



Agricultural Marketing Service

U.S. DEPARTMENT OF AGRICULTURE

AWARD YEARS 2021 AND PRIOR

This annual Performance Progress Report (PPR) must illustrate the progress made toward the completion of your project. If this project is completed at the time of the annual PPR submission, the project report should be marked as final. Please note character limits (abbreviated "char.") throughout.

PROJECT INFORMATION

Project Title (250 char.)	Lakota Traditional Plants Specialty-Crop Market Cooperative
Organization Name (250 char.)	Patricia Hammond, Rebel Earth Farms (& Partners)
Project Start Date	9/30/2020
Project End Date	9/29/2023

ORGANIZATION POINT OF CONTACT

Full Name	Patricia Hammond
Phone Number	605-858-8185
Email Address	patrisha_h@yahoo.com

BACKGROUND INFORMATION

PROJECT PROGRESS

Please provide the total percentage of work completed on the project.	100%
Is this a final report? Please select the box to the right if the answer is "yes".	☐

PROJECT BACKGROUND (REQUIRED FOR FINAL REPORTS)

Provide enough information for the reader to understand the importance or context of the project and any key findings. This section may draw from the background and justification contained in the accepted project plan. As the project has been completed, write this section in past tense. If this is an annual report, please skip this section. (1200 char.)

We looked at the connection between micro-organisms in the soil and beneficial properties inside plants of cultural-significance (gathered in the wild) to Lakota culture. We explored ways to cultivate these indigenous microbiology under cultivation. We developed new culturally significant Lakota specialty crops for up to 40 disabled tribal small farmers Pine Ridge Reservation. We explored cost-effective ways to bring these specialty crops to market via a re-purposed trailer with a digital air conditioner unit and CoolBot Pro. Despite several setbacks, including the effects of the Covid-19 global pandemic, we were able to achieve quite a few meaningful results. Primarily, the identification of 18 culturally-significant plants to the Lakota people, in use historically that could be cultivated for modern production inside a high-tunnel that would lead to larger yield in harvest, than those wild-gathered in nature. Thirteen were deemed most likely to succeed as a crop. The connection between soil micro-organisms and plant properties remains to be fully analyzed post-grant due to difficulties in getting collected samples to a Canadian lab before the samples degraded. This is under way.

OBJECTIVE(S) (REQUIRED)

Please provide the approved project's objectives from the accepted project plan. Use the boxes to indicate if the objective is in progress, has been completed, or is not (and will not be) completed. At the final report, if "no" is selected for any of the listed objectives, you must expand upon this in the Challenges and Developments Section. Additional objectives may be added as needed.

+	#	Objective (2,000 char.)	Objective Completed?
-	1	Objective 1: Increase the production of traditional Lakota Herbal Teas that Rebel Earth Farms (Patricia Hammond) started with in a previously awarded SCBG from the South Dakota Dept. of Agriculture that focused on these items. In that grant, she had one high-tunnel producing these teas. In this proposal, we'd be increasing the number of high tunnels from one to seven. We'd also be increasing it through the recruitment and training of 10 additional Lakota growers from across western South Dakota.	Yes
-	2	Objective 2: Do research into 13 additional traditional Lakota plants and mushrooms: ceyaka (wild field mint), tinpsila (wild prairie turnip), Sweetgrass, Wild Onion, pantego/plantain, prickly-pear cactus, Anise Hyssop, Bergamot, Echinacea, puffball, turkey-tail, field mushrooms, morals.	Yes
-	3	Objective 3: Do marketing research and outreach to: local, regional chefs (such as Sioux Chef, Sean Sherman), hotels, bed-n-breakfasts, coffee shops and restaurants as well as to institutions such as hospitals, colleges and national parks, etc.	Yes
-	4	Objective 4: Attend area Farmers Markets (such as the Black Hills Area Farmers Market in Rapid City, SD) to sell products, but also to conduct educational outreach to the general public about the value of specialty-crops that were historically used by the Lakota people. In addition, local restaurants and chefs do shop at the farmers market. In addition, towards outreach to the general public, we plan to conduct outreach to the schools and via the development of you-tube videos.	Yes
-	5	Objective 5: research into the beneficial properties and compounds of the traditional plants and mushrooms mentioned above. Research into what these compounds are in the wild (including the soil's indigenous microorganisms, an examination of what insects and other plants interact with these plants in the wild, and what mycorrhiza fungi may play in in the wild. etc.) versus what they become under-cultivation. In addition, we'll look at what's in the soil in the wild and how we can replicate that most closely under cultivation:	Yes

OUTCOMES

Please only report on the outcomes and indicators that are selected and approved for this project. Use the check boxes to indicate which outcomes and indicators are selected. Select the "N/A" box for any indicators that are not applicable.

1. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH INCREASED SALES



Please provide data on the sales increased as a result of marketing and/or promotion activities for this reporting period.

Indicators	Value	N/A
Dollar value of sales increased from initial (original) sales amount	\$1,000.00	☐
Dollar value of estimated final (resulted) sales amount (in dollars)	\$1,000.00	☐

2. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH INCREASED CONSUMPTION



Please provide the total number of children and youth reached and select the applicable indicators for this reporting period.

Indicators	Value	N/A
1. Total number of children and youth	166	☐
1.a. Of the total number in 1, enter the number of children and youth that gained knowledge about eating more specialty crops	166	☐
1.b. Of the total number in 1, enter the number of children and youth that reported an intention to eat more specialty crops	70	☐
1.c. Of the total number in 1, enter the number of children and youth that reported eating more specialty crops	166	☐

Please provide the total number of adults reached and select the applicable indicators for this reporting period.

Indicators	Value	N/A
2. Total number of adults reached	203	☐
2.a. Of the total number in 2, enter the number of adults that gained knowledge about eating more specialty crops	203	☐
2.b. Of the total number in 2, enter the number of adults that reported an intention to eat more specialty crops	175	☐
2.c. Of the total number in 2, enter the number of adults that reported eating more specialty crops	203	☐

Please provide the number of new and improved technologies and processes to enhance the nutritional value and consumer acceptance of specialty crops (excluding patents) for this reporting period.

Indicators	Value	N/A
3. Number of new and improved technologies and processes		☒

Please provide the number of new specialty crops and/or specialty crop products introduced to consumers this reporting period.

Indicators	Value	N/A
4. Number of new specialty crops and/or specialty crop products	13	☐

3. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH INCREASED ACCESS AND AWARENESS



Please provide the total number of consumers or wholesale buyers who access/produce/prepare/preserve specialty crops and select the applicable indicators for this reporting period.

Indicators	Value	N/A
1. Total number of consumers or wholesale buyers reached	10	☐

Indicators	Value	N/A
1.a. Of the total number in 1, enter the number that gained knowledge on how to access/produce/prepare/preserve specialty crops	10	☐
1.b. Of the total number in 1, enter the number that reported an intention to access/produce/prepare/preserve specialty crops	10	☐
1.c. Of the total number in 1, enter the number that reported supplementing their diets with specialty crops that they produced/preserved/obtained/prepared	10	☐

Please provide the total number of individuals reached and select the applicable indicators for this reporting period.

Indicators	Value	N/A
2. Total number of individuals reached	369	☐
2.a. Of the total number in 2, enter the number of adults that gained knowledge on how to access/produce/prepare/preserve specialty crops	203	☐
2.b. Of the total number in 2, enter the number that reported an intention to access/produce/prepare/preserve specialty crops	203	☐
2.c. Of the total number in 2, enter the number that reported supplementing their diets with specialty crops that they produced/prepared/preserved/obtained	175	☐

Please select the applicable indicators from the list and provide data on applicable existing delivery systems/access points of those reached that expanded and/or improved offerings of specialty crops for this reporting period.

Indicators	Value	N/A
3.a. Farmers markets	8	☐
3.b. Produce at corner stores	2	☐
3.c. School food programs and other food options (vending machines, school events, etc.)	4	☐
3.d. Grocery stores	2	☐
3.e. Wholesale markets	12	☐
3.f. Food hubs that process, aggregate, distribute, or store specialty crops	2	☐
3.g. Home improvement centers with lawn and garden	1	☐
3.h. Lawn and garden centers		☒
3.i. Other systems/access points, not noted		☒
3.j. Total (if not reported above)	30	☐

*Please select the applicable indicators from the list and provide data on applicable **new** existing delivery systems/access points offering specialty crops for this reporting period.*

Indicators	Value	N/A
4.a. Farmers markets	3	☐
4.b. Produce at corner stores	2	☐
4.c. School food programs and other food options (vending machines, school events, etc.)	4	☐
4.d. Grocery stores	2	☐

