



Desert project, there are many innovative ways to provide water sufficient for subsurface, micro-drip irrigation water for desert crops. It seems clear that NRCS has long acted to discriminate against and underserve Native Americans living on desert lands NRCS is charged with developing conservation practices for. The results are prolonged food insecurity, high diabetes rates, and horrific unemployment rates for the San Carlos Apache, as stated above. NRCS' records indicate that NRCS does not even list counterdesertification as one of its approved conservation practices.

One-third of all land is desert and some 720 million impoverished populations, living on these desert lands are impoverished and food insecure. Prolonged hunger typically results in these people having frustration and anger issues causing them to support terrorist and insurgent groups promising to "put food-on-their-tables." The result is repeated armed conflict in these areas, and some of this conflict is threatening U.S. national security interests in nations like Somalia, Yemen, and Sudan. NRCS clearly has a fiduciary, if not legal, responsibility to help develop and promote the counterdesertification means to help end population hunger in such areas via demonstration of such technologies on U.S. desert lands. The NRCS has failed to undertake this task although they could do so in the process of helping Native Americans, who live on desert lands, achieve food security.

NPI's counterdesertification technologies, improvements and additions to those used in the Thar Desert counterdesertification effort(s), are as follows:

- 1) Production of food crops on desert lands, without irrigation water, using selected crops such as Facai;
- 2) Innovative development, collection, transport, storage, and management of desert and nearby water resources to fully support year-long subsurface, micro-drip irrigation of desired desert crops;
- 3) Use of natural and artificial ground covers as well as windbreaks to deter blowing sand plus wind erosion and water erosion from infrequent, hard rains;
- 4) Clearing and use of desert brush to make a biochar bioactivated with soil microbes for minimal additions to desert sands or soils to greatly increase long-term natural fertility;
- 5) Spraying of clay particles on desert sands to further increase fertility to increase crop yields;
- 6) Use of sand-filtered livestock and wildlife manure as an irrigation-water additive to deliver basic nutrients to growing plants;
- 7) Addition of tubal-algalculture systems for further prevention of wind erosion while producing algal-lipids for biofuels and algal-solids for protein food and feed supplements as well as other algal products (tubes prevent evaporation of production water and water is recycled after each algal harvest).
- 8) Planting of a symbiotic mix of arid region food, feed, forage, fiber, cash, niche, traditional, tree, and other green-energy crops such as jojoba;
- 9) Creation of a forage and stock-water improvement area for the intensive, rotational grazing of livestock and wildlife displaced from crop production areas; and
- 10) Use of self-sufficient, solar-zeolite cooled shelters for rest and lunch facilities for field labor who work the above crop production under the hot desert sun.

N.B. NPI is planning to create a 6,400 acre counterdesertification demonstration, in a Kenyan desert area, using water from Turkana Lake, in Kenya, using World Bank funds. (We are hopeful that NRCS will fund this proposal for a similar demonstration on a U.S. SCAT desert area near San Carlos, AZ.)

## Needs Assessment

NRCS has a critical need to fund an effort for a group of impoverished, food insecure Native Americans to establish the fact that NRCS is not engaged in the careless negligence of these U.S. populations. The other essential needs, addressed by this project, are as stated in the Target Population section (see above). These needs apply to other Native American populations living under similar conditions on their reservation desert lands; e.g. the Navajo. NPI plans to use distance education & technology transfer to later assist these other tribes. In addition, this project will work to help meet the purposes and goals of NRCS in a reasonable dimension created with substantial inputs from clients and beneficiaries. The NRCS Arizona State Conservationist shall be asked to give her advance approval for subject project. Stated needs include no unsupported assumptions and have been proven to be compelling. In summary, priority needs being met are food security, job creation, and the reduction of diabetes rates (based on local consumption of more traditional foods). A special need being addressed is creation and full demonstration of a counterdesertification model that may be used by all impoverished, food insecure desert dwelling populations, worldwide. As may be required by NRCS, documentation will be provided on the stated needs of the San Carlos Apache Tribe (SCAT).

