



# WIPAZOKA WAKPA MANG'ISTINA ACTION PLAN

Prepared by: Sioux Valley Dakota Nation and the  
Centre for Indigenous Environmental Resources

Submitted to: Indigenous Services Canada



CENTRE FOR INDIGENOUS ENVIRONMENTAL RESOURCES

## ACKNOWLEDGEMENTS

There was an immense amount of participation in the gardening project by members of the community. Community members helped us all along the way with finding land to hold the gardens, preparing the land and tilling the ground, planting and caring for the plants, and harvesting. This project could not have been successful without them. We would like to thank the below individuals and organizations.

### Support from Individuals

Finding Land: Colleen Hall, Caroline Johnson, Diana Roulette, Chief Jennifer Bone

Preparation of Land: Public Works Team: Jon Bell, George Blacksmith, Angelo Blacksmith, Denny Pratt, Tony Tacan, Vince Tacan, Sonny Ross

Planting, Maintenance, and Harvest: Betty Anne Merrick, Deidre Essie, Brooke Eastman, Bridget Ross, Douglas Tacan, Brent Pratt, Clayton Tacan Micheal Blacksmith, Sharmaine Branth, Jodi Wombdiska, Murphy Antoine, Sasha Blacksmith, Lanny Elk, as well as Sioux Valley's Waste Warrior Team.

### Support from Organizations

Support was given from organizations such as the Green Spot, Peace of the Valley Greenhouses, and Home Hardware Garden Centres.

## PROJECT TEAM

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# EXECUTIVE SUMMARY

As part of the Indigenous Waste Management Capacity Building and Collaboration Phase II initiative, the Centre for Indigenous Environmental Resources (CIER) formed a partnership with Sioux Valley Dakota Nation (SVDN) to introduce SVDN to sustainable practices and environmental stewardship through innovative waste management or recycling/upcycling projects that yield social and economic benefits.

CIER, in partnership with SVDN, identified community gardening, composting, and building a greenhouse as the methods to provide sustainable waste management, social and economical benefits. The project aimed to reduce and reuse SVDN waste by encouraging and teaching sustainable practices with the composting, greenhouse, and community garden programs. It was integral to the project to include the Dakota culture and principles in all activities pertaining to the community gardens, greenhouse, and composting programs and to provide places that were accessible to community members, including young children, youth, and Elders, where relationships and teamwork could be fostered.

The project was implemented through hiring a project coordinator, a gardener, and a youth coordinator. The team met with a group of Elders to help guide the direction of activities. There was an immense amount of participation in the gardening project by members of the community. Community members helped along the way with finding land to hold the gardens, preparing the land and tilling the ground, planting and caring for the plants, and harvesting. This project could not have been successful without them.

The community garden project was carried out through: locating land, tilling the community garden and health centre garden plots, building 12 raised garden beds, preparing space for a medicine garden, purchasing commercial, Indigenous, and medicinal seeds and seedlings, tending to the gardens, harvesting foods in the fall, hosting a community workshop to teach food preservation methods, and distributing harvested foods through the health office.

The composting program was carried out through: educating community members through a composting workshop held by Green Action Centre, distributing 70 household composting bins, building composting bins, and designating a space for the community members to drop off compost.

The greenhouse was initiated by: designating a space beside the health office, purchasing two poly greenhouses, constructing the greenhouse shells, and installing a water tank and plumbing.

CIER and SVDN identified a set of next steps for carrying forward the community gardens, the composting program, the greenhouse and new initiatives. The next steps include: extending the community garden plots, developing an Indigenous orchid, developing a landscaping program, encouraging community members to compost and utilizing the greenhouse.

# 1.0 INTRODUCTION

The Centre for Indigenous Environmental Resources (CIER) worked in partnership with Sioux Valley Dakota Nation (SVDN) to develop a community garden, composting program, and green house. This was accomplished by recruiting a coordinator from the community, Jennifer McIvor, to establish a working group comprised of community Elders, youth and a gardener to plan and develop a process for establishing a community garden, composting program, and green house in Sioux Valley Dakota Nation. This project was generously funded by Indigenous Services Canada - Manitoba Region.

The goals for this project were to introduce the community to sustainable practices and environmental stewardship through innovative waste management or recycling/upcycling projects that yield social and economic benefits. Specifically, CIER and SVDN partnered together to develop a community garden, greenhouse, and composting program.

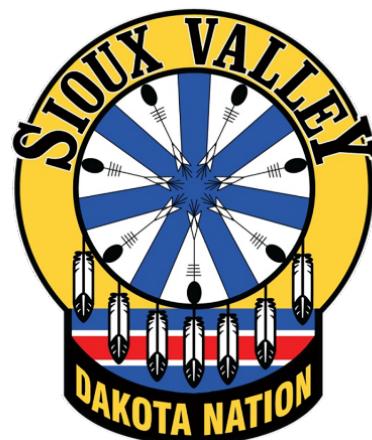
Other objectives included to; provide employment opportunities to summer students who reside in a community with a high unemployment rate, provide an outlet for those who can find gardening a benefit to their mental, physical and emotional health, and provide the community with fresh fruits and vegetables that are free from insecticides, pesticides or other harmful chemicals, and to use natural, organic practices of producing food.

The project aimed to reduce and reuse our waste by encouraging and teaching sustainable practices with the composting, greenhouse, and community garden programs. It was integral to the project to include the Dakota culture and principles in all activities pertaining to the community gardens, greenhouse, and composting programs and to provide places that were accessible to community members, including young children, youth, and Elders, where relationships and teamwork could be fostered.

## 1.1 Sioux Valley Dakota Nation

Sioux Valley Dakota Nation (SVDN), formerly called the Oak River Reserve, is located on the banks of the Assiniboine River in Southwestern Manitoba (Figure 1). The Oak River Reserve was created by an Order in Council of the Government of Canada in 1876. Sioux Valley Dakota Nation is the largest Dakota Nation in Canada with a membership of approximately 2500. SVDN is not a signatory to a Treaty. SVDN continues to lead and progress by becoming the only self-governing Dakota Nation in Canada recognized by both the Federal and Provincial governments, and the only self-governing First Nation in the Prairie Provinces.

SVDN is abundant in its Dakota culture, language and traditions. Because of the significance held on the cultural teachings by the Dakota people, the land and its sustainability are of great importance. In 2001, Sioux Valley started caring for the Bison herd which includes the rare & sacred White Buffalo, which is of great significance to the Dakota people and included in the main teachings & prophecies.



