ZFVP), a part of the Zuni Conservation Project, and is located at the Zuni Conservation Project Office.

**Why does Zuni need the ZCS?** The purpose for the collection of seeds in the ZCS freezer is to keep some seed as a back-up for crops being grown by only a few people, or by no one at all in the community.



*Seeds. D. Soleri*

The other purpose of the ZCS is to help Zuni farmers and gardeners obtain seed of Zuni folk varieties that they do not have and are looking for. The ZCS is doing this by creating a network of cooperating farmers and gardeners who are growing Zuni crops and are willing to share some of the seed with other farmers or gardeners. This network will help Zuni farmers and gardeners who are seeking specific kinds of Zuni seed to either contact

## The Birth of the Zuni Community Seed Bank

*by Carol B. Brandt*

To help increase the amount of seed for Zuni folk varieties (or traditional varieties) in the community, the Charles Lindbergh Fund provided support in 1991 for a survey of Zuni folk varieties and the establishment of a seed bank at Zuni. During the month of September 1991, Carol Brandt and Jerome Zunie of the Zuni Archaeology Program interviewed 50 Zuni Tribal members concerning the crops that they grow in their fields and gardens.

Among those surveyed, the most commonly grown food crops are maize, vegetables (such as broccoli, lettuce, chile), squash, and beans. The majority of the people interviewed were growing Zuni varieties of maize (72%), while Zuni folk varieties of beans (36%) and squash (28%) were grown by fewer people.

In late October, Carol and Jerome returned to those people who had expressed an interest in donating seed to the seed bank when they were interviewed. They received a number of donations to the seed bank, many of which are unique and may be grown by only one or two people at Zuni. Chile seed was donated by a woman whose mother and grandmother grew this chile in waffle gardens along the Zuni River in the late 1890s. Another surprise was the Zuni sweetcorn or ***shots i'do***. This variety grows quickly even without irrigation. Several people also donated seeds for the Zuni purple string bean or ***łapia' we'***. They also received seed for several different varieties of white corn.

The seed and all of the information on these crops is now stored at the Zuni Sustainable Agriculture Project (ZSAP) in the Zuni Conservation Project Offices near the Tribal Fair Grounds.

those with the seed directly, or if they prefer, to have the ZCS make the contact. Only small quantities of starter seed will be available through the network, and those who receive the seed will pay the network back by returning a specific amount of the seed they harvest to it. The details and guidelines for how this network will operate will be decided by the ZCS Board of Directors.

**Who will oversee the ZCS?** Day to day care of the ZCS is the responsibility of the Zuni Folk Varieties Project, which will become a part of the Zuni Sustainable Agriculture Project next year. Providing advice, direction and information about Zuni crop varieties and how the ZCS should be run will be the responsibility of the ZCS Board of Directors.

**What will the ZCS Board of Directors do?** The duties of the five member ZCS board will be to:

- Inform the community about the existence and purpose of the ZCS
- Work with ZFVP staff to develop seed distribution guidelines
- Advise the ZFVP concerning needs and concerns of the ZCS and of the Zuni farming community
- Meet four times a year to review ZCS activities, give advise, and discuss policy
- Work with the ZFVP director to advise the Tribal Council on policy issues affecting folk varieties at Zuni
- Act as the contact body for outside individuals and organizations with an interest in Zuni folk varieties

**What is in it for the board members?** Benefits for those who become members of the ZCS board include

Contributing to the revitalization of Zuni crop varieties, an important part of Zuni cultural and agricultural heritage and a valuable ingredient for sustainable agriculture at Zuni

Compensation for their time at the quarterly board meetings

Attending workshops or other events in the region to improve their knowledge and get them in touch with other communities working to save their own crop varieties.

**Are you interested in being on the ZCS board or do you know someone who you think would be appropriate? If so let Daniela, Donald, or David know. We can be reached at the Zuni Conservation Project Office 782-5851/5852.**

## Gardens are Important!

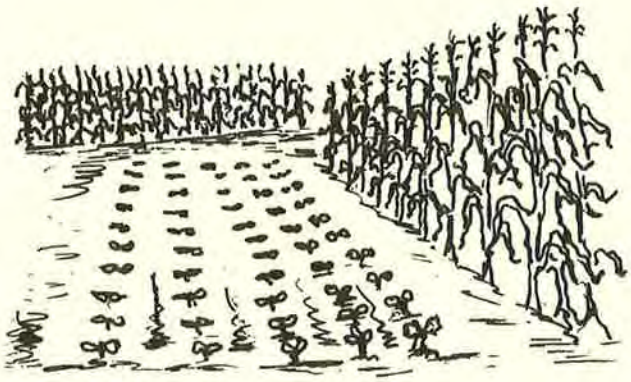
At Zuni ***hek:we*** (waffle gardens) have a long tradition. Some older Zuni people remember when the banks of the Zuni River where it runs through the village were lined with these gardens. They were a center of activity for the family, especially the women and children and produced many vegetables for the household meals.

Today the ***hek:we*** along the Zuni River have almost entirely disappeared. But many Zuni families continue to garden in small plots near their houses, and in the irrigation districts.

Gardens are important in many communities all over the world. Did you know that in 1985 40% of households in the US gardened and that they grew $12 billion (retail value) worth of produce? In comparison, commercial farms in the US that same year grew only $4 billion (retail value) worth of produce.

What can gardens do?

- Gardens can produce nutritious, flavorful food
- Gardens can save money for the household
- Gardens can provide good exercise for the whole family
- Gardens can be a way to share and pass on knowledge



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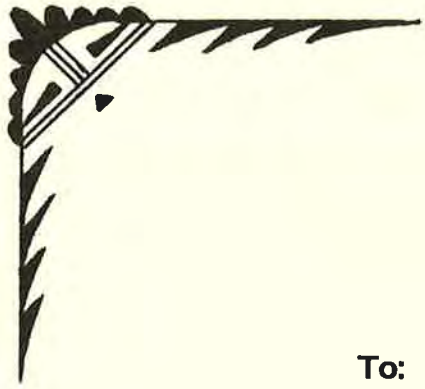
*David Cleveland Director*
*Donald Eriacho Assistant Director*

***Let Us Know What You Think*** *about any of the articles in this newsletter, or any other issues concerning farming and gardening at Zuni. You can talk with us at the Zuni Conservation Project offices (near the Fair Grounds, 782-5851/2), or write to us (P.O. Drawer 630, Zuni, NM 87327).*

## *In this issue of* ***ZUNI FARMING***





**To:**

***Zuni Farming***
**ZSAP/ZFVP**
**P.O. Drawer 630**
**Zuni, NM 87327**