## Program Objectives

NPI, in collaboration with the San Carlos Apache and Director of San Carlos NRCS will work together to achieve the following objectives:

- a) On said Apache reservation desert land, using irrigation water from a reservation lake, Lake San Carlos, a 1,280 Apache Reservation farm shall be created and made fully operational (over a 2-year project period) using the counterdesertification means detailed herein;
- b) To provide complete training and effective coaching of the Apache Farm Manager as well as Apache farm staff operating the above farm thus adding skilled personnel and quality jobs for subject reservation;
- c) To reduce the said Apache diabetes rate by the growing and consumption of more traditional crops historically consumed by the Apache;
- d) To provide the underserved Apache reservation population with fresh, locally grown, organic, more healthful, tradition-based foods, safely processed and transported short distances to provide food security and adequate nutrition that reduces diabetes rates;
- e) To supplement all the above using a USDA/ FDA certified self-sufficient food processing trailer (8.5 ft. W x 32 ft. L x 8 ft. H) with the means to safely process can, freeze, dry, make value-added food products, and temporarily provide cool storage for food products made from crops grown on the herein described Apache farm;
- f) To create value-added food products from surplus crops to add additional jobs while also creating food items that may be sold for added cash tribal income on local markets;
- g) To evaluate and report on project success based on the quantity, quality, and dollar value of crops produced on said farm along with the evaluation of conservation as well as all the environmental and tribal health benefits created by the subject project; and
- h) To educate the NRCS staff on the many conservation and other benefits of NPI's advanced counterdesertification means.

N.B. The above said mobile food processing trailer was developed, perfected, and tested by Kentucky State University with these trailers now being commercially manufactured by Russell Concessions. In

several demonstrations of this trailer farmers using same to convert their crops into value-added food products more than doubled their typical farm income.

#### Project Methods

1. Project activities shall focus on using the herein described counterdesertification means to start and successfully operate a 1,280 acre desert farm on the San Carlos Apache Reservation. Startup activities include clearing brush and using this to create bioactivated biochar while leveling land and creating any terracing needed to help prevent any soil erosion during infrequent hard rains. Biochar bioactivated with quality soil microbes will be mixed with crop-row sand or soil to a depth of 08 to 10 inches. About 10 percent such biochar levels are desired by such mixing. Areas with sand alone will have a thin layer of clay sprayed, via a special water mix, over crop-rows prior to the above said mixing effort with biochar. A series of 4-inch PVC pipelines will be created to move water, using solar-powered pumps, to farm-area water storage tanks providing water year-long for subsurface, micro-drip irrigation of the crop mix being grown on said Apache farm. These initial efforts will allow desert crop production and related activities as described in the above NPI counterdesertification technologies section.

2. The reason for selection of the above activities is because they were well proven in the above stated Thar Desert counterdesertification project as well as being further perfected and added upon by NPI.

3. All of the said activities and probable outcomes are fully transferable to others who might seek to farm on desert lands. Again note that NPI has perfected the means to grow desert food crops with no irrigation water and this is being done in P.R. China.

4. Staff Requirements for subject project are as follows:

- A) Project Technical Advisor (TA), David A. Nuttle, inventor of subject NPI counterdesertification advanced technologies responsible to train and coach the Apache in same;
- B) Farm Manager, a selected San Carlos Apache having the education and agricultural background to start, direct, and sustain all aspects of said farm and counterdesertification means;
- C) Assistant Farm Manager, with like requirements and duties.
- D) A Farm Staff of 12 divided into six teams of two with each team being trained as specialists in one crop or production area of subject project; e.g. production of value-added food products would be one production area;
- E) A Project Accounting & Reports Officer (PARO) responsible for these aspects of said project and fully qualified as well as experienced to accomplish same; and
- F) A Project Evaluation Officer (PEO) who is a contracted, independent agricultural expert with an array of project evaluation skills.

5. NRCS Assistance Requirements: The Director of San Carlos NRCS Office, Millie Titla, is a project collaborator and will make her inputs to the project as she deems appropriate. No special or specific assistance is being requested from NRCS.

6. The above said TA (Nuttle), also NPI's founder and President, is the inventor of NPI's subject unique counterdesertification technologies and holds copyrights, patents, provisional patents, and trade secrets that these technologies are based upon. A technology example is Nuttle's U.S. Provisional Patent No. 61/744,995 for his Tubal-Algaculture System. In addition, Nuttle has IP (intellectual property) for self-sufficient, solar-zeolite cooled desert shelter for desert work forces as well as IP for value-added food

products. Nuttle has donated all of this IP to NPI, & NPI is donating perpetual no-fee/ no-royalty use of same to this project as an in-kind match having a current fair market value of not less than \$1.1 million. In actuality, NPI recently refused a \$7 million cash offer for just one of these technologies based on algalculture derived from Nuttle’s U.S. Patent No. 5,121,708 and associated Trade Secrets. There is no doubt that project technologies are innovative.

