The Environmental Impact of Intercropping from a Financial Perspective

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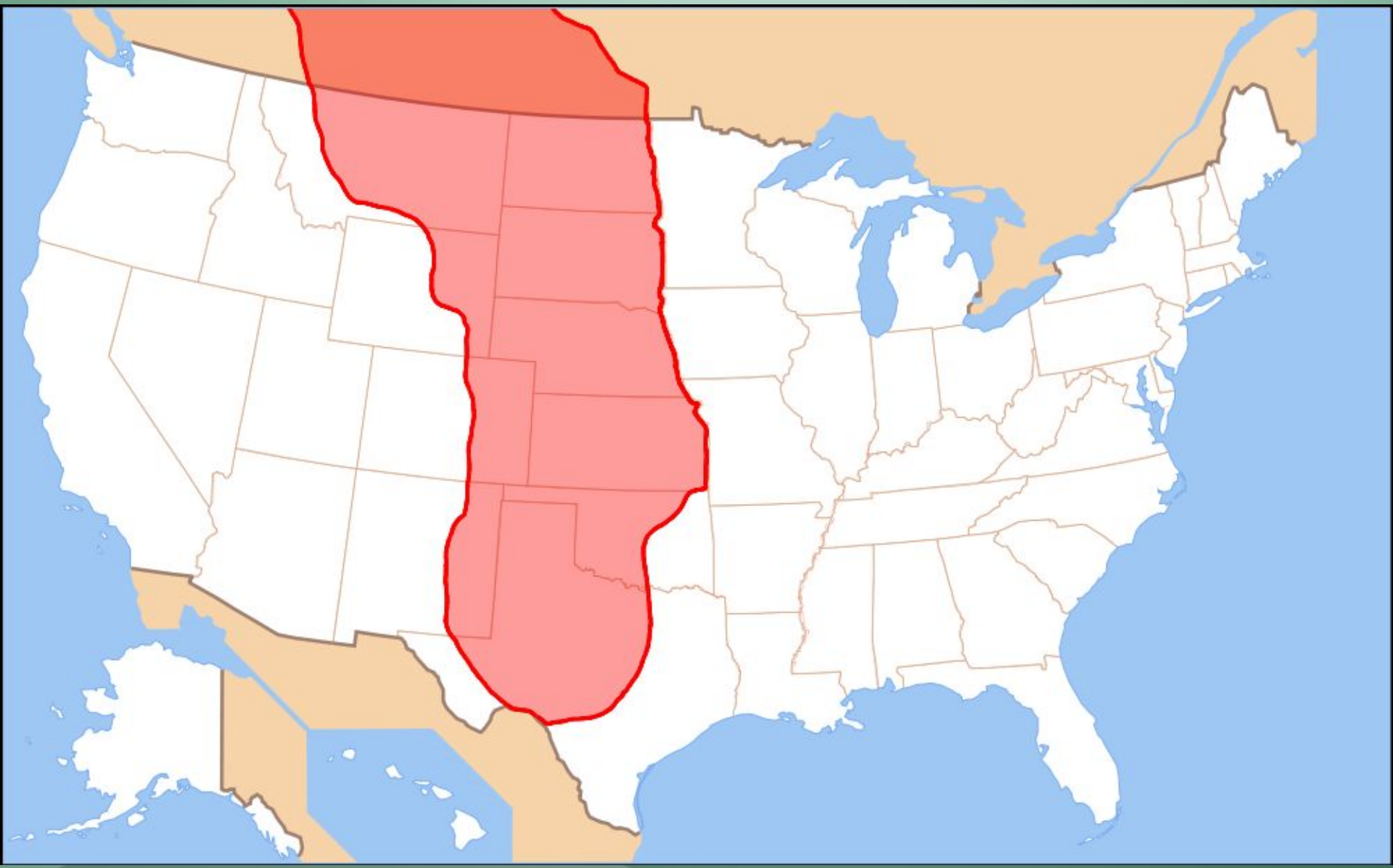
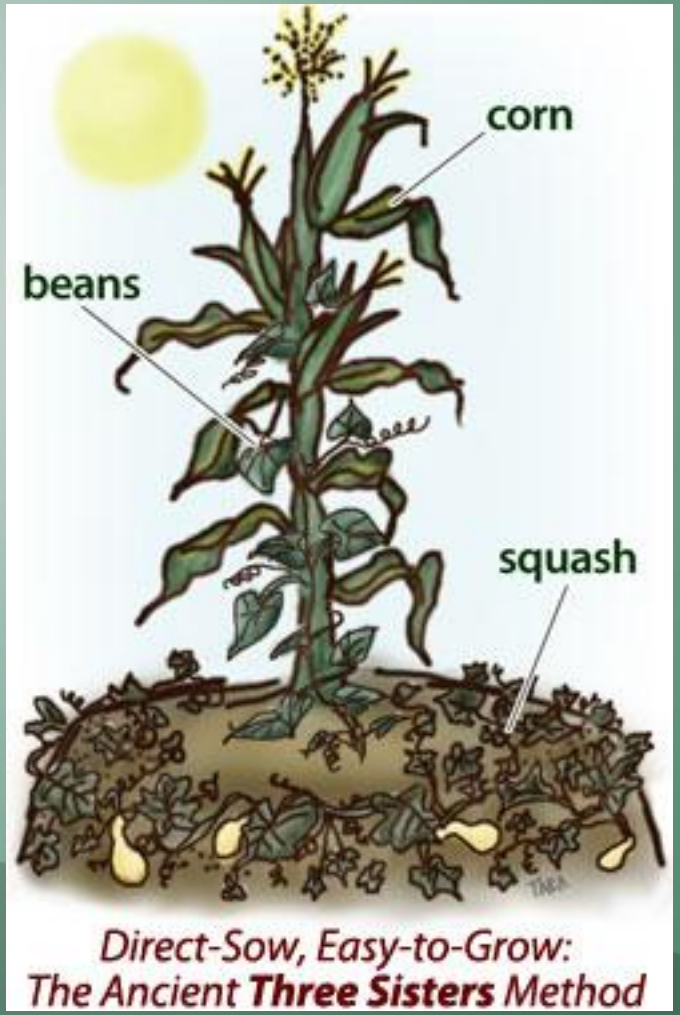