Located on the reserve there is a gaming centre, Dakota Quick Stop gas bar, Sioux Valley School which teaches grades Kindergarten to Grade 7; Dakota Tiwahe Services, Band Hall which is used for much of the reserves major events such as feasts & funerals; Health Centre, Radio Station, Finance office, Social Development office, Self-Government Office, Daycare Centre, and pow-wow grounds. Located about 10 minutes away, Petro is located off the #1 highway. The closest city is the City of Brandon which is located 25 minutes east of the reserve and holds the Sioux Valley sub-office, which offers services such as housing, post-secondary, and registrations to community members who live off-reserve.

As of July 2019, there was a total of 2,670 people registered as members of Sioux Valley Dakota Nation. Of those members, 1,388 people live in Sioux Valley Dakota Nation, 124 people live on another reserve, 2 people live on Crown land, and 1,156 live off reserve.

### Mixed-Grass Prairie

The Mixed Grass Prairie for which Sioux Valley is located on, is the natural habitat for many of Sioux Valleys' Dakota people's traditional medicines and hunting grounds. Located in the valley, Sioux Valley is home to many traditional medicines used by the prairie natives including the Dakota. Incorporating native plants into the landscape will attract many organisms that naturally contribute to the many different ecosystems. These many insects and microorganisms contribute to both plant and soil and can be helpful in the garden by attracting butterflies and pollinators. When used with certain companion vegetables, these ornamentals such as Marigolds, can be used as natural pesticides as well. The plants that serve cultural significance that were used in the Community Gardens were: Yarrow (Figure 2), Beebalm, Phlox, Marigold, Gaillardia, Larkspur, Big Bluestem, and Peppermint.

Although these plants were used in the gardens, there are a number of Native Plants located on the Sioux Valley Dakota Nation reserve. Jennifer was able to identify over 60 plants and plans to develop a Medicine Garden in phase 2 of planning for the next opportunity for funding.

### Soil Composition

Soil is composed of both organic and inorganic matter, and its fertility is dependant on the vigor and productivity of the plants. Most soils are composed of a mixture of silt, sand, and clay, and is home of both beneficial and harmful organisms such as bacteria, fungi, algae, and protozoans.



Figure 1. Map of Sioux Valley Dakota Nation in relation to the province of Manitoba



Figure 2. Plants of cultural significance used in the community garden. Yarrow is the plant in the foreground.

The soil located in Sioux Valley differs from area to area. The main areas are separated by their directional locations. The main area of Sioux Valley is the Project/Highway Area, and all other areas are distinguished as North Side, North Slope, East Side, Central, South Central, South Side, and Far South Side. The largest of the two community gardens was located in the Central part of Sioux Valley. The area with the smaller community garden, greenhouse, and compost area is located on the South side of the Highway, beside the Health Office. Both areas have a similar soil composition with the Health Office Community Garden containing more rocks, sand, and silt compared to the Central Community garden.

The Soil Map for the Sioux Valley areas described above are: Fine Loamy soil type with % 44 Sand, % 34 Silt, and % 23 Clay. Sand and silt are chemically the same as the rocks and minerals from which they have been formed. Clay has a chemical makeup which gives it the ability to attract and hold water and nutrients that are beneficial to the plant. The varying proportions and combinations are what gives the soil its characteristics and determines if the area is a good area to grow a garden. Because the Health Office Community Garden area contained large rocks and housed a large population of gophers; this area had to have amendments made to the soil which included removing all large rocks and dealing with the gopher population.

## 2.0 COMMUNITY GARDEN

### 2.1 Rationale

The community has a history of home gardeners who have kept annual gardens. There were stories of community gardens in the past as well, but all areas have grown over with little to no evidence of gardens existing. Most of the community has been interested in gardening or have tried to grow their own gardens, but a lack of experience and time has made this difficult to maintain.

The health centre has tried to have a community garden program in the past as well, but funding and time constraints have made those endeavors difficult. In order to have a successful community garden, an entire program with fulltime staff is needed to prepare for gardening in the early spring, plant the gardens in the spring, maintain the gardens throughout an entire growing season, and to harvest and clean up the gardens in the fall (End of April – Beginning of October).

### 2.2 Goals

CIER worked in partnership with Sioux Valley Dakota Nation (SVDN) to develop a community garden. The project had the following list of goals:

- Provide fresh food to the community;
- Provide employment opportunities;
- Provide a sustainable program and resource to the community that can be utilized and needed on a yearly basis;
- Provide productive knowledge to all age groups in the community that can be used in everyday living;
- Rejuvenate the cultural knowledge of the land, plants, medicines, and all living things in the community; and,
- Provide a program that brings the community together as one.
- Start a medicinal garden which would serve as a resource to the education and health programs in the community.
  - This would give the elders the opportunity to share knowledge with the youth, and the youth would learn how to sustain, identify medicines and plants, and gain experience/knowledge in their land and community.

## **2.3 Planning Details**

Jennifer McIvor was hired in May 2019 by Sioux Valley Dakota Nation Health Centre (SVDNHC) and CIER as the coordinator for the community garden project. Jennifer graduated in 2017 with a certificate in Horticultural Production from the Assiniboine Community College located in Brandon, Manitoba. Jennifer had also completed one year in College for Business Administration.

Planting of the community garden vegetables began May 2019, shortly after Jennifer was hired. By this time, SVDN had provided a location for the gardens and prepared the ground by tilling.

Conrad White was hired April 29<sup>th</sup>, 2019 by SVDNHC as the head gardener. At that time, Conrad began planting seedlings for future transplanting into the community garden and began determining what supplies would be needed for the upcoming growing season. Conrad was also put in charge of maintenance needed at the health centre garden location, and was responsible for weeding, watering, and providing supervision to casual workers and the youth worker.

Ethan Allen was hired May 31, 2019 by SVDNHC and CIER as one of two youth workers. As the month of June went on, it was decided that Ethan would fill both youth positions until the project ended in October. This increased Ethan's hours from 250 to 500 hours to be completed over the Summer and Fall months. Ethan's responsibilities included maintaining the larger central community garden and assisting casual workers with weeding and watering.

On May 14<sup>th</sup> 2019, it was determined that the garden location that had been originally assigned to the health centre had been claimed to be the property of a local community member, and it was decided that tilling could not be done until another piece of land was found. Two other pieces of land were identified after Jennifer did some research and she asked community members for suggestions. Both pieces of land had been used in the past as community gardens, but both were very overgrown and would need lots of work to bring them up to growing standards. The central location was chosen after it was reported that Betty Anne Merrick had given the Health centre permission to use some of her land for community gardens.

On May 16<sup>th</sup>, vegetable, fruit seedlings, and fruit trees were purchased as well as donated by various Brandon garden centres. The main centre to donate the most produce was The Green Spot, located on Pacific Avenue East in Brandon. Seeds and other growing items were donated by the Home and Health care department in the Health centre and Home Hardware. After a donation request letter was presented to Home Hardware, the organization provide a large discount towards gardening supplies and household composting bins.

