Topics/Presenters

I. Project Overview: Julie Robinson, Manager of Sustainability Programs for Pima County

II. CFB Perspective: Claudio Rodriguez, Manager of Farm and Garden Programs

III. Landscape Design: Sandra Buldoc, Landscape Architect, RFCD

IV. Climate Data Evaluation: Jeremy Weiss, UA

V. Autocase Analysis: Simon Fowell

VI. Recommendations & Next Steps: Julie Robinson & Claudio Rodriguez
Project Overview

JULIE ROBINSON, PHD
PIMA COUNTY SUSTAINABILITY MANAGER
Seeds of the Project

- Community dialogues – early career farmers and ranchers have difficulty accessing land and capital
- Accelerated loss of land tenure and cultural knowledge
  - Green Revolution
  - Urbanization/Migration/Economic Disparities
- Economic and social benefits to rebuilding local food value chains
  - Small & mid-tier food producers/makers
  - Unique local ingredients & rich traditions
  - UNESCO City of Gastronomy designation
- Yet, many unanswerable questions -- environmental and social impacts and benefits & long-term sustainability with expanding local food production in SD – especially under climate change
Seeds of the Project

✓ Pima County has a lot of “dirt”
  • Sonoran Desert Conservation Plan - commitment to manage vast open spaces to conserve important natural areas and biological diversity, protect cultural and historic resources and western traditions

✓ Pima County has a history of supporting food systems: Conserving ranches, landscapes, cattle grazing leases, heritage gardens, food and nutrition programs, etc.)

✓ Pima County’s Sustainability Programs focus on collaborative work, water and energy savings and waste diversion, meeting goals of Paris Agreement
  ✓ GIS
  ✓ Regional Flood Control
  ✓ Community Development
  ✓ Health Department
  ✓ Natural Resources, Parks and Recreation
Project Team

Acknowledgements

It is with deep appreciation the project team acknowledges the participation and contributions of the following individuals and their organizations in this effort.

Regional Flood Control District

- Financial & Tech Support
  - Autocase - Willingness and enthusiastic tech expertise
  - CFB & Las Milpitas Staff – Time & willingness to accept risks
  - UA - Time and expertise
  - County & Stakeholders – all of the above😊

List

Report Layout by Sandra Maina, Sustainability Division
 Goals & Objectives

Objectives

1. Form a trans-disciplinary and cross-sectional work group of experts to undertake a TBL-CBA analysis of an existing food production site on Pima County land.

2. Inform the TBL-CBA through the shared knowledge and contributions of member experts and collectively vet the assumptions that form the basis of analysis.

3. Use the results of the Autocase analysis to inform future food systems work, e.g. the full range of costs, considerations, risks and benefits associated with expanding food systems on appropriate Pima County properties under future climate scenarios.

4. Build relationships with stakeholders for future projects.

5. Showcase the triple-bottom-line benefits of the Las Milpitas Farm.
Project Management Framework

- Interdisciplinary Working Group
- Project Charter & Partnership Agreement
- Group Management: Decision Rules & Process, Mechanics of Reaching Closure
- Research Questions
- Data Collection, Vetting Assumptions
- Analysis & Results
- Recommendations
## Research Questions

1. **What site should serve as the base case for the Las Milpitas comparison?** (Decision by group made to use Las Milpitas site pre-herb garden. Stephen Kaplan procured a 1998 aerial image that shows a little native vegetation.)

2. **What combination of site design elements & users yield the highest net present value (NPV) for a food production site compared to the base case?**
   - a. Land type (soil type/s, compost, mulch)
   - b. Topography (altitude, relationship to land form patterns)
   - c. Geographic location (food desert, types of access motorized vs. bicycle, bus, etc.)
   - d. Farm design (permaculture/guild garden, tilled beds, box plots, other?)
   - e. Water types (Tucson Water -irrigation, active rainwater harvesting, passive rainwater harvesting, reclaimed water)
   - f. Crops (table crops – best suited for desert gardens per LM staff; fruit trees, native plants - legume trees, cactus pads, fruit, buds, others?)
   - g. Users (types – personal gardener, market gardener, adult learner, child learner, others?)

