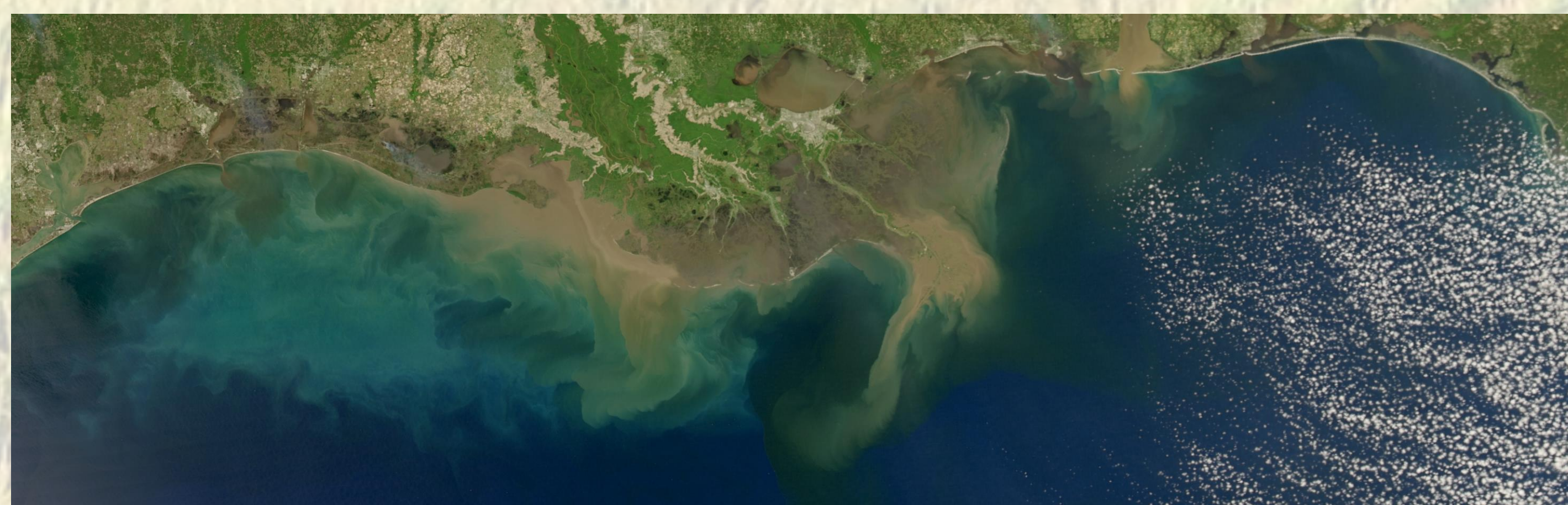


## Abstract

Along the Mississippi River, the heavy usage of nitrogen fertilizer is causing eutrophication, leading to the formation of a Dead Zone in the Gulf of Mexico [IX]. This Dead Zone is uninhabitable to all marine life, harming the environment and the local economy.



Dead zones from nitrogenous runoff [http://upload.wikimedia.org/wikipedia/commons/2/2a/Sediment\\_in\\_the\\_Gulf\\_of\\_Mexico.jpg](http://upload.wikimedia.org/wikipedia/commons/2/2a/Sediment_in_the_Gulf_of_Mexico.jpg)

