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Back to Roots

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Background

Increase in corn production compared to November, 2015 to satisfy the demand.

Increase in the use of synthetic fertilizer from 2011 to 2009 in the U.S.

Of waterways in the U.S. have impaired quality due to artificial fertilizers.

$22,000,000,000
Spent on artificial fertilizers in the U.S. every year.

Problem

Farmers continue to use synthetic fertilizer because they result in a higher yield and, therefore, higher profit. However, the effects of these chemicals are causing soil quality on farmlands to decrease.

Goals

- Educate local farmers about the problem
- Provide alternative sustainable methods of farming that still have economic value

Traditional

- Immediately supplies essential nutrients to the soil
- Lowers biodiversity
- Damages the natural makeup of the soil
- Runs off into surrounding ecosystems

No-Tillage

- Increases the amount of water in the soil
- Decreases soil erosion
- Lowered fuel and labor costs; increase in profit
- Builds soil structure and health

Polyculture

- Leads to healthier, more resilient plants
- Replenishes soil with natural nutrients
- Prevents soil erosion
- Eliminates food supplies for pests, thus eliminating the need for the use of pesticides

Perennial

- Prevents soil erosion
- Improves soil structure
- Ability to access nutrients that are deep in the soil and bring it up to the surface for other plants
- Helps preserve soil moisture

$504
$955
$801
$1091
Profit produced by an acre of corn field with various planting methods (excluding cost of machinery).

Solution

Holistic Management
Taking into account financial, environmental, and social aspects of decisions made.

The Decision Support System for Agrotechnology
- Examined the nitrogen (N), nitrate (NO₃⁻), and ammonium (NH₄⁺) makeup of fertilized soil
- The absence of NH₄ marks the acidification of the soil, which harms growth
- Compared the data generated between the use of synthetic fertilizer and other alternative sustainable methods of farming

Cost-Benefit Analysis
- The numbers show that the use of synthetic fertilizers yields a lower profit compared to alternative sustainable methods in the long run
- Organic corn retails twice as high, bringing more profit despite lower yield

Virtual Farm Simulation
Welcome to your farm!