Indicators	Value	N/A
4.e. Wholesale markets	12	☐
4.f. Food hubs that process, aggregate, distribute, or store specialty crops	2	☐
4.g. Home improvement centers with lawn and garden	1	☐
4.h. Lawn and garden centers		☒
4.i. Other systems/access points, not noted		☒
4.j. Total (if not reported above)	30	☐

4. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH GREATER CAPACITY OF SUSTAINABLE PRACTICES OF SPECIALTY CROP PRODUCTION RESULTING IN INCREASED YIELD, REDUCED INPUTS, INCREASED EFFICIENCY, INCREASED ECONOMIC RETURN, AND/OR CONSERVATION OF RESOURCES



Please provide the numbers of plant/seed releases (e.g., cultivars, drought-tolerant plants, organic, enhanced nutritional composition, etc.) for this reporting period.

Indicators	Value	N/A
1. Number of plant/seed releases	18	☐

Please select the applicable indicators and provide data for the adoption of best practices and technologies resulting in increased yields, reduced inputs, increased efficiency, increased economic return, and conservation of resources for this reporting period.

Indicators	Value	N/A
2.a. Number of growers/producers indicating adoption of recommended practices	40	☐
2.b. Number of growers/producers reporting reduction in pesticides, fertilizers, water used/acres	40	☐
2.c. Number of producers reporting increased dollar returns per acre or reduced costs per acre		☒
2.d. Number of acres in conservation tillage or acres in other best management practices	30	☐

Please provide the total number of adults reached and select the applicable indicators for this reporting period.

Indicators	Value	N/A
3. Number of habitat acres established and maintained for the mutual benefit of pollinators and specialty crops		☒

5. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH MORE SUSTAINABLE, DIVERSE, AND RESILIENT SPECIALTY CROP SYSTEMS



Please provide data for the applicable indicators for this reporting period.

Indicators	Value	N/A
1. Number of new or improved innovation models (biological, economic, business, management, etc.), technologies, networks, products, processes, etc. developed for specialty crop entities including producers, processors, distributors, etc.	2	☐
2. Number of innovations adopted		☒

Indicators	Value	N/A
3. Number of specialty crop growers/producers (and other members of the specialty crop supply chain) that have increased revenue expressed in dollars		☒
4. Number of new diagnostic systems analyzing specialty crop pests and diseases		☒
5. Number of new diagnostic technologies available for detecting plant pests and diseases		☒
6. Number of first responders trained in early detection and rapid response to combat plant pests and diseases		☒
7. Number of viable technologies/processes developed or modified that will increase specialty crop distribution and/or production		☒
8. Number of growers/producers that gained knowledge about science-based tools through outreach and education programs		☒

6. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH INCREASING THE NUMBER OF VIABLE TECHNOLOGIES TO IMPROVE FOOD SAFETY ☐

7. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH INCREASED UNDERSTANDING OF THREATS TO FOOD SAFETY FROM MICROBIAL AND CHEMICAL SOURCES ☐

8. ENHANCE THE COMPETITIVENESS OF SPECIALTY CROPS THROUGH ENHANCING OR IMPROVING THE ECONOMY AS A RESULT OF SPECIALTY CROP DEVELOPMENT ☐

ADDITIONAL APPROVED OUTCOME (IF APPLICABLE) ☐

OUTCOME REMARKS (REQUIRED)

Please explain any quantifiable results, along with an update on their progress and data collection efforts for each of the outcomes and indicators selected in the accepted project plan. It is understood that the results may not yet be final at the time that this report is submitted; however, please provide an update on progress to date. If you do not have any data on the indicator(s) listed above, you must explain why in this section. (2,000 char.)