## Process

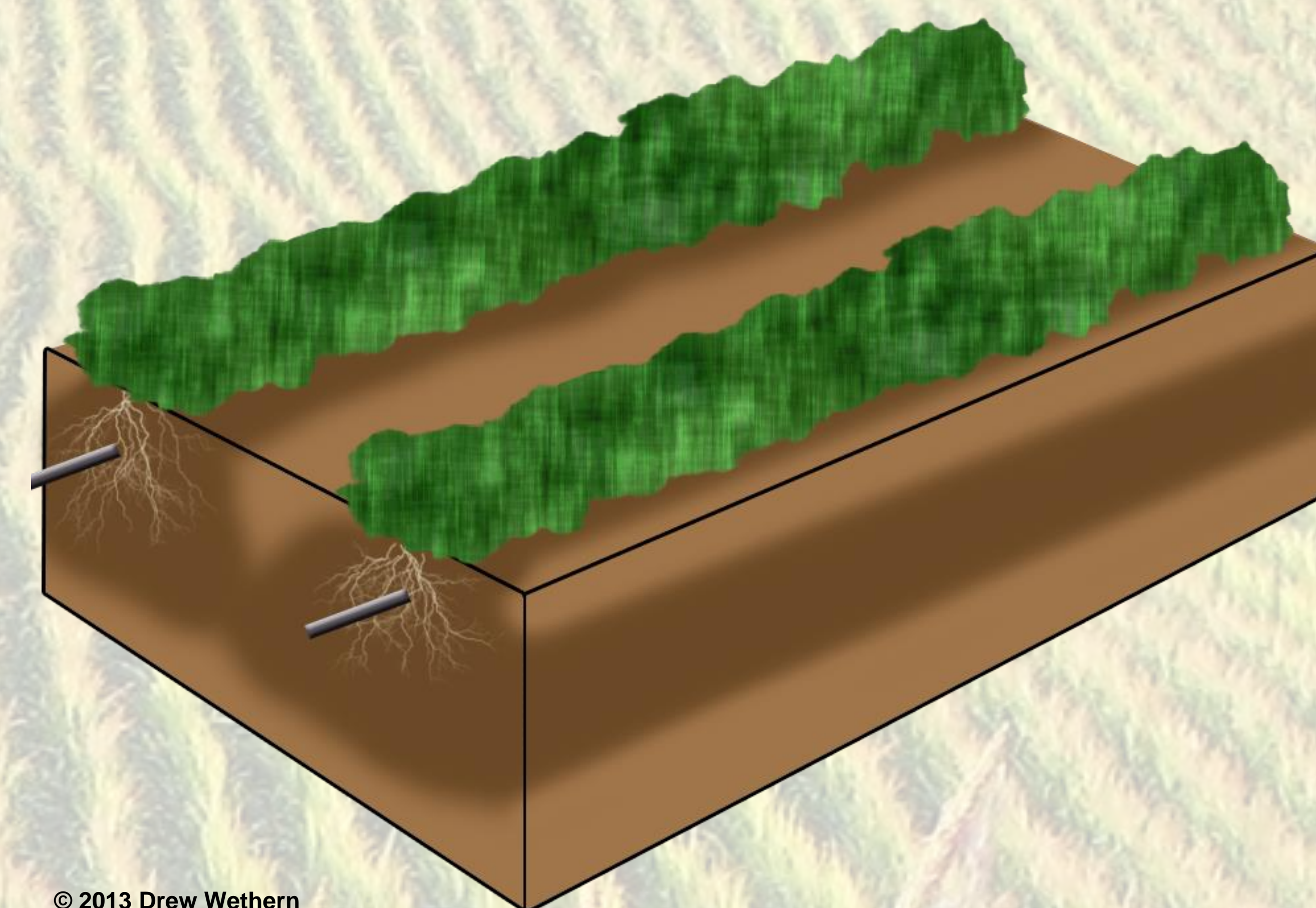
We investigated the major sources of nitrogen pollution and discovered corn farms in Illinois and Iowa were the worst polluters. We then researched and analyzed solutions to reduce the nitrogen runoff.

We compared:

- Subsurface Drip Irrigation (SDI)
- Recycling runoff
- A clay pot irrigation solution
- Surrounding farms with rock beds

We concluded that the SDI system was the most feasible solution as it is cost-effective and very successful in reducing nitrogen runoff.