7. NPI has current working partnerships with Pfeifer Guard-All, NovaShield, Hays Engineering, Kohilo Wind, Real Goods, FarmTek, and The University of Embu, Embu, Kenya. Prior partnerships were with two universities, NC State and Duke as well as with a public company NextPath. As needed any one of these partners, or past partners, will be available to provide needed technical assistance to NPI’s said project. (NPI also did prior work with The Chinese Academy of Sciences, but not as a partner.)

8. The project activities herein proposed by NPI are reasonable in scope and may be conducted with the stated budget and given resources during the 2-year time-period of the project. NPI’s staff makes this statement based on other successful NPI projects that were as complex as the proposed project. NPI works with tribal groups worldwide and NPI’s last major project with a Native American tribe was with the Tiwa tribe of Taos Pueblo, NM.

9. Sustainability of NPI’s said counterdesertification project will be based on the fact that at the end of the 2-year project period, the subject desert Apache farm will produce and sell sufficient crops and value-added food products to pay all expenses to continue operations. Moreover, this project is expected to be highly profitable for the San Carlos Apache tribe.

**Project Budget**

The total project budget, over a 2-year period, is \$2.1 million with \$1.1 million being an in-kind proprietary technologies free-use grant by NPI. A cash grant of \$1 million, from NRCS, would be used to pay for the following project expenses over the stated project period. To wit:

a) Technical Advisor (also acting as Project Manager) .... 24 months’ salary ...	\$ 64,000.00
b) Travel Costs (for Technical Advisor) .....	1,200.00
c) Farm Manager ..... 24 months’ salary .....	58,000.00
d) Assistant Farm Manager ..... 24 months’ salary .....	52,000.00
e) Farm Labor ..... staff of 12 salaries for 24 months .....	276,000.00
Sub-total for Labor	\$ 451,200.00
f) Land clearing, leveling, & fencing .... 1280 acres @ \$75 per acre .....	96,000.00
g) Irrigation water system(s) ..... water, pumps, pipes, tanks, & drip-lines .....	107,000.00
h) Engineering support for the above .....	13,500.00
i) Artificial ground covers & windbreaks .....	24,000.00
j) Tubal-Algalculture system(s) .....	21,000.00
k) Project equipment ... kiln, bio-activation tub, farm tractor w/ equipment ...	64,000.00
l) Special items ... mixer & field-sprayer to add clay particles to crop-rows .....	9,300.00
m) USDA/ FDA certified mobile food processing trailer .....	73,000.00
n) Seeds & plants for selected crops .....	15,000.00
o) Self-Sufficient, solar-zeolite cooled break-shelter for field labor .....	46,000.00
p) Project Evaluator .....	30,000.00
q) Indirect fees ..... (\$20,000 for NPI & \$30,000 for the Apache) .....	50,000.00
Total	\$1,000,000.00

N.B. 1) The NRCS grant will be awarded to the San Carlos Apache tribal government and they will assume responsibility for paying project costs and accounting for funds according to the approved budget (see above). The exception(s) will be any budget modifications approved in advance (in writing) by all the parties to this project. If there is any unapproved diversion or expenditure of these funds, said Apache tribe would contractually be required to repay NRCS the entire \$1 million grant. Liability insurance, to cover the project, will be a responsibility of the tribe and the tribe will be responsible for any benefits due to Apache employees of this project.

2) NRCS may have bureaucratic regulations or legislative mandates that prevent them use of their grant funds for one or more of the above budget items. In that event, two options are proposed: a) The participant tribe finds and approves funds to cover the budget items not approved; or b) NPI delays this project for a year and uses that time to promote and obtain legislation from the U.S. Congress that will require NRCS to fully support the proposed project. Such legislation will be requested on the basis of a known critical need to develop counterdesertification models that will help resolve hunger issues that are acting to promote armed conflicts in desert nations with starving populations. Such an effort is a high priority U.S. overseas national security support and is expected to be approved by Congress.