Analysis of the soil/plant properties was done via two batches of testing. The first batch arrived and was successfully tested in the lab, however the results of this first batch of testing only looked at part of the goals of this grant and the results told us that there is only a broad regional connection between types of terrain where plants were harvested and beneficial properties. We were unable to distinguish a connection between the soil micro-organisms and the beneficial properties. In general, the plants examined appear to show that in wetland and riparian areas plants broadly had more beneficial compounds than from plants gathered in the wild. We identified beneficial properties in the 13 of 18 culturally significant plants. However, the 2nd batch of soil/plants collected from inside our high-tunnels and sent off to the lab for analysis had something go wrong with them at the lab so no results were quantifiable. We re-sent new samples to be tested. This 2nd batch will tell us about the soil microbiology inside the high-tunnels and beneficial properties of plants under cultivation. This 2nd analysis (wild/cultivated) will allow us to determine what soil microbiology may lead to beneficial properties in plants under cultivation. We await the lab report. Outcome 1: There was no increase in sales in this reporting period. The grant has ended. Other options for sales discussed in past reports are still viable options but efforts to connect with other market opportunities were slowed by other challenges. We are still working with project partners to help them scale up to meet demand, and are still trying to educate local, Reservation-based wholesale locations on what they can buy from local producers. Outcome 2 and 3: We conducted a visual head count at market events such as at Lakota Made LLC and farmers markets to reach the numbers reported here.

NARRATIVE

ACCOMPLISHMENTS (REQUIRED)

If this is an annual report, list your accomplishments for this reporting period. If this is a final report, your accomplishments should be cumulative and include all accomplishments previously reported on and updated to include activities conducted this past reporting period. Indicate how these accomplishments associated with each of your project's objective(s), outcome(s), and/or indicator(s). This listing should identify your project's partners and their contributions. Additional accomplishments can be added as needed.

+	#	Accomplishment (1,200 char.)	Related to (Objective/ Outcome)
-	1	Objective 1: Increase the production of traditional Lakota Herbal Teas that Rebel Earth Farms (Patricia Hammond) started with in a previously awarded SCBG from the South Dakota Dept. of Agriculture. We identified 18 culturally-significant plants, traditionally wild gathered and used by Lakota people historically, that are capable of being cultivated under production, both inside and outside of a high-tunnel, utilizing drip irrigation, mulching and other conservation best practices. Of these 18, we specifically worked with and planted 13 plants, developed them into new specialty crops. Of these, several are herbal teas: ceyaka (wild field mint), Wahpe Yatape (annise hyssop), Wild strawberry, wild rose, wild raspberry. We produced all of these herbal teas in our four high-tunnels on Rebel Earth Farms and introduced them to tribal schools, 40 disabled tribal producers and are working with five of these on aggregating our harvests together, via a tribal cooperative to meet the available markets, including identified whole-sale markets both on and off Pine Ridge Reservation.	Increased number of specialty crop producers producing new specialty crops based off of the culturally significant plants, traditionally gathered wild by Lakota people. Also will increase the number of sites that can produce not only plants, but plant transplants and seeds and provide more sites where we can look at the soil microbiology around healthy plants. Lessening the risks of having only one site doing this important research. It's always good to have a backup.
-	2	Objective 2: Do research into 13 additional traditional Lakota plants and mushrooms: ceyaka (wild field mint), tinpsila (wild prairie turnip), Sweetgrass, Wild Onion, pantego/plantain, prickly-pear cactus, Anise Hyssop, Bergamot, Echinacea, puffball, turkey-tail, field mushrooms, morals: Using our own research and the research of Native American ethnobotanist, Linda Black Elk's work, we developed a list of scores of potential new specialty crops, beyond the 13 we've identified. In developing these new specialty crops, we were more successful than anticipated in recruiting additional tribal producers to add at least some of these crops (primarily the herbal teas) to their operations and were also more successful than anticipated at events like the Lakota Made LLC event and set ups at market events in how many people in the general public and wholeseller buyers who were interested in our product. A good thing, but it made us realize we now need to focus on helping our other cooperative tribal growers scale up their operations to meet this unexpected demand.	Increased use and knowledge of specialty crops. This allows for my Lakota people to truly look at not only developing marketable specialty crops, but creating value-added products to our small tribal farmers' cooperative. This moves us closer to obtaining a large goal of developing a culturally significant and relevant form of Lakota agriculture.