## **2.4 Health Centre Garden**

On the South side of the Health Office, an area was provided which had previously held a community garden. The area housed two old raised beds from years past that were starting to fall apart.

The project team decided that they wanted to use the area predominantly for growing Pshdyapi, a traditional corn used by the Dakota for ceremony and feasts. The Pshdyapi seeds were purchased from an Elder and community member, Sandra McKay.

A 50 FT x 40FT area was tilled for the purpose of growing the Pshdyapi. The project team was told that the previous garden failed due to poor soil composition. The team decided that they would have to amend the soil. The team was able to use composted manure which was generously donated by

community member and Fire Chief Jon Bell. The composted manure came from the Bell family's donkey. The manure was shovelled into the garden space and then tilled into the soil. After this amendment was made, the soil became more fertile and was able to grow over 100 Psydyapi plants.

Eight raised beds were constructed on Northern and Eastern sides of the Psydyapi plot, and the two original raised beds were placed outside the plotted area to grow wild flowers that would attract butterflies and pollinators.

Fencing was put in place to surround the Pshdyapi area and eight raised beds, in order to ward off pests and vandalism. The fencing was not enough to ward off gophers which became the main problem for this garden.

### Health Centre Garden Planting Guide

Health Plot Design

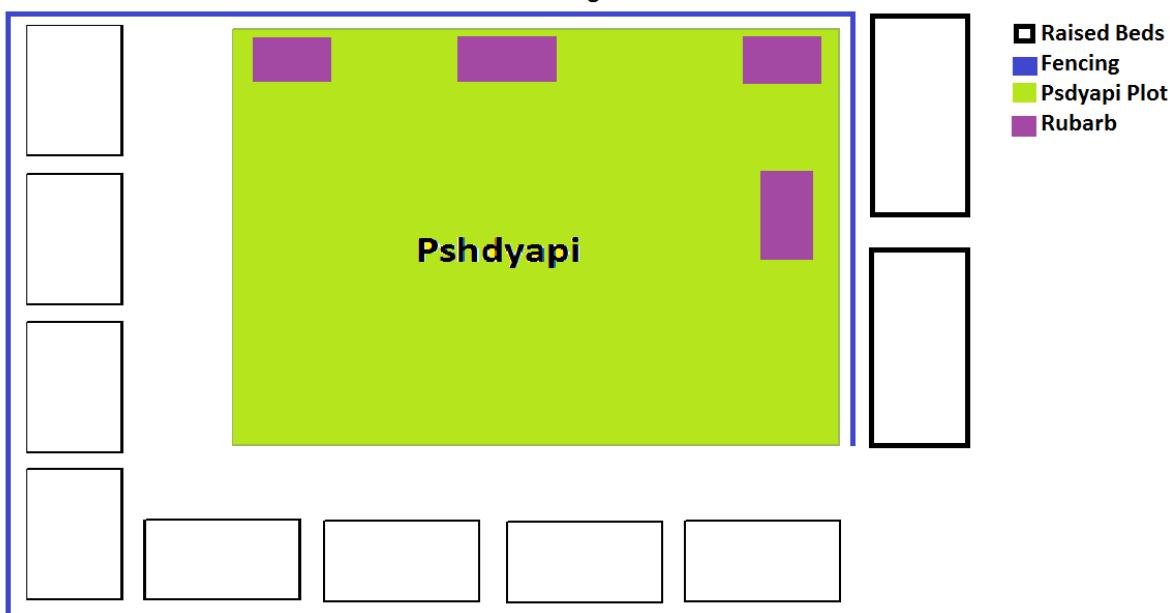




Figure 3. Health Centre Garden with Pshdyapi plants

In order to stop gophers from eating the produce and roots of the vegetables, numerous methods were used to try and deter the gophers from the area which included physical and non-chemical. These included:

- Pellets;
- Gumballs;
- Water;
- Tillage; and,
- Solar powered sonar emission.

Another method that was sought out to be used was Falconry, but the team decided that the process would have taken too long and other methods were needed due the time constraints. All methods that were taken into consideration had to be non-chemical, and non-harmful to the land, water, soil, and plant forms as well as all other living organisms. The most successful method was the use of solar powered sonar emission.