#### Evaluation of Project

NPI is in the process of recruiting a skilled agricultural projects evaluator from an Arizona university to be the independent, third-party evaluator for subject counterdesertification effort for the San Carlos Apache. That evaluator will be provided to NRCS on or before the NRCS grant award for this project if approved by NRCS. Evaluation will be based on: a) Numbers of successful conservation practices created and demonstrated; b) The quantity, quality, and profitability of crops produced; and c) Effective achievement of project goals for the Apache; e.g. food security, job creation, and reduction of diabetes rates for the tribe.

#### Technical Advisor (also the Project Manager and Technology Inventor) Background

David A. Nuttle, has a farming background and was an FFA State Farmer and winner of a national 4-H Award during his youth. He has a BS degree in Agriculture with advanced training in tropical, desert, urban, and greenhouse farming along with over five decades of successful agricultural development experience, worldwide. Nuttle is a published author and inventor of unique agricultural technologies to include those NPI will be using for subject project. He has worked with 39 tribes such as the Montagnard's of Vietnam, Hmong and Tai Dam of Laos, Embu of Kenya and Tiwa of Taos Pueblo in NM. Nuttle's early work with tribes is detailed in a book entitled "Vietnam's High Ground," by J.P. Harris (a distinguished historian). His many national and international honors include The Thomas Jefferson Award for Humanitarian Service. Kansas State University named Nuttle as its Distinguished Agricultural Alumni for 2019.

#### Attachments

- A) NPI Letter of Collaboration, Support, and In-Kind Donation
- B) Letter of Collaboration and Project Sponsorship by the San Carlos Apache Tribe
- C) Letter of Collaboration by the San Carlos NRCS Office
- D) Letter of Approval by the Arizona State Conservationist

## Disadvantages for the San Carlos Apache Tribe

- 1) Reservation land is mostly desert and USDA NRCS or others have done little to help the Apache make this land capable of significant crop production;
- 2) Economic development assistance has been minimal and few jobs are being created so the unemployment rate(s) have long remained very high;
- 3) Assistance programs have promoted non-traditional foods so the general absence of Apache traditional diets have caused extensive obesity and diabetes problems;
- 4) Waste from mining activities and a smelting plant have not been properly regulated allowing reservation waterways to experience extensive pollution such as metal-laden effluvia seep;
- 5) Historical testing of nuclear bombs on Nevada military bomb-ranges resulted in wind-blown particles having radiation-contamination being deposited on said Apache reservation land;
- 6) Testing of an Agent Orange herbicide, with a mix of 2, 4-D, 2, 4, 5-T, and toxic dioxin, was undertaken by spraying on reservation salt cedars and brush in the 1960s. This herbicide, manufactured by Monsanto and Dow, resulted in the deaths of thousands of Vietnamese after being exposed to this chemical in Vietnam. American, Korean, and other soldiers so exposed also died from cancer and other major health issues caused by Agent Orange exposure. Several Apache clans were exterminated, all reportedly having died of cancer, after being exposed to this chemical. Public records indicate the Apache were never compensated for this harm; and
- 7) Assistance programs to Native Americans, to include the Apache, have tended to make some of them welfare addicts with the domestic violence, alcohol, illegal drug, and other problems that seem to typically come with this condition.

## Supplemental Efforts

Extensive environmental testing must be undertaken to discover any toxic dioxin residue remaining after several years of illegal spraying Agent Orange herbicide on reservation lands. Where dioxin is found, the appropriate mitigation measures will need to be undertaken funded by Monsanto and Dow under court order as may be required. With SCAT's approval and NRCS agreement, added conservation projects may be undertaken with tribal and NRCS funding. Such projects may include terracing of fields, some grass waterways, field shelter belts to reduce wind damage, milkweed plots to support Monarch butterflies, and flower plots with bee rest-shelters to increase the honey bee population. In addition, if more food crop production is needed NPI will assist in creating one or more of its innovative all-season greenhouses with solar-zeolite cooling (as needed) and supplemental solar heating to protect plants from cold. These very productive greenhouses are sealed with air-lock doors to protect against pests and plant diseases. As may be needed alternative power systems (solar or wind) may be provided to power operational systems in remote areas. Any or all such efforts to be determined.

## Extension Work

NPI, at its own expense, will make project instructional materials to include videos and DVDs to teach other Native Americans tribes, with desert lands, how to replicate the subject project. These training materials will be translated into appropriate languages and also made available to desert dwelling peoples, worldwide.

San Carlos Apache Justification of Need: Documentation on said needs to be provided to NRCS.