-	3	Objective 3: Do marketing research and outreach to: local, regional chefs (such as Sioux Chef, Sean Sherman), hotels, bed-n-breakfasts, coffee shops and restaurants as well as to institutions such as hospitals, colleges and national parks, etc. We didn't just target non-native regional and national markets, we worked to help Farm to School programs develop to get specialty crops (both fruits and vegetables and our traditional foods) into our schools. We also looked into selling at local farmers markets. Regionally we are worked with tribal owned businesses to get these products on their shelves. We're approached restaurants and hospitals about adding these items to their menu's especially for Native American patients under their care. We continue to work with other tribal growers to help them scale up to meet the demand, but this is work beyond the scope of this grant and the grant has now ended.	Increased use and knowledge and awareness of specialty crops (in particular traditional Lakota teas and foods) as well as increased consumption of specialty crops.
-	4	Objective 4: Attend area Farmers Markets (such as the Black Hills Area Farmers Market in Rapid City, SD) to sell products, but also to conduct educational outreach to the general public about the value of specialty-crops that were historically used by the Lakota people. In addition, local restaurants and chefs do shop at the farmers market. In addition, towards outreach to the general public, we plan to conduct outreach to the schools and via the development of you-tube videos. We have provided these vendors with websites, published documents and phone numbers and emails of USDA officials who can verify that they can buy from local farmers. we traveled to Lakota Made LLC, out of Mankato, MN, a Lakota owned & operated value-added, artisanal business. They've agreed to purchase the traditional plants, foods and medicines produced by Rebel Earth and our other Lakota Cooperative growers and gatherers as soon as we have marketable products. I have reached out to them to let them know I will soon have products that they can test market in their location.	Increased use and knowledge and awareness of specialty crops (in particular traditional Lakota teas and foods) as well as increased consumption of specialty crops. After the COVID situation got better on Pine Ridge we were able to do more outreach, especially to schools, local farmers markets and stores on Pine Ridge about being whole-sellers of our group's products. They have some misconceptions about buying and selling local, which we are working to overcome. <<
-	5	Objective 5: research into the beneficial properties and compounds of the traditional plants and mushrooms mentioned above. Research into what these compounds are in the wild (including the soil's indigenous microorganisms, an examination of what insects and other plants interact with these plants in the wild, and what mycorrhiza fungi may play in in the wild. etc.) versus what they become under-cultivation. In addition, we'll look at what's in the soil in the wild and how we can replicate that most closely under cultivation. We worked with Tina Trout, a Korean Natura Farmer and with local and regional labs to examine the soil micro-biology around these potential new specialty crops. We started a new Lakota agricultural system that avoids costly and poisonous chemical inputs. Our people prefer to work with nature, not against it. Regenerative farming strategies like Korean natural farming are true sustainable community food system based on specialty crop production.	Enhance the competitiveness of specialty crops through more sustainable practices and through more diverse and resilient crop systems.

CHALLENGES AND DEVELOPMENTS (REQUIRED)

Provide any challenges to the completion of your project or any positive developments outside of the project's original intent that you experienced during this reporting period. Also, provide the corrective actions you took to address these issues. If you did not attain an approved objective, outcome(s), and/or indicator(s), provide an explanation in the Corrective Actions column. For developments, you may put "N/A" under Corrective Actions. Additional challenges/developments may be added as needed.

+	#	Challenge or Development (1,200 char.)	Corrective Action
---	---	--	-------------------

-	1	Late start to the project due to USDA requested edits to our proposal delayed start of project.	We did what we could with what existing funds we had on hand.
---	---	---	---

-	2	Covid-19: Delayed our team working with some elders and traditional plant gatherers to identify wild sources for some plants (to test soil and plants in the wild to compare vs cultivated ones inside the high-tunnels. Most of these folks are elders or have compromised immune systems. Also, we lost two elders to Covid that were both producers and a source of plant knowledge. In addition, throughout 2021 and 2022 there were delays related to COVID and tribal border closings.	2020-2021: We applied for essential worker status early on and received it, but needed special passes and were only awarded a few, so many of our partners, including some SDSU experts were unable to access the reservation for most of 2020. They let most travelers and workers onto and off of the reservation at the Covid Border Check Points, but with the Covid variants we never knew when they might close them down again. In addition, however, Covid made it quite difficult to find electricians, but we had LaCreek Electric install the poles and electrical box on the pole. We've managed to find and purchase enough electrical wire and conduit and have trenched from the pole to inside the high-tunnels and pulled the wir. All four high tunnels are now connected to electricity. Due to Covid, we were unable to get a Korean Natural farmer out a second time on site to develop the soil microbiology. 2022: the Covid-19 situation improved significantly on Pine Ridge, in terms of the ending of Covid-19 check point border crossings into the Reservation and the ability of myself and partners to access schools/ students as well as the operation of potential wholesale buyers. However, it remained an ongoing concern for many of our fellow tribal producers, as most are disabled and have compromised immune systems. So although we didn't meet in person as a group, I reached out to them all directly myself to mitigate their concerns.
---	---	---	--