<table>
<thead>
<tr>
<th>Question</th>
<th>WG1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What site should serve as the base case for the Las Milpitas comparison? (Decision by group made to use Las Milpitas site pre-herb garden. Stephen Kaplan procured a 1998 aerial image that shows a little native vegetation.)</td>
<td>WG1</td>
</tr>
<tr>
<td>2. What combination of site design elements &amp; users yield the highest net present value (NPV) for a food production site compared to the base case?</td>
<td>WG1</td>
</tr>
<tr>
<td>a. Land type (soil type/s, compost, mulch)</td>
<td>WG1</td>
</tr>
<tr>
<td>b. Topography (altitude, relationship to land form patterns)</td>
<td>WG1</td>
</tr>
<tr>
<td>c. Geographic location (food desert, types of access motorized vs. bicycle, bus, etc.)</td>
<td>WG1</td>
</tr>
<tr>
<td>d. Farm design (permaculture/guild garden, tilled beds, box plots, other?)</td>
<td>WG1</td>
</tr>
<tr>
<td>e. Water types (Tucson Water -irrigation, active rainwater harvesting, passive rainwater harvesting, reclaimed water)</td>
<td>WG1</td>
</tr>
<tr>
<td>f. Crops (table crops – best suited for desert gardens per LM staff; fruit trees, native plants - legume trees, cactus pads, fruit, buds, others?)</td>
<td>WG2</td>
</tr>
<tr>
<td>g. Users (types – personal gardener, market gardener, adult learner, child learner, others?)</td>
<td>WG2</td>
</tr>
</tbody>
</table>
## Research Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. What is the TBL of fruit trees/orchard trees vs. seasonal vegetable/root crops?</td>
<td></td>
</tr>
<tr>
<td>a. Tree crops vs. seasonal vegetable crops</td>
<td>WG2</td>
</tr>
<tr>
<td>b. Native tree harvest yields vs. fruit tree harvest yields</td>
<td>WG2</td>
</tr>
<tr>
<td>4. What is the best value to use for soil carbon sequestration?</td>
<td>WG1</td>
</tr>
<tr>
<td>5. What are suitable values to include for evapotranspiration?</td>
<td>WG1</td>
</tr>
<tr>
<td>6. Does the NPV change positively or negatively under a Representative Concentration Pathway (RCP) 8.5 greenhouse gas concentration trajectory (temperature, rainfall, and possibly TBD other factors) over the next 100 years (demonstrate climate resilience benefits)?</td>
<td>WG4</td>
</tr>
<tr>
<td>7. Under the RCP 8.5 GHG trajectory, which design elements (more of/less of) would improve NPV?</td>
<td>WG4</td>
</tr>
<tr>
<td>8. Can the NPV of a community farm be correlated with food justice benefits (to be defined by the group)? (Group agreed to push discussion to WG2 to refine questions below)</td>
<td>WG2</td>
</tr>
<tr>
<td>a. How can we show the association between location of food system and alleviation of food desert/increase in food security/accessibility?</td>
<td></td>
</tr>
<tr>
<td>b. Autocase says it’s tricky. May be able to produce a partial valuation. Need to dig deeper in the workgroup.</td>
<td></td>
</tr>
<tr>
<td>c. Change the term “food justice” to something else. Food access? Food security?</td>
<td></td>
</tr>
<tr>
<td>d. Should we bring equity into this?</td>
<td></td>
</tr>
<tr>
<td>e. Try to analyze how food system relates to broader issues: food justice, community health benefit, food access, etc.</td>
<td></td>
</tr>
</tbody>
</table>
Data Collection

Documenting Assumptions & Data Sources
The working group will discuss and document the data and assumptions used in the Autocase analysis. This documentation will provide a central resource for communicating these assumptions to external audiences and for comparative research and future project development.

Deliverables
Autocase will produce a short report with data visualizations on the Las Milpitas Farm TBL-CBA analysis. The Office of Sustainability, Conservation and Cultural Resources (OSC) will include the report in a package that includes a short overview of project, participants, results and recommendations for future work. The work group will iteratively review and comment on the analysis and report to produce the final deliverable.