## 2.5 Central Garden

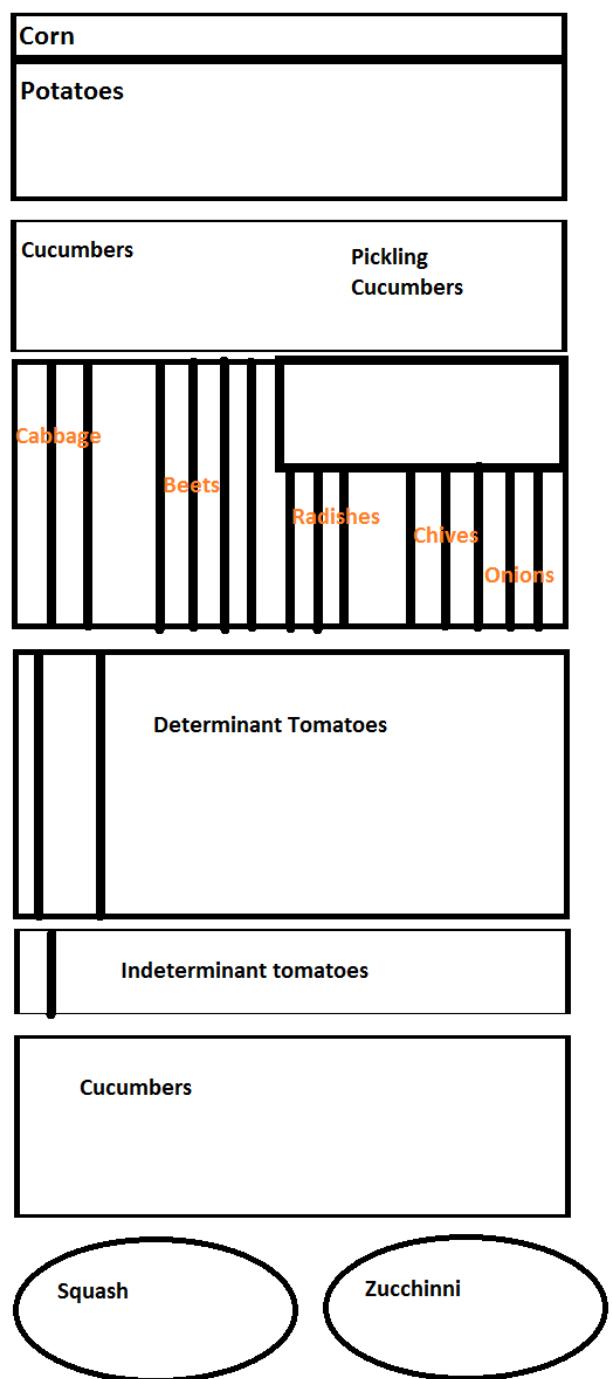
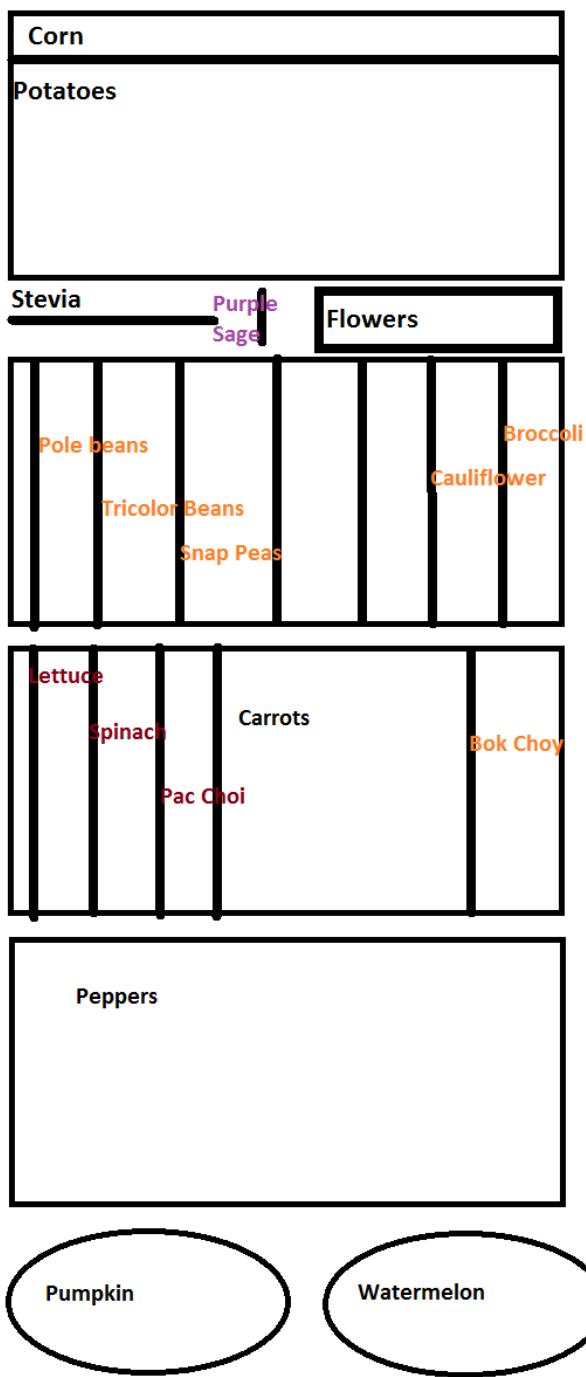
The central garden location was generously donated by Betty Anne Merricks. The land was located behind her house and had previous gardens located in the same area many years ago. The soil composition was very good and all that was needed in order to start the community gardens was to have the area tilled and cleared. A water source was needed as well; however, Betty Anne Merrick was nice enough to let the project team use her water source until a water tank was purchased.

The plot that was used had a dimension of 232 FT x 80 FT. Most of the produce was directly seeded by the workers and the rest of the produce were donated seedlings from The Green Spot. The produce planted in the garden is listed in table 1 below. The central garden location was responsible for growing all of the produce other than the psydyapi. This area did not have a gopher problem.

**Table 1. Produce planted in the Central Garden**

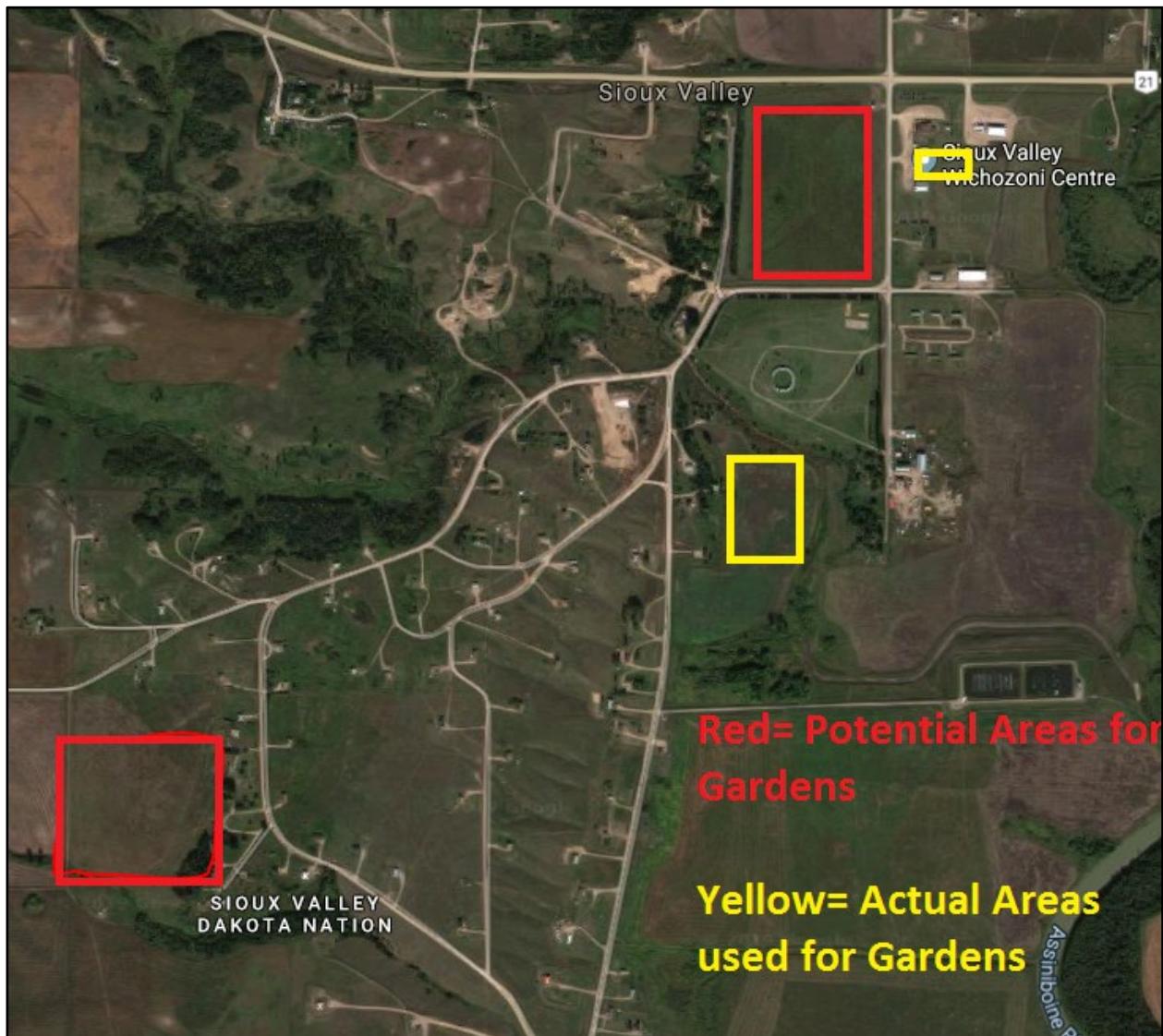
Vegetables	Vegetables	Herbs	Fruits	Flowers	Produce that was planted, but did not survive
Corn	Cauliflower	Stevia	Strawberries	Marigolds	Watermelon
Potatoes	Broccoli	Purple Sage			Pumpkin
Cucumber	Red Cabbage				Red and Green Peppers
Pickling Cucumber	White Cabbage				Parsley
Pole Beans	Beets				Mint
Tricolour Beans	Chives				Bok choy
Snap Peas	Onions				Parsnips
Radishes	Spinach				
Lettuce	Carrots				
Salsa Peppers	Squash				
Jalapeno Peppers	Zucchini				
Tomatoes					