Intercropping

- Definition-When two or more crops are planted in the same agricultural bed
- Current Academic Findings
  - Reduced nitrate leaching
  - Small tropical farms getting more yield in same space
  - Increases in biomass production while incorporating perennials

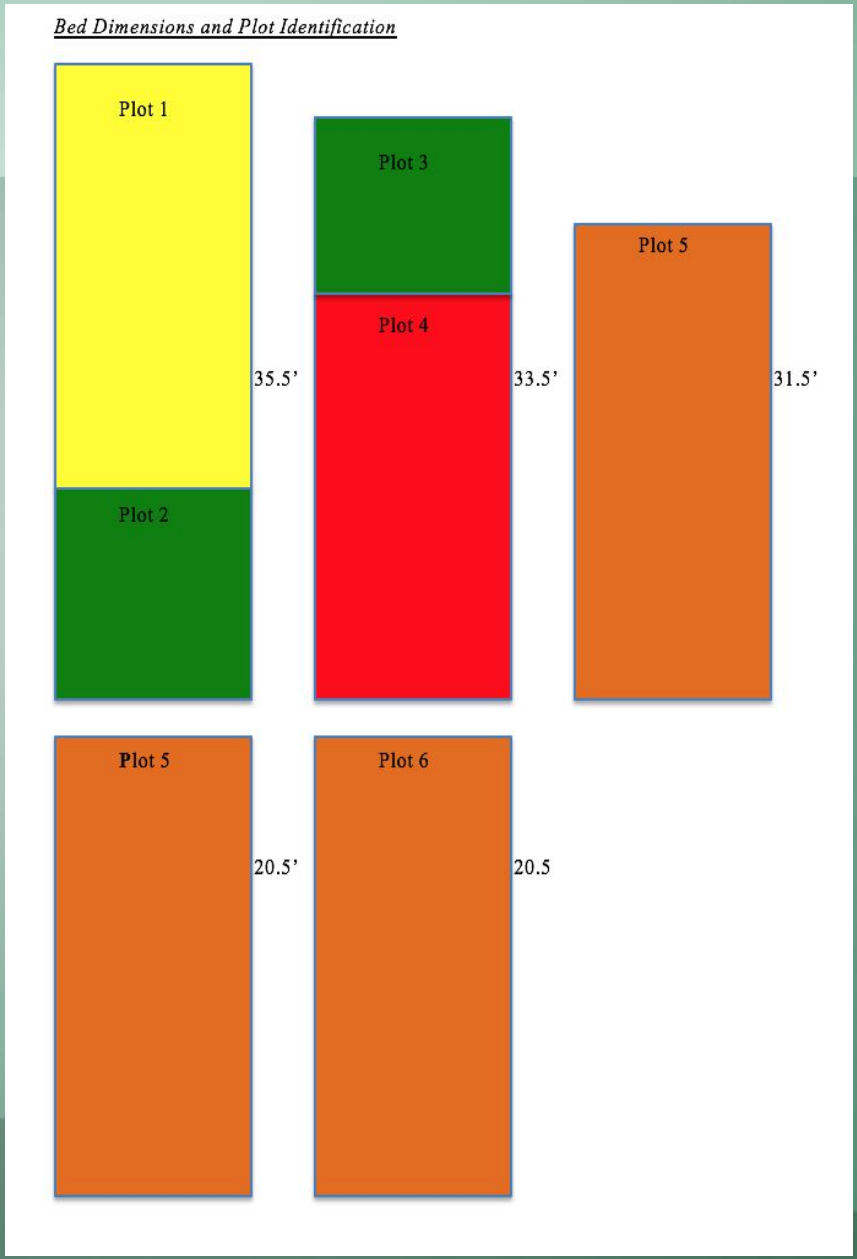


Rational

- Large scale, single crop, industrial farming causes widespread environmental problems
- Small scale, multi-crop farming could potentially mitigate environmental degradation associated with agriculture
  - Year long harvest dates
  - Biological benefits of biodiversity
- Therefore it is valuable to environmentally compare the common practice of monoculture to the alternative method of intercropping.

A Single Succession Intercropping-Monoculture Cost-Benefit Comparison Experiment

- **Purpose-** To compare the practice of monoculture to the practice of intercropping through an environmentally focused cost-benefit analysis.
- **Hypothesis-** The net value of the intercrop sample is higher than the net values of the monoculture samples



Data Collection and Conversion

- Economic Translations
  - Raw Data from plots
  - Prices of Vegetables and Fertilizers
  - Damage Estimates from Academic Sources
  - Unit Conversion Ratios

5% Soil Organic Matter / 1.72 (SOM to SOC conversion) = 2.91% Soil Organic Carbon

2.91% * .483g/cm^3 (bulk density) * 3958695.17g/cm^3 (volume of plot) = **55640.65g of Soil Carbon**

- **Soil Carbon Content (g)**

55640.65g * 10^-6 (grams to tC conversion) * 3 (comparison factor) * $50/tC (Marginal Damage of CO2 Emissions) = **$8.35**