Post-project Communications
The working group will agree on a framework for communicating the results of the analysis and for sharing the report to external audiences.
Data Needs, Roles, & Responsibilities

The success of this project will be determined in part, by the sustained involvement of project principals from Pima County, Autocase and the Community Food Bank. The principals will guide and participate in collecting data, participate in/lead meetings, and review Autocase results. Additional project participants may opt to join some or all meetings and discussions to learn and to contribute to the co-production of the project results.
Perspectives from the Community Food Bank

Claudio Rodriguez
Farm & Garden Manager, Community Food Bank
Community Food Bank of Southern Arizona

Our Praxis
• Partner
• Support
• Advocate
• Convene

• Community Connection
• Spaces providing purpose
• Reconnect with nature
• Sharing surplus with community
Growing towards equity

• Food desserts – our role and responsibility

• ID Potential areas where community can replicate these spaces

• Land access and opportunities
Landscape Design for the Site Analysis

SANDRA BOLDUC, RLA
RFCD
A STRONG FOUNDATION IS THE KEY
KEY
- Property Line; fenced perimeter
- Native Tree (Mesquite, Palo Verde, Acacia, Ironwood)
- Nut/Desert Shrub (Jojoba, Saltbush, etc.)
- Fruit Shrub (Pomegranate, Quince, Hackberry, Fig, Loquat, Apple, Peach, Wolfberry, Jujube)
- Prickly Pear/Cholla/Agave clusters

Las Milpitas
Current Status
July 2019  Pg 2

DETAILS IMPROVE THE RESULTS
KEY
- Property Line: fenced perimeter
- Native Tree (Mesquite, Palo Verde, Acacia, Ironwood)
- Nut/Desert Shrub (Jojoba, Saltbush, etc.)
- Fruit/Berry Shrub (Pomegranate, Quince, Hackberry, Fig, Loquat, Apple, Peach, Wolfberry, Jujube)
- Prickly Pear/Cholla/Agave clusters
Las Milpitas
Current Status
July 2019
Pg 4

DETAILS IMPROVE THE RESULTS
# LAS MILPITAS - Garden Features

## June 2019

### Garden Beds: In-ground

<table>
<thead>
<tr>
<th>Size</th>
<th>Page 1</th>
<th>Page 2</th>
<th>Page 3</th>
<th>Page 4</th>
<th>Page 5</th>
<th>Total #</th>
<th>SqFt Ea</th>
<th>Total SqFt</th>
</tr>
</thead>
<tbody>
<tr>
<td>75” x 5’</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>375</td>
<td>750</td>
</tr>
<tr>
<td>20” x 5’</td>
<td>51</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>71</td>
<td>100</td>
<td>7100</td>
</tr>
<tr>
<td>15” x 4’</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>60</td>
<td>480</td>
</tr>
<tr>
<td>10” x 3’</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>30</td>
<td>240</td>
</tr>
<tr>
<td>8” x 8”</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>64</td>
<td>256 City HS</td>
</tr>
<tr>
<td>4’ dia circle</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>15</td>
<td>208</td>
</tr>
<tr>
<td>140” x 10’</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>1400</td>
<td>7000 Commercial production</td>
</tr>
<tr>
<td>140” x 6’</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>840</td>
<td>6720 Commercial production</td>
</tr>
<tr>
<td><strong>Total Sq Ft Garden Beds: in-ground</strong></td>
<td><strong>22754</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Garden Beds: Raised

<table>
<thead>
<tr>
<th>Size</th>
<th>Page 1</th>
<th>Page 2</th>
<th>Page 3</th>
<th>Page 4</th>
<th>Page 5</th>
<th>Total #</th>
<th>SqFt Ea</th>
</tr>
</thead>
<tbody>
<tr>
<td>10” x 3’</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>4’ x 4’</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>3’ dia circle</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total Sq Ft Garden Beds: raised</strong></td>
<td><strong>192</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Shrubs/Trees

