

# Evaluating Cotton Production Systems using EPIC/APEX Models

## Background

Cotton is an important crop and economic fiber. As the leading cotton exporter, the United States grows cotton from coast-to-coast in 17 southern states. Insect pests are a major constraint to efficient cotton production and pest management imposes significant costs and environmental problems. Pesticides used on cotton have the potential to contaminate ground and surface water and kill beneficial insects and soil micro-organisms if not managed properly.

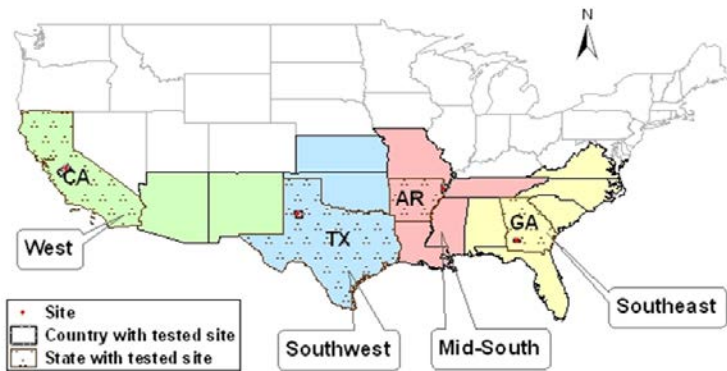
## Objective

To have a science-based approach to evaluate the potential environmental impacts of cotton production systems on air, water and soil quality in order to identify conservation practices that will minimize the negative environmental and societal impacts of cotton production.

## EPIC/APEX model

EPIC and APEX are comprehensive terrestrial ecosystem models capable of simulating the basic biological, chemical, hydrologic, and meteorological processes of farming systems and their interactions. They are continuous models that run typically on a daily time step. EPIC, as a field-scale model, is designed to simulate drainage areas that are characterized by homogeneous weather, soil, landscape, crop rotation, and management system parameters. APEX extends the EPIC modeling functions to a spatially distributed model with the capabilities of simulating key landscape processes with the study area segmented into hydrologically connected landscape units called subareas to capture the land use, soil, and management variability.

Study Regions of the Cotton Belt



## Impacts

The results from the EPIC/APEX simulations will:

- Identify research gaps and sensitive areas
- Determine conservation practices for cotton production systems to minimize environmental and economical costs
- Feed into USEtox model to further assess the ecotoxicological impacts of chemicals from cotton production systems