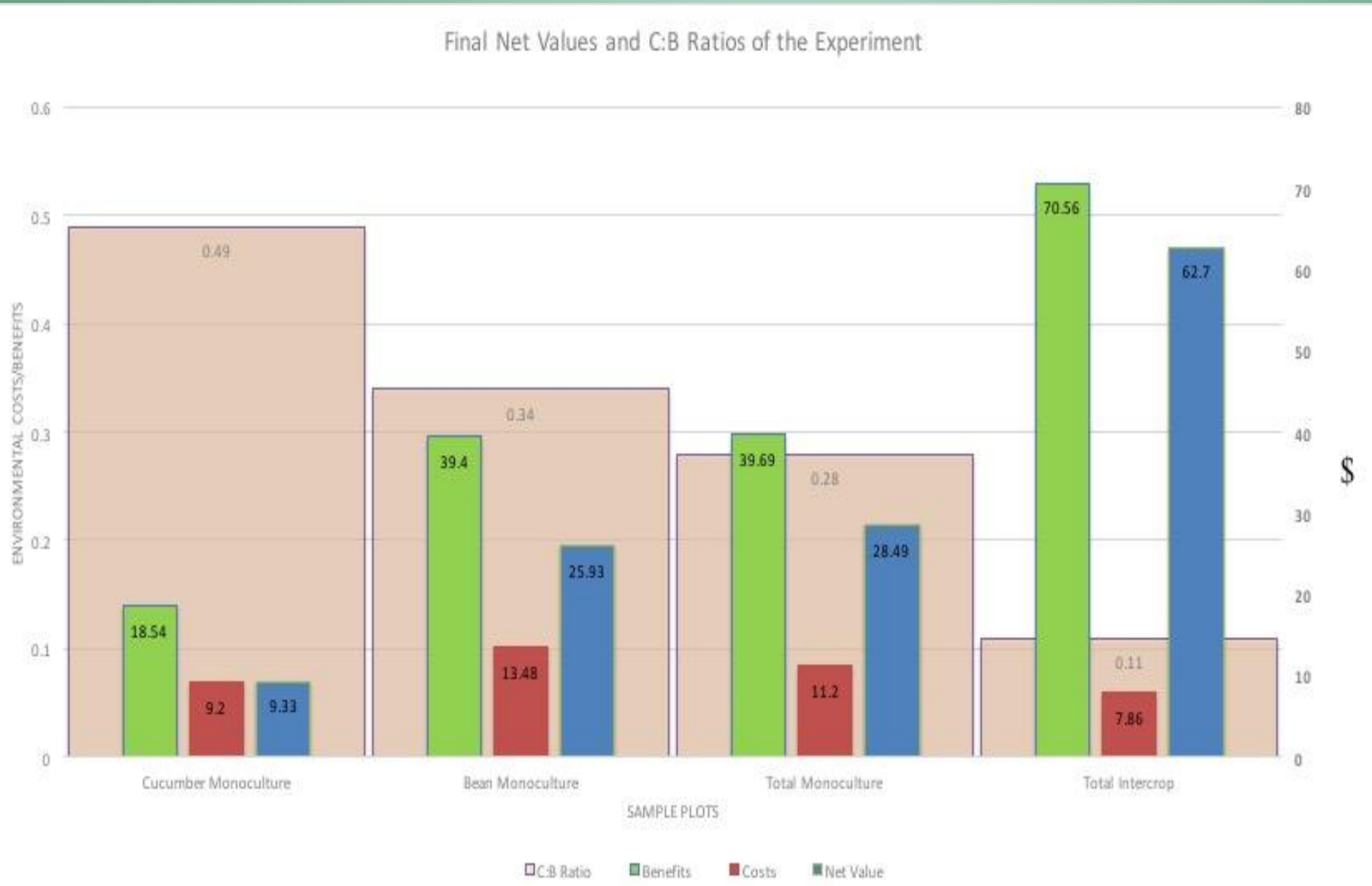
- **Value of Soil Carbon Sequestration ($)**