-	3	Climate change: increased number of storms, increased high wind days and storms, cold snaps and heat wave rollercoasters means that many species either come early or late in the wild. It delayed our ability to find them as easily as we'd hoped. In some cases, like mushrooms, we weren't able to find them at all. Winter temps dropped quickly in 2020-2023 in our area and in spring cold wet temps quickly give way to high 80 and 90 degree days, which put our plantings under stress. The high-tunnel manufacturing company sent replacement covers to replace the faulty ones in fall of 2021, but sent too small of covers for Rebel Earth's 100' length. So we contacted the company and had them send the correct sized covers, but as it was already spring of 2022 when they sent them, we were behind on spring planting. However, we did install the fans and exhaust vents in 2020, connected them to electricity and got some structures planted in 2022 and 2023.	In 2022 we planted a wind break. We built a temporary windbreak wall / snow fence to keep winds and snow drifts from damaging the high-tunnels. We strengthened end-walls, sidewalls and doors to strengthen the structure overall and allow us to add additional high-wind mitigation measures such as additional tracking and wiggle wire, ratchet straps, etc. We requested an extension beyond the original May 2022 end date so that we had more time to gather traditional plants and seeds after significant crop damage from grasshoppers. The extension granted allowed us to collect both living plants/ mushrooms in the wild and fall seeds and properly gather data on seasonal plant performance. We needed a full year of growing <i>as well as winter stratification</i> (some wild plants need to overwinter in the soil).
-	4	Technology woes: due to most of our farmers and our own Rebel Earth Farms lack of reliable WIFI access (most of our fellow farmers only have limited amounts of sketchy cell phone data access to WIFI) we were unable to attempt to hold meetings via WIFI during 2020 or 2021 and so in 2022 we met with our co-producers one on one. We also added additional sites and producers to our group. The addition of these new producers (as well as current and pending new hoop house structures being added by SDSU) greatly increased our group's future capacity to meet market demands. It also increased the visibility of specialty crops in general on the Pine Ridge Reservation, in particular new specialty crops being developed from traditional plants of cultural significance still used by Lakota people today. Covid imposed shut-downs and Covid restrictions meant that most of our plant gatherers (who know how to identify these plants in the wild) couldn't get out into the field. 2021: Our SDSU advisory team and research team were unable to come down to the reservation to train our farmers due to covid.	2021: We tried to hold as many meetings as we could digitally while navigating varying levels of connectivity and instead met one on one in person. We coordinated responsibilities with SDSU, identified sites for gathering all 13 plants, and collected soil and plant matter from many of them. We delivered soil and plant matter for analysis and Dr. Graham did instructed the PI on how to gather the soil and plants samples to create time efficiencies.

UPCOMING ACTIVITIES (REQUIRED FOR ANNUAL REPORTS)

Provide a description of the activities that you are planning to complete during the next reporting period. Additional activities can be added as needed. Please note, if this is a final report there should be no upcoming activities associated with the project, and this section should be left blank.

+	#	Activity (600 char.)	Anticipated Completion
-	1	None. Grant is ended	
-			

LESSON LEARNED (REQUIRED FOR FINAL REPORTS)

The recipient or subrecipient is required to provide recommendations or advice that others may use to improve their performance in implementing similar projects. If this is an annual report, please skip this section. (1200 char.)

In regards to lessons learned, it's hard to say. Our biggest challenge was in getting samples harvested in the wild and on Rebel Earth Farms on Pine Ridge Reservation, up to Rapid City, to Dr. Graham's freezers, getting him to send the samples off to the Canadian lab in the manner in which they'd arrive viable to be tested. It's between 1-2 hours drive between sites and our freezer on the farm, then two hour drive one way to Rapid and Dr. Graham. Samples have to be shipped with dry ice to Canada and the lab needs to test them in a short turn around for everything to be viable. In the future, we'd recommend reducing the number of plants and sites examined and tested to reduce logistical challenges. We'd also strongly suggest reducing the number of objectives and outcomes down to just two or three. We took on too much with this project. Lastly, I think we could tighten up the project by re-structuring our end goal through comparing apples to apples, by looking at one species in the wild and the same species under cultivation inside the high-tunnels and collecting samples that were more geographically close together. We were too ambitious.