<table>
<thead>
<tr>
<th>Type</th>
<th>Page 1</th>
<th>Page 2</th>
<th>Page 3</th>
<th>Page 4</th>
<th>Page 5</th>
<th>Total #</th>
<th>Canopy Sq</th>
<th>Total SqFt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Shrubs, lge</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>17</td>
<td>47</td>
<td>799</td>
</tr>
<tr>
<td>Fruit Shrubs, sml</td>
<td>18</td>
<td>24</td>
<td>3</td>
<td>23</td>
<td>0</td>
<td>68</td>
<td>12</td>
<td>816</td>
</tr>
<tr>
<td>Native Shrub, lge</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>254</td>
<td>508</td>
</tr>
<tr>
<td>Native Shrub, sml</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Native Tree, lge</td>
<td>11</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>21</td>
<td>1661</td>
<td>34881</td>
</tr>
<tr>
<td>Native Tree, sml</td>
<td>28</td>
<td>25</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>73</td>
<td>201</td>
<td>14673</td>
</tr>
</tbody>
</table>

### Site Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Page 1</th>
<th>Page 2</th>
<th>Page 3</th>
<th>Page 4</th>
<th>Page 5</th>
<th>Total</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainwater cistern</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>Each</td>
</tr>
<tr>
<td>Shed</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>Each</td>
</tr>
<tr>
<td>Playground</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Each</td>
</tr>
<tr>
<td>Pollinator garden</td>
<td>1345</td>
<td>263</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1608</td>
<td>Square feet</td>
</tr>
<tr>
<td>Compost</td>
<td>11</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>Each: 200 cubic feet x 11 = 2200 CFt</td>
</tr>
<tr>
<td>Chicken Yard</td>
<td>0</td>
<td>0</td>
<td>289</td>
<td>0</td>
<td>0</td>
<td>289</td>
<td>Square feet; includes (1) coop</td>
</tr>
<tr>
<td>Aquaponics shed</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Climate Data for the Analysis

JEREMY WEISS, PHD
UA
Climate Data for the Analysis

Let’s revisit points made in the report and supplement them with additional related information to enhance our understanding of the climate data used in the Autocase Project.
Climate Data for the Analysis

“Autocase uses location-specific temperature data from the North American regional data from the Canadian Center for Climate Modelling and Analysis’s CanESM2 data set that is location-specific to 50 km grids.” p.54

Such regional projection data are derived from general circulation and/or global climate models (GCMs) and earth system models (ESMs) with coarser spatial resolution.
Climate Data for the Analysis

GCMs and ESMs:

• Complex numerical models that represent physical processes in and interactions between different components of Earth’s climate system, including the atmosphere, ocean, cryosphere, and land surface

• Used to improve scientific understanding of Earth’s current climate

• Used to calculate potential changes in climate based on “natural” and “human” forcings
Climate Data for the Analysis

“Two future climate scenarios were assessed for this project to account for changing climatic conditions over the project period.” p.54

“Representative Concentration Pathway 4.5 scenario is a stabilization scenario, which means the radiative forcing level stabilizes at 4.5 W/m² before 2100 by employment of a range of technologies and strategies for reducing greenhouse gas emissions.”

“Representative Concentration Pathway 8.5 scenario assumes the radiative forcing level reaches 8.5 W/m² characterized by increasing greenhouse gas emissions over time.”
Climate Data for the Analysis

Projected Annual Global Carbon Emissions

- Higher Scenario (RCP 8.5)
- Mid-high Scenario (RCP 6.0)
- Lower Scenario (RCP 4.5)
- Even Lower Scenario (RCP 2.6)
- Observed

Projected Global Temperatures

- RCP 8.5
- RCP 4.5
- Observed
Climate Data for the Analysis

Scenarios:

• We don’t know what future greenhouse gas emissions will be (related to human activities and success in transitioning to renewable energy supplies and/or sequestering carbon from the atmosphere).

• To address this, modeling studies use a range of plausible future trajectories of “human” forcings to project possible future changes in climate.
Climate Data for the Analysis

Emissions scenarios drive global models that project future climate. Regional models translate global output to finer spatial scales. We’re using temperature data overlaying the Tucson area from one such regional model as input for the Autocase analysis.