## Central Garden Planting Guide

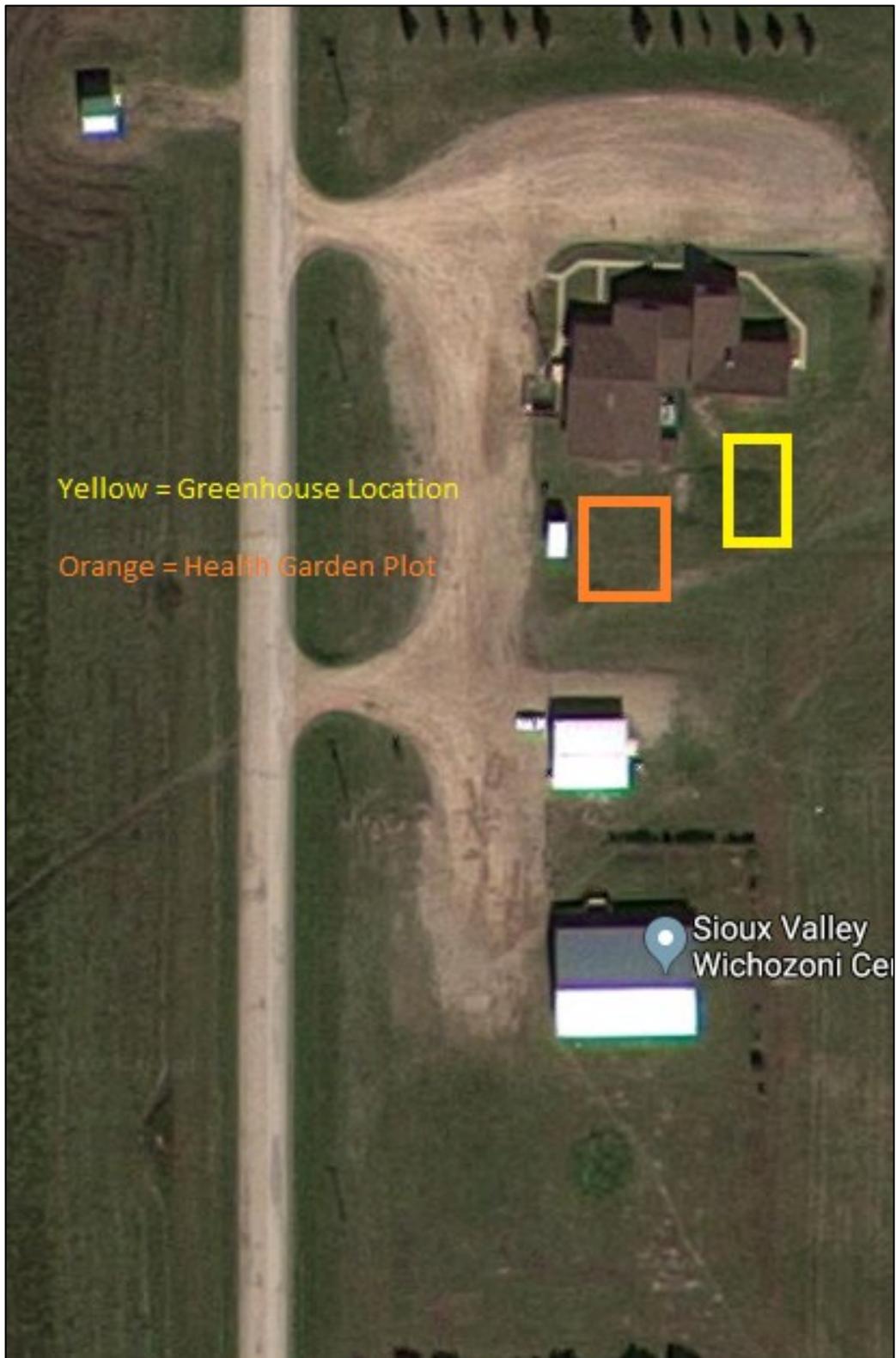


## 2.6 Maps

### COMMUNITY GARDEN AREAS



## HEALTH CENTRE GARDEN AREA



## 2.7 Budget

The following budget contains the approximate costs of materials used in this gardening project.

