California Tomato Cropping

Exploring the effect of improved agricultural techniques on N$_2$O emissions in California tomato cropping systems.

**Field sites:** This study was conducted in two tomato fields located in Winters, CA. One represents the standard tomato management practices while the second utilizes improved agricultural techniques: reduced tillage, drip irrigation and a grain cover crop.

**Conventional System**
- Conventional Tillage
- Furrow Irrigation
- Rip and reform Beds

**Integrated System**
- Reduced Tillage
- Subsurface Drip Irrigation
- Winter Grain Cover Crop (Triticale trios)
- Preserve Planting Beds

**Cumulative Emissions:** Cumulative N$_2$O emissions are 2.5X lower in the integrated system than the conventional system, with more fertilizer applied and a higher crop yield.

**Why N$_2$O?**
Nitrous oxide is a very potent greenhouse gas and contributes to the destruction of stratospheric ozone. Agricultural activities are the source of approximately 75% of global N$_2$O emissions. There is potential to reduce N$_2$O emissions in intensively managed agroecosystems. High uncertainty around N$_2$O emissions exists due to scarcity of accurate annual N$_2$O flux estimates.

**Discussion:**
- During the growing season, N$_2$O emissions are lower in reduced tillage with drip irrigation due to increase synchrony between nitrogen availability and crop demand.
- Fertilizing through the subsurface drip system allows for more control over how much nitrogen is being added and results in lower levels of soil mineral nitrogen throughout the season.

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