$8.35 / 70 ft. = **$.1193/ ft.**

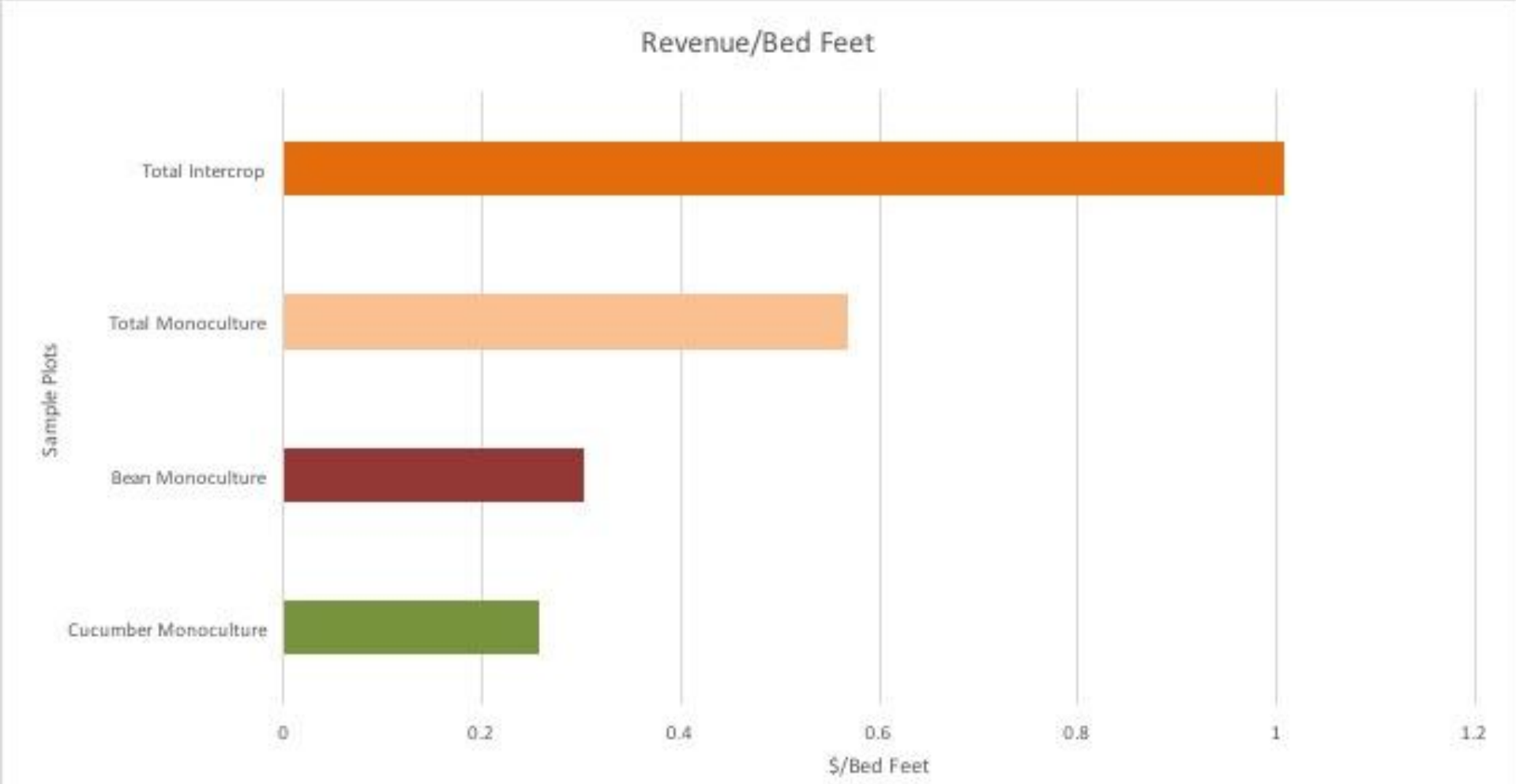
- **Plot Value / Bed Feet ($/ft.)**

Factors of the Cost-Benefit Analysis

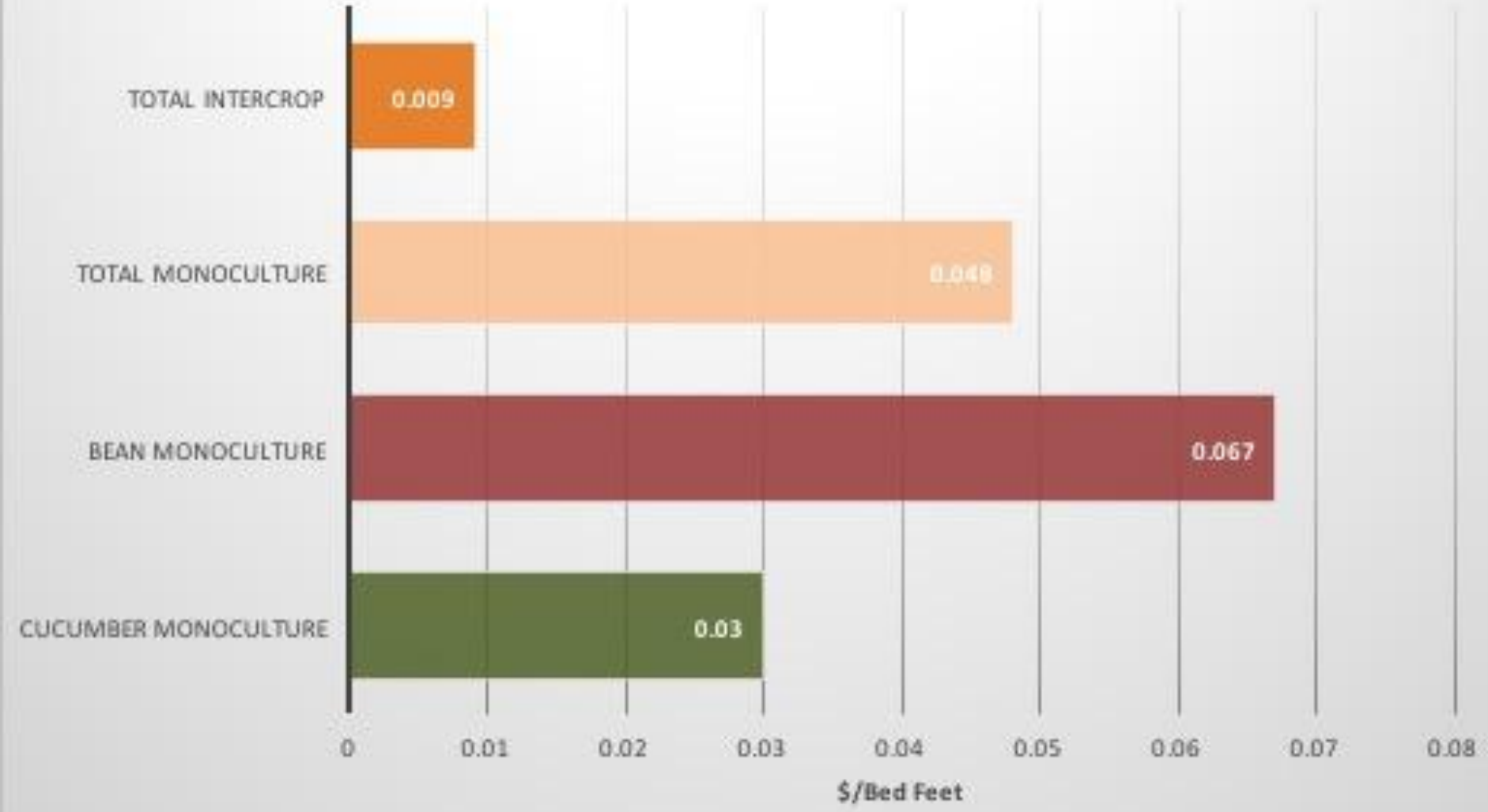
- Revenue
- Soil Carbon Sequestration
- Replacement Costs of Fertilizer N, P205, K20, CaCO3
- Social and Environmental Costs of N20 and NOx Fertilizer Emissions
- Environmental Costs of Fertilizer Production Emissions for N, P205, K20, CaCO3
- Environmental Cost of Nitrate Leaching
- Environmental Cost of Natural Soil Loss


Final Net Values and C:B Ratios of the Experiment
ENVIRONMENTAL COSTS/BENEFITS
$
0.6
0.5
0.4
0.3
0.2
0.1
0
80
70
60
50
40
30
20
10
0
0.49
0.34
0.28
0.11
18.54
9.2
9.33
39.4
13.48
25.93
39.69
11.2
28.49
70.56
7.86
62.7
Cucumber Monoculture
Bean Monoculture
Total Monoculture
Total Intercrop
SAMPLE PLOTS
C:B Ratio
Benefits
Costs
Net Value

Revenue



Replacement Cost of K20/Bed Feet



Larger Implications

- Environmental accounting on small scale farm budgets
- Evaluation method applied to large scale agriculture
- Political Considerations
  - Carbon tax revenues to farmers that sequester carbon
  - Implementing fertilizer tax

Thank You!