Item	Item details	Cost
Project coordinator contract	\$25/hour x 480 hours	\$12,000
Youth worker contract	\$12/hour x 500 hours	\$6,000
Elder Honorarium	\$250/day x 7 days	\$1,050
Camera	1	\$100
Ultrasonic animal repeller	Solar powered for 3,000 sq. ft.	\$55
Gardener contract	\$20/hour x 188 hours	\$3,760
Watering can	5 x7.6 Litre cans	\$48
Hose	8 lengths of hose	\$345
Hose nozzle	4	\$65
Hoe	5	\$125
Shovel	2	\$65
Axe	1	\$35
Cultivator	2	\$45
Rake	4	\$70
Trowels	4	\$40
Wheelbarrow	1	\$130
Pitchfork	2	\$100
Hay fork	2	\$100
Garden Gloves	7	\$20
Latex Gloves	3	\$10
Garden tape	200 inches	\$50
Garden/bird netting	2 pieces	\$30
Pruners	3	\$35
Plant Supports	Bamboo sticks, garden twine, pines, plant twists, tomato folding cages, stakes	\$210
Tape measures	2	\$60
Labels	1 pack	\$10
Screws	3.2 lbs	\$16
Produce bulbs (Onion)	5 packs	\$60
Potatoes	10 packs	\$290
Vegetable Seeds	10 packs	\$15
Vegetable plants	16 packs	\$110
Tomato plants	19 packs	\$80
Flowers	Annuals and bulbs	\$70
Herbs	19 packs	\$100
Saskatoon bush/tree	12 assorted varieties	\$190
Raspberry bush	3 packs	\$40
Strawberry plants	21 plants	\$75
Perennials	16 Assorted	\$175
Trees	4 assorted	\$30
Brown Mulch	5 bags	\$15
Potting soil	13 x 32L bag	\$115
Meal	Bone & blood	\$18

Fertilizer	Vegetable fertilizer	\$18
Water tank	420 Gallon tank for onsite water storage	\$620
Rain Barrel	55 Gallon barrel for collecting and storing rain water	\$110
Chain-link Fence	Supply and install of galvanized chain-link fence at a height of six feet with two gates.	\$9,170
Gas Auger	Rental	\$50
<b>Total Cost:</b>		<b>\$35, 925.00</b>

Note: The project underbudgeted the hours for the gardener. In order to provide the gardener with additional hours, hours were shifted from the coordinator to the gardener, and the Sioux Valley Health Department matched the project hours to supplement this cost. Additional labours for the project were supported through Sioux Valley Employment and Training which brought in positions for more labourers to tend to the garden and assist with harvesting, as well as construction of garden boxes and composting bins.

## 2.8 Photos



Figure 4. Central Garden after tilling



Figure 5. Central Garden after planting



Figure 6. Health Centre Garden after tilling



Figure 7. New and old garden boxes at Health Centre Garden



Figure 8. Corn and potato plants in foreground



Figure 9. Radishes



Figure 10. Onions



Figure 11. Potato Plants



Figure 12. Cabbage Plants



Figure 13. Tomato Plants



Figure 14. Two rows of corn



Figure 15. Stakes for tomatoes



Figure 16. Beans



Figure 17. Cucumber



Figure 18. Cucumber plants



Figure 19. Community members working in the garden



Figure 20. Pepper plants



Figure 21. Zucchini plant



Figure 22. Cucumber after harvest



Figure 23. Cucumbers after harvest



Figure 24. Radishes after harvest



Figure 25. White Radishes after harvest



Figure 26. Chives after harvest



Figure 27. Supplies for canning session that was held at the Health Office



Figure 28. Green Tomato Salsa

# 3.0 COMPOSTING PROGRAM

## 3.1 Rationale

The community had no compost program in place at the time of this project. Starting a compost program would assist the community garden program by providing fresh compost that could be used as fertilizer for the soil and produce, as well as reduce the amount of waste ending up at the landfill. Prolonging the life of the landfill could save the community money which could be used towards other ventures.

Compost typically needs at least a year until it can be added to a garden. Therefore, the project team carried out planning activities to prepare the space, and educate community members on composting basics. This included building compost bins at the garden sites and hosting a composting workshop.

## 3.2 Goals

- *Provide the community with sustainable composting program options such as backyard composting and a location for the community to drop-off compost, that would reuse and recycle the food and vegetation waste of the community and,*
- *Educate all community members on waste management, recycling, and composting.*

## 3.3 Budget

The following budget provides an approximate cost of supplying composting bins for 70 community members and a public composting bin at the gardening site.

Item	Item details	Cost
Compost bin lumber	2X6X8 Premium Cedar x 36	\$685
Labour for constructing compost bins		\$260
Compost aerators	3 aerators for compost	\$60
Compost bins	70 x 7Litres	\$550
Stain	ALK Wood Stain x 4	\$230
Screws	1.6 lbs	\$19
Bits	2	\$10
Green Action Centre contract	Deliver composting workshop	\$1750
Prizes	3 Aerators 4 Chloroplast signs 70 Kitchen catcher stickers	\$360
Catering	For workshop	\$600
<b>Total Cost:</b>		<b>\$4524.00</b>

## 3.4 Community Participation

Both the Sioux Valley Dakota Nation public works team as well as the Health department participated in holding a full-day workshop with CIER and Green Action Centre that included door prizes, a meal, and individual composting bins. The gathering was attended by approximately 25 community members and Canupawakpa Dakota Nation and Sioux Valley Dakota Nation Seventh Generation Waste Warriors were represented. Each participant received information pamphlets provided by Green Action Centre and house-hold composting bins to take home. Canupawakpa Dakota Nation and Sioux Valley were provided with signage for their composting bins and aerators to help turn the compost.

### Support from other organizations

Centre for Indigenous Environmental Resources, CIER  
Green Action Centre, GAC  
Canupawakpa Dakota First Nation Waste Warriors, CDN Waste Warriors

## 3.5 Photos



Figure 29. (From left to right) Cheyenne Ironman, CIER Research Associate; Jennifer McIvor, SVDN Coordinator; Shianne McKay, CIER Project Manager; Lea Cote and Kristen Malec, Green Action Centre Composting Specialists, and Brendan Eastman, Land Manager, Canupawakpa Dakota First Nation



Figure 30. Compost Bins in Canupawakpa Dakota Nation



Figure 31. Compost bin at the Central Garden area in Sioux Valley.

# 4.0 GREEN HOUSE

## 4.1 Rationale

Having a greenhouse in the community would make it possible to extend a growing season by 60 days by adding an extra month in the spring and fall where plants could be started or finished inside the greenhouse. It is possible to extend a growing season to close to a full year, with the right funding and knowledge in running a greenhouse. Not only does a greenhouse give the ability to trap sunlight into the internal environment, it also gives protection to the plants from unpredictable weather and some pests. The project team decided that having a greenhouse would enable the community to have a jumpstart in getting seeds started in the spring and be able to have a later harvest in the fall. The greenhouse could also be used to harden off and overwintering young trees/shrubs.

## 4.2 Goals

- *Provide the community with a sustainable greenhouse that can grow all kinds of produce;*
- *Provide the community with an employment opportunity (Greenhouse worker);*
- *Provide a resource that will assist the community garden and composting programs;*
- *Educate the community on how a greenhouse can be utilized; and,*
- *Provide a sustainable, environmental, and economical way of growing food for the community.*

## 4.3 Planning Details

At the beginning of the program, it was determined that the greenhouse would be located at the Health office location so that it was in sight, and could be worked in without travelling too far. It was not possible to construct and use the greenhouse during the project, so the project team decided to prepare the land where the greenhouse would go, purchase the materials, and construct the frame. The greenhouse will be used in future growing seasons.