## Model of a SDI System

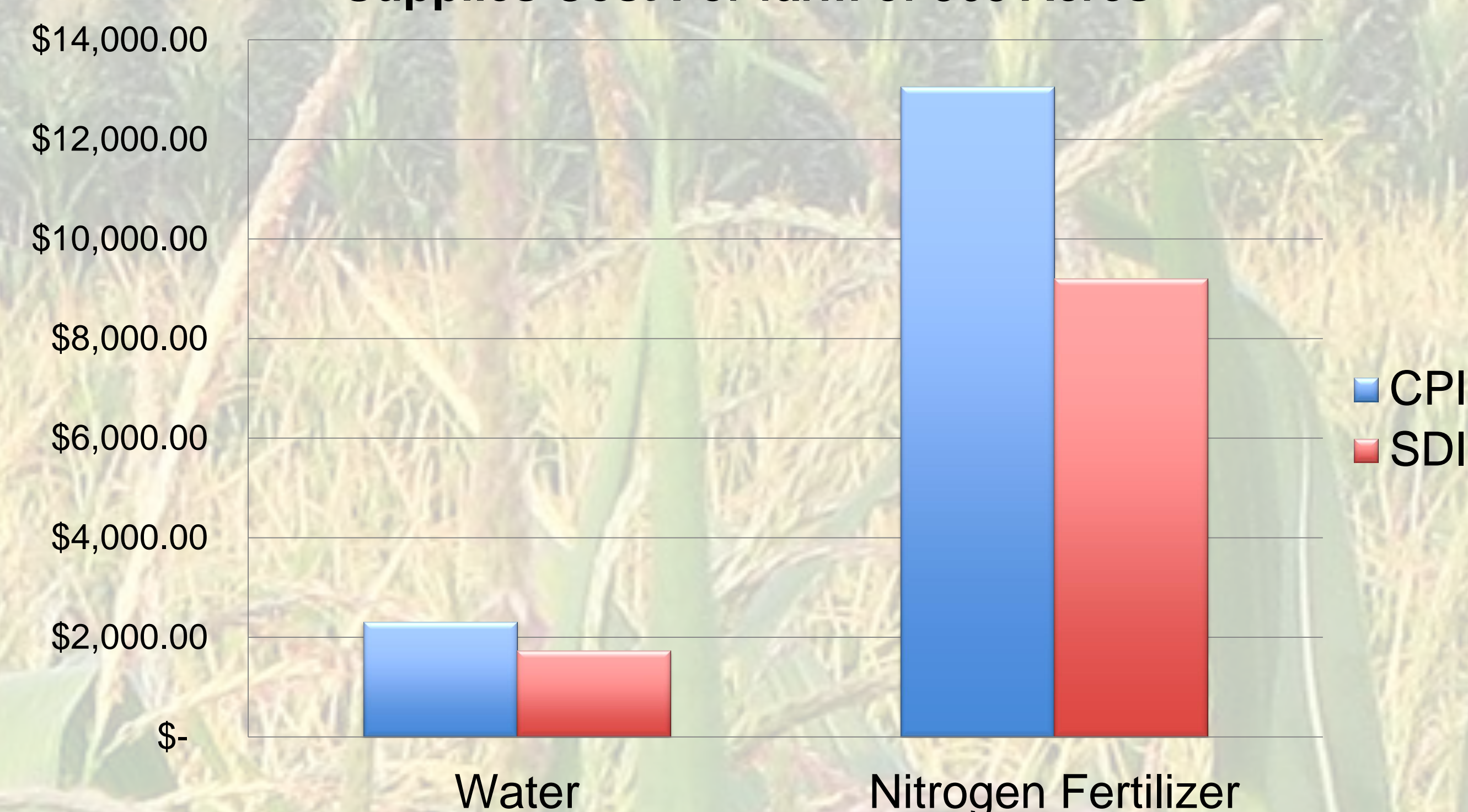


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## Background

Corn farms in Iowa and Illinois are the biggest contributors to nitrogen pollution [VI]. Currently, most farms use central pivot irrigation (CPI) sprinklers, which create a lot of surface water runoff that washes the excess nitrogen into water sources. This runoff goes into the Mississippi River and accumulates in the Gulf of Mexico. The excess nutrients in the Gulf cause toxic algal blooms, making the waters hypoxic [III]. The toxin from the algae can contaminate shellfish and make the air around the area unsafe [I]. Lastly, the Dead Zone either kills sea life or forces the sea life to migrate away, which negatively affects the fishing and tourism industries [II].

Supplies Cost For farm of 368 Acres



## Conclusions

- The Dead Zone problem is fixable
- SDI is the most feasible solution
- Installation costs are high, but water and fertilizer savings would offset those costs [X]

## Objectives

- Reduce the nitrogenous runoff to the Mississippi River
- Provide a guideline for incentivizing change in irrigation techniques
- Curtail the size of the Dead Zone in the Gulf of Mexico to increase welfare of the environment and industries affected

## Results

- SDI directly applies water and fertilizer to the roots, eliminating surface runoff
- Water use can be reduced by 20% [III]
- Nitrogen fertilizer application can be reduced by 30% [III]
- Use of SDI in the long run will reduce the size of the Dead Zone

## Recommendations

- Government subsidies to reduce the initial cost of SDI systems
- Inform farmers of benefits of SDI systems
- Low interest government loans to aid in SDI payment

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