CONTINUATION AND DISSEMINATION OF RESULTS (REQUIRED FOR FINAL REPORTS)

Describe your plans for continuing the project (sustainability; capacity building) and/or disseminating the project results. If this is an annual report, please skip this section. (1200 char.)

We plan to keep collecting batch samples of plants and soils to be sent off to test, but will reduce the number of samples from 13 of the 18 identified species to just three species. From this we hope to be able to extrapolate a general connection between specific beneficial microorganisms in the soil to beneficial properties inside the plants. Discovering this connection, would allow us at later dates to repeat the testing process of more of the 13 or full 18 in future years and develop a database of beneficial soil micro-organisms to the presence of beneficial properties inside plants. We will then look to see which of these beneficial soil micro-organisms can be easily cultivated in lab or via Koren Natural Farming practices to inoculate our soils inside our high-tunnels and then test to see if the inoculations are successful and if it leads to an increase in beneficial properties in plants. One of our key questions was would cultivation of these culturally significant plants lead to weaker beneficial properties in plants and whether or not we could mimic nature's way of growing these plants. Unfortunately this remains to be seen, as more testing will be required.

PROJECT BENEFICIARIES (REQUIRED FOR FINAL REPORTS)

Provide the number of project beneficiaries. If this is an annual report, please skip this section. (12 char.)

369

FEDERAL PROJECT EXPENDITURE

EXPENDITURE (REQUIRED)

You must respond to at least one cost category. Please note, the subtotal and total rows include formulas to auto-calculate totals. The approved budget should come from the accepted project plan or any approved budget amendments.

Cost Category	Amount Approved in Budget	Actual Federal Expenditures (Federal Funds Only)
Personnel	\$0.00	\$0.00
Fringe Benefits	\$0.00	\$0.00
Travel	\$7,205.28	\$6,460.72
Equipment	\$8,707.00	\$8,287.00
Supplies	\$48,199.00	\$47,462.55
Contractual	\$1,300.00	\$1,300.00
Other	\$22,766.72	\$24,851.72
Direct Costs Sub-Total	\$88,178.00	\$88,361.99
Indirect Costs	\$0.00	\$0.00
Project Expenditure Total Federal Costs	\$88,178.00	\$88,361.99

DISCUSSION OF EXPENDITURES (REQUIRED)

For 1st Annual Reports, if total project expenditures is less than 30 percent, and for 2nd Annual Reports, if total project expenditures is less than 60 percent, include a statement explaining how the grant funds will be expended and project activities completed as planned by the end date on the grant agreement. Any state approved budget amendments should be included here; Include the line item that the funds are coming from and going to and when the state approved the budget amendment. (1,200 char.)

Slight overspend of \$183.99 on final invoice authorized by the South Dakota Department of Agriculture and Natural Resources.

The project coordinated with DANR to adjust the Travel and Other budget categories in November 2022. USDA acknowledged DANR's ability to extend the performance deadline to 9/29/23 from the original 5/31/23 end date and move funds from travel (made available by the removal of an external project partner from project cooperation) to other to pay for worker stipends requested by the project lead. Patricia Hammond proposed the adjustments in June 2022 and DANR finalized the revised work plan and budget in November 2022. USDA acknowledged DANR and the PI could complete this adjustment in July 2022.

PROGRAM INCOME (IF APPLICABLE)

If program income was earned on the project, grant recipients are required to report on the source, amount, and how funds were expended. Program income is gross income --earned by a recipient or subrecipient under a grant --directly generated by the grant-supported activity or earned only because of the grant agreement during the grant period of performance. Program income includes, but is not limited to, income from fees for services performed; the sale of commodities or items fabricated under an award (this includes items sold at cost if the cost of producing the item was funded in whole or partially with grant funds); registration fees for conferences, etc.

+	Source/Nature of Program Income (100 char.)	Amount Approved in Budget	Actual Amount Earned
-		\$0.00	\$0.00

USE OF PROGRAM INCOME (IF APPLICABLE)

Describe how the earned program income was used to further the objectives of this project during the performance period. Any income generated must be reinvested back into the project and not set aside or reserved for future expenses after the grant ends. (1,200 char.)

We made no income in 2022.

PPR ATTACHMENTS DESCRIPTION (IF APPLICABLE)

Grantors will rely on the data that is submitted in this form when they report to congress. However, if you think additional documents are necessary to support PPR, please attach them and provide a document name and description of document below.

+	Document Name	Document Description
-		