The greenhouse frames were bought as two separate greenhouse frames with the dimensions of 20FT x 30 FT. The frames were then combined into one 20FT x 60 FT structure. It was decided that the greenhouse plastic would not be put on until the following spring to prevent any wear or tear that could be possible during the winter months.

At the end of April 2020, seedlings could be started in the greenhouse and be ready for transplanting by the following May 20<sup>th</sup>. There are certain kinds of vegetables that benefit from being started in a greenhouse. Cold and cool season crops would be ideal for starting in a greenhouse without any supplemental heating. All other types of seasonal crops could be started and grown in a greenhouse with supplemental lighting, heating, and ventilation systems in place.

## 4.4 Budget

The budget provided below gives the approximate costs of the items used to build the greenhouse.

Item	Item details	Cost
Greenhouse structure	60ft. by 30ft.	\$3,150
Greenhouse Poly	11 mils Clear=Translucent Super strong Woven Poly in the following dimensions: 62 ft. by 36 ft 2 x (22 ft. by 12 ft)	\$1,300
Screws	1.6 lbs	\$19
Labour	\$30/hour x 14 hours x 2 workers	\$840
Plumbing Fixtures and Pump for Water tank	Control panel, sub pump, and plumbing fixtures	\$1,900
Labour for operating and maintaining the water tank	Adding salt and changing filters on reverse osmosis system	\$975
Labour for installing water tank underground	Dug hole, insulated tank, installed reverse osmosis system, and filled in the hole.	\$1872
<b>Total Cost:</b>		<b>\$10,056.00</b>

## 4.5 Photos



Figure 32. Preparing the land for the Greenhouse. The site is directly beside the Health Centre Garden. The Health Centre Garden is in the background of the photo.



Figure 33. The Greenhouse site after preparing the land.



Figure 34. The Greenhouse frame before construction.



Figure 35. Greenhouse frame during construction.



Figure 36. The Greenhouse frame after construction. The plastic covering will be installed in the spring of 2020.

## 5.0 CELEBRATION EVENT

Sioux Valley Dakota Oyate Health and the Centre for Indigenous Environmental Resources (CIER) hosted a Celebration Feast on December 19, 2019 to celebrate the 2019 Community Garden and Composting Program. The event was open to the public and offered door prizes, food, a presentation, surveys and free copies of 'Wipazoka Wakpa Mang'istina Wožupi'—a gardening guide for beginners with Dakota language. Twenty-six people attended the celebration.

### 5.1 Feedback

Participants were offered the opportunity to fill out a survey during the celebration. Twenty-one people completed a survey, and the survey results are shared in Appendix A as well as the following section.

## 6.0 PROJECT OUTCOMES AND SURVEY ANALYSIS

Through their partnership Sioux Valley Dakota Nation and CIER successfully established a community garden, a greenhouse, and initiated a composting program. Overall, the partnership provided social benefits (e.g. opportunities for cultural activities, knowledge transfer between knowledge keepers and community members, volunteering, and boosting mental, physical and emotional health through gardening) and economical benefits (e.g. provided employment for three community members and several small contract positions and opportunities for waste reduction through composting).

### 6.1 Community Garden Project Outcomes

In only one season, SVDN was able to create two community gardens, one medicine garden, and twelve raised garden beds as well as harvest fresh vegetables, fruits, berries and medicines from them.

Food from the gardens were shared with the community members through household distribution carried out by the SVDN Health Centre. When asked about who should receive the harvested foods, community members explained that the food produced from the community garden should be given to Elders, volunteers, families and people in need, or to all community members through food hampers or food programs.

Community members of SVDN were supportive of the community garden project and supported the project with their time, resources, and even land in one case. Elders supported the project by advising the planning process and sharing their knowledge of food preservation during one of the community workshops. Many community members (82%) were interested in learning how to garden. In particular, community members were interested in learning how to grow fruits, vegetables, flowers and medicines. For example, one community member noted their particular interest in organic gardening methods that incorporated companion planting and no pesticides.

In an effort to promote gardening within the community and raise awareness of the project, it was suggested that the garden team host school field trips in their site at multiple times throughout the growing season.

One of the challenges SVDN may face in continuing their community garden is the willingness of people to volunteer their time to work in the gardens. Luckily, 69% of community members indicated that they would volunteer to help maintain the community gardens.

In addition to volunteer support, future gardening efforts will be made easier through the use of *Wipazoka Wakpa Manġčistina Wožup*. *Wipazoka Wakpa Manġčistina Wožup* is a beginner's gardening guide, which includes the Dakota language, that was developed by the community coordinator as an outcome of this project.

## 6.2 Composting Program Outcomes

The project team successfully initiated a composting program in SVDN through educating community members during a composting workshop, distributing 70 household composting bins, and designating a space for composting to be dropped off.

While composting was new to many SVDN community members, with just 14% currently composting, 67% of community members indicated that they would like to learn how to compost. Community members generally preferred to drop off their own compost (78%) rather than have it picked up regularly (32%). If a door to door compost pick-up program did exist, community members preferred to have it picked up once a week (70%).

The community members did have several concerns about composting. The concerns were mainly about animals, knowing what to compost, and the visual/smell of the compost. However, the program was well received by community members, and more composting workshops and learning opportunities were requested.

## 6.3 Greenhouse

The project team decided a greenhouse would be needed to extend their growing season, and enable SVDN to start their own seedlings instead of purchasing them from commercial greenhouses.

Two passive greenhouses were purchased along with plumbing fixtures and a water pump. The greenhouses were combined to form one large greenhouse for a cost-effective system (e.g. centralized water, heating, lighting); and, equipment was purchased. The project team installed a water tank and the plumbing fixtures and water pump needed to pump water to the greenhouse.

Having the greenhouse installed opens up more sustainable and economical opportunities for growing food in SVDN. The new growing space the greenhouse offers also creates more employment and volunteer opportunities for community members.

# 7.0 NEXT STEPS

Sioux Valley Dakota Nation has successfully established a community garden, a greenhouse, and initiated a composting program. If/as funding becomes available, it is recommended that ongoing support be provided to increase gardening and composting capacity and equip Sioux Valley with the necessary tools to manage a community garden and composting system as there is a strong desire among community members to support these initiatives.