If you would like to learn more about climate models, scenarios, and projections, please visit:

science2017.globalchange.gov/chapter/4/
Autocase Analysis & Results

SIMON FOWELL
AUTOCASE
Triple Bottom Line Valuation

Identify | Quantify | Value

Justify

Compare

Communicate
Bring to the surface the true value

Triple Bottom Line Cost Benefit Analysis

- Sustainable ROI
- Natural Capital Accounting
- Ecosystem Service Valuation
- TBL Valuation
- Full Cost Accounting
- People, Planet, Profit
Impacts Assessed

**Financial**
- Upfront capital costs
- O&M costs
- Electricity
- Water
- Rental revenue
- Avoided lease

**Environmental**
- Pollination
- CO₂ & Air pollution from:
  - water
  - vegetation
  - electricity
  - food miles

**Social**
- Health
- Property value
- Recreation
- Urban heat island
- Food desert
- Water scarcity
- Food revenue
- Eco-literacy
- Volunteer
Valuing impacts

- Project
- Impact Identified
- Impact Quantified
- Impact Valued
Key Assumptions

- 40 years
- Using local values for climate, water prices, property values, etc.
- Scenarios
  - 3 water scenarios
    - 100% potable
    - 82% potable/18% harvested
    - 82% reclaimed/18% harvested
  - 2 climate change scenarios for temperatures
Summary Results

Financial = -$6.4m
Social = $7.1m
Environmental = $0.2m

Triple bottom line = $0.9m
Financial: Capex + O&M

Capex = -$1,910,000
Opex = -$229,000/yr

- Wages + insurance + avoided volunteer cost + etc.

Capex Results = -$1,910,000
Opex Results = -$4,871,000
Financial: Water

Scenario 1: 100% potable
2,729 ccf/yr @ $4.83/ccf
= -$13,200/yr
= -$493,000 over 40 years

Scenario 2: 82% potable, 18% harvested
2,244 ccf/yr @ $4.83/ccf
= -$10,800/yr
= -$405,000 over 40 years

Scenario 3: 82% reclaimed, 18% harvested
2,244 ccf/yr @ $0.67/ccf
= -$1,500/yr
= -$35,000 over 40 years

Also think about water scarcity and water-energy nexus
Social: Property value

Increase green space  230 homes increase in value  ~$3,100 per home
                                          ~2%

Result = $714,000
Social: Community cohesion

LMF acts as a place for people to gather, meet, and have fun, as well as volunteer

- Key assumptions
  - Assuming the 60 community gardeners spend around 1 hr/week + the recorded volunteer hours = over 6,000 volunteer hours.
  - Volunteer value = $25/hr (Trust for Public Land)

Result = $140,000/yr... = $2.7m lifetime
Social: Education & training

- Eco-literacy for adults and children. We value this through the equivalent cost of classroom education

- Key assumptions
  - ~1,850 K-12 student hours
  - `900 hours of formal or hands-on training/instruction
  - Value of k-12 = $8/hr
  - Value of adult edu = $25/hr

Result = $40,000/yr.... = $866,000 lifetime
Environmental: GHG & Air pollution sequestered

- Vegetation sequesters carbon and removes air pollutants...these have a social value:
  - Avoided climate change damages, and damages to human health, property and ecosystem
- Key assumptions
  - CO2e sequestered and CAC reduced:
    - CO2e: 40,000 kgs
    - NOx, SO2, PM2.5, CO

GHG Result = $189,000
Air Pollution Result = $25,000
Environmental: Food miles

Growing food close to end consumption point reduces trucking miles...emissions, value of trucker time, wear and tear on roads, traffic congestion, risk of accidents etc.

- Key assumption
  - Mexico and Fresno (CA) as nearest importer locations
  - 850 miles of trucking reduced/yr

GHG Result = $1,000
Air Pollution Result = $4,000
Congestion/accidents/road damage = $36,000
Some added context