## Next Steps for the Community Gardens

Action	Resources required	Outcomes	Time required
Extend the community garden plots (see section 2.6 Maps for potential areas)	Tiller Labour for tilling Additional garden worker job Rain Barrel(s) Additional garden stakes for plant supports	Increased food production	2 weeks
Buy scale to be used for weighing harvested produce (dry weight) to determine quantity of vegetables produced and distributed	Scale or scale rental during the harvest season	Harvested produce weighed and recorded	1 day to purchase scale
Develop a medicinal garden plot that would work as a resource for cultural knowledge such housing native plants and the rejuvenation of the native prairies	Medicinal plants Native plants Knowledge Keepers Project Coordinator to oversee garden, design process for knowledge sharing, and facilitate workshops Additional Garden space (see section 2.6)	Medicinal Garden Plot with medicinal and native plants Process (e.g. self-guided signs in garden or formal program) designed for knowledge sharing Workshops held to promote knowledge transfer	6 months (April to September)
Develop an orchard comprised of Native fruit trees that are significant to the Dakota	Orchard worker Native fruit trees that are significant to the Dakota Land (see section 2.6)	Orchard of native fruit trees significant to the Dakota	6 months to plan and initiate
Incorporate a Community Supported Household Gardening Program	Project Coordinator Transportation Soil Tiller Labour for tilling Seeds and seedlings	Household garden plots created Produce planted and harvested Support provided for community members who cannot tend to their gardens	6 months each year
Provide programming for the school and other community groups and organizations in SVDN	Program Coordinator Office space and equipment Honorariums for Elders and knowledge keepers Budget for program supplies (e.g. gardening tools, seeds and seedling for prizes, food)	Programming designed for the school and other specific community groups	8 months each year (April to November)
Develop a landscaping program which will incorporated Native plants, medicines, edible plants, indoor plants, and produce plants into the ornamental integrity of the community which	Program Coordinator Landscape workers Native plants Medicinal plants Edible Plants Indoor plants Greenhouse space Garden space	A number of community spaces with new landscaping	6 months each year (April to September)

can be utilized by all departments in the community.	Soil Mulch Landscaping cloth Landscaping tools Edging materials (e.g. rocks or plastic edging)		
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## Next Steps for Community Composting

Action	Resources required	Outcomes	Time required
Encourage the community to compost their wasted material to assist the community garden and greenhouse programs	Program coordinator Training through GAC Incentives for composting (e.g. more household compost bins) Community Composting Education Workshops	Increased compost being dropped off at community compost bins	All year
Build additional community compost bins	Labour Wood Nails or screws Tools	New community compost bins	1 week

## Next Steps for the Greenhouse

Action	Resources required	Outcomes	Time required
Utilize Greenhouse	Project Coordinator Shelving Supplemental Lighting Ventilation Heating	Seedlings started in greenhouse Less or no seedling purchased from commercial greenhouses	6 months (April to September) each year
Encourage the community to collect rainwater for the community garden and greenhouse programs	Rain barrels for households Transportation to pick up full barrels Electric water pump	Increased water supply at garden and greenhouse sites	6 months (April to September) each year

# APPENDIX A – SURVEY RESULTS

## Survey Results

1. How many people live in your house?

Minimum: 2

Maximum: 7

Average: 3.7

2. Do you currently garden?

Yes	Percentage	No	Percentage	Total Responses
13	62%	8	38%	21

If yes, please indicate what you already grow.

10	Vegetables	7	Flowers	
6	Fruit		Traditional Medicines	

3. Are you interested in learning how to garden?

Yes	Percentage	No	Percentage	No response	Total Responses
14	82%	3	18%	4	17

4. Please mark with an "X" any of the following you would be interested in learning how to grow:

Type	Responses	Percentage	Type	Responses	Percentage
Vegetables	7	33%	Flowers	9	43%
Fruit	10	48%	Traditional Medicines	11	52%

5. In your opinion, who should be given the produce and how should it be given?

Response	Answer
1	[food] should be given to those who want it and want to learn how to cook with it.
2	1) Elders 2) Single Mothers 3) SA Recipients 4) SV Members (on-reserve)
3	1) people in need (low income) 2) food kitchens/hampers 3) breakfast + lunch programs
4	Open to all community to pick freely- would love more canning classes so I feel comfortable doing it on my own.
5	Single parent families; low income households; social assistance clients
6	Families who will make use of it
7	Elders, families, and single people
8	Those most in need of produce.
9	Low income families and volunteers
10	Single mothers and elders
11	Elders first then community members interested in it
12	Sharing with all of the community
13	Blank
14	Single people over 50, frozen, canned, or dehydrated options
15	Blank
16	Large families with low resources
17	Families with kids

18	Blank
19	Each household a variety to garden
20	[would like to learn how to grow herbs] and all community members should have produced equally
21	Elders and it should be equal to number of people in the house

6. Would you volunteer to maintain the community gardens and greenhouse?

Yes	Percentage	No	Percentage	Total Responses
9	69%	4	31%	13

Volunteer list	Contact Information
Jaimie Eastman	
Betty Ann Merrick	
Bill Scott	
Desiree Wasicuna	
Dylan Essie	
Sherry Taylor	
Tracey Ironman	
Ethan Allen	

#### PART B – Composting

Sioux Valley will begin a community composting program to reduce the amount of waste going into our landfill and to reduce the amount of greenhouses gasses it emits. The community will have outdoor compost bins, open to all community members.

1. Do you currently compost?

Yes	Percentage	No	Percentage	No, but would like to learn	Percentage	Total Responses
3	14%	4	19%	14	67%	21

2. For now, the community compost bins will be drop-off only, until we can gauge the community's interest in having a pick-up schedule in place.

Yes, I would use bins and drop off compost	Percentage	I would prefer our organics to be picked up regularly	Percentage	Total Responses
14	78%	4	32%	18

3. How often would you like to have waste and recycling picked up from your household?

1x week	Percentage	2x week	Percentage	Twice a month	Percentage	Total Responses
14	70%	3	15%	5	25%	20

4. Please mark with an "X" any of the following concerns you may have around composting:

Total	Options	Total	Options
13	Animals	3	Ground Water Contamination
8	Visual/ smells	2	Soil Contamination
10	Knowing what to compost	4	Human Health and Safety
5	Knowing how to compost	3	Not wanting it in your own yard

5. Do you have any other concerns, comments, or suggestions for the community garden, greenhouse, and composting program in the community?

Answers
Learning to can, what to freeze, how to prepare for storage
Organic gardening, no fertilizer, no pesticides, learning companion plants
No – appreciate all what is done to promote gardening, composting & hope it branches to most households. Thank you for your work!
Class field trips for school at every stage of garden and more community awareness
I would like to learn how to compost thank you
It would be nice to have another composting workshop in the community – I didn't know about the one previously held.
I think you're doing a good job
Would like to learn
Good to see programs such as this friendly to the environment