This project made me join my local community farm in Alameda, CA!
<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Impact Type</th>
<th>Impact Type</th>
<th>100% Potable Water</th>
<th>82% Potable, 18% Harvested</th>
<th>82% Reclaimed, 18% Harvested</th>
<th>RCP 4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Capital Expenditure</td>
<td>-$1,910,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Opex</td>
<td>-$4,871,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Electricity</td>
<td>-$41,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Water</td>
<td>-$493,000</td>
<td>-$405,000</td>
<td>-$35,000</td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Event Revenue</td>
<td>$17,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Rent (Gardeners Pay Farm)</td>
<td>$97,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Financial</td>
<td>Avoided Lease Cost</td>
<td>$832,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Avoided Food Purchase</td>
<td>$53,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Food Revenue</td>
<td>$868,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Rent (Paid by Gardeners)</td>
<td>-$97,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Property Value</td>
<td>$714,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Urban Heat Island (RCP 8.5)</td>
<td>$62,000</td>
<td></td>
<td>$52,000</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Water Scarcity Value</td>
<td>-$113,000</td>
<td>-$108,000</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Recreation</td>
<td>$240,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Food Desert &amp; Healthier Diet</td>
<td>$848,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Health from Exercise</td>
<td>$573,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Community Cohesion</td>
<td>$2,670,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Forest Bathing</td>
<td>$323,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Education</td>
<td>$909,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social</td>
<td>Social Value of Food Miles</td>
<td>$36,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>Pollination</td>
<td>$34,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>GHG from Energy Use</td>
<td>-$9,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>Air pollution from Energy Use</td>
<td>-$3,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>GHG from Water Use</td>
<td>-$17,000</td>
<td>-$14,000</td>
<td>-$12,000</td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>Air Pollution from Water Use</td>
<td>-$11,000</td>
<td>-$9,000</td>
<td>-$8,000</td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>GHG Avoided by Vegetation</td>
<td>$189,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>Air Pollution from Vegetation</td>
<td>$25,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>GHG from Food Miles</td>
<td>$1,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental</td>
<td>Air Pollution from Food Miles</td>
<td>$4,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Recommendations & Next Steps

CLAUDIO RODRIGUEZ & JULIE ROBINSON
Recommendations

1. **Undertake a GIS analysis of vacant County, RFCD (and City of Tucson and City of South Tucson) owned parcels to identify a portfolio of candidate sites to expand food production;**

2. **Assign a County staff to act as the Food System Manager** to lead the next step efforts and to coordinate internal efforts and work, and external collaborations;

3. **Form a Working Group with the Community Food Bank and other key partners to develop a roadmap and Management Plan** for expanding gardening and farming on suitable County and other jurisdiction owned parcels;

Community Food Bank April 2020
Recommendations

4. Based on the results of the pilot projects, iterate and refine the Food Production Management Plan for County and Lands and expand the effort to create more economic opportunities for would be food producers and early career farmers;

5. With partners, create urban farming training programs and linked economic development opportunities.
   - niche agricultural production
   - commercial composting
   - artisanal food production
   - farmers markets; wholesale and retail markets
   - commercial kitchens to support and expand the regional food economy; and

6. Seek grant funding from USDA and foundations
LAS MILPITAS AUTOCASE PROJECT

A TRIPLE-BOTTOM-LINE ANALYSIS REPORT OF LAS MILPITAS DE COTTONWOOD COMMUNITY FARM

---

**Contents**

ACKNOWLEDGEMENTS ................................................. 8
EXECUTIVE SUMMARY .............................................. 10
SURVEY OF RESEARCH ON COMMUNITY GARDENS & SMALL URBAN FARMS ........ 14
Community Gardens in the United States ........................................ 15
History ................................................................. 15
Community Gardens in Tucson and Pima County ................................. 16
New Urban Agriculture ................................................. 17
Environmental Benefits ................................................. 18
Multiple Benefits: Community Gardens & Small Farms ......................... 18
Soils: Healthy Soils Support Better Stormwater Infiltration .................... 19
Biodiversity: Gardens and Farms Buffer Climate Disruption .................... 20
Urban Cooling: Adapting to Climate Change with Gardens, Trees, and Farms . 21
Carbon Mitigation: Combating Climate Change with Localizing Food Production . 22
Water ................................................................. 23
Economic Development ................................................. 24
Physical Health and Mental Wellbeing ............................................ 25
Food Security and Food Justice ........................................... 26
Food Security ........................................................... 26
Food Justice ............................................................ 28
Community Development, Social Cohesion and Education ....................... 29
Gathering Spaces, Social Networks & Identity .................................... 29
Reducing Isolation ........................................................ 30
Flowering Inclusion ..................................................... 30
Sites of Reclamation ..................................................... 31
Educational Spaces ....................................................... 31
Crime Prevention ......................................................... 32

---

CONCLUSIONS AND RECOMMENDATION

APPENDICES

Appendix A: Project Charter
Project Leads
Sponsoring Department: Project Principals by Agency

REFERENCES

---

Report available for download at Pima County Sustainability Division Website under “Reports”
Thank you