

Natuculture: Biomimicry in Urban Landscapes

by Natuculture Team at Iba pa (many others). Presented at the 2012 International Conference of the ASABE, Dallas, TX, July 29 to August 1, 2012





Natuculture Team

Thanks Dr. Godfrey A. Gayle, NRCS Scholars
Twenty years ago hired me as BioE faculty of NCA&T



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Thanks to my family



Micah, sailing in Newport, Rhode Island, Wolfpack graduate, no girlfriend @ 27 years old. I want to be a granddad.



Lorna





2012
Just turned 13



**Zach, kissing in
Angkor Wat,**

Cambodia

2011



Third International Conservation Agriculture Conference, Hanoi, Vietnam, Dec. 10-15, 2012

Fourth International Conservation Agriculture Conference, Battambang, Cambodia, December 9 to 14, 2013



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Angkor Wat



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Bottle cap





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Fourth International Conservation Agriculture Conference, Battambang, Cambodia, December 9 to 14, 2013



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Funding for Study

- NC Regional Water Quality Education Program
- Capacity Building Grant Program



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Partnership



Mitch Woodward
Greg Jennings
Bill Hung



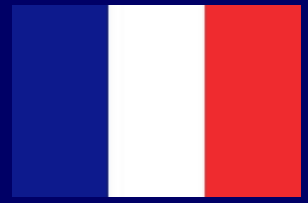
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Partnership of Countries with Flags of Red, White and Blue



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Outline

1. What is Natuculture?
2. Natuculture and Citizen Engagement
3. Natuculture the Plan to Engage K-12 students





Outline

- 1. What is Natuculture?**
- 2. Natuculture and Citizen Engagement**
- 3. Natuculture the Plan to Engage K-12 students**





Natuculture

New Term



Natuculture

Pronounced as:

Nā-chew-culture



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Natuculture

Any human made
system that mimics
nature in human
disturbed landscapes



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Lawn

our drug addicted
carpet



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Natuculture

Human
disturbed
landscape



Lawn

our drug addicted
carpet



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Sockwell Lawn Before Rain Garden



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Natuculture

Human
made
system



Rain garden





Natuculture

Mimics
Nature



Infiltration
enhancer and
groundwater
recharger

Rain garden - 'just like a forest'



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**Considered a weed
What is beautiful?**

Permaculture is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems.

Natuculture can be a transition term for permaculture. When several natuculture systems stably synergize, the site is transformed into a permaculture system.



Natuculture

Any human made
system that mimics
nature in human
disturbed landscapes



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Outline

1. What is Natuculture?
2. Natuculture and Citizen Engagement
3. Natuculture the Plan to Engage K-12 students





Citizen Engagement



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SANREM CRSP



Natuculture Engagement

To see is to
believe



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Sockwell Lawn Before Rain Garden



Lawn

the drug addicted carpet



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Natuculture, April 2012



N
a



PEOPLE



Ribbon Cutting by the Dean October 2011 for Oasis sofas





Natuculture Scholars, Fall 2011





Spring 2012





Summer 2011





August 2011



Drs. Xiu & Michele, Fall 2011



Dr. Kelsi Bracmort
Bench donation



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Annette building the Green Roof, May 2011



No
an





Dripped Irrigation installation





Volunteers, Summer 2011





Volunteers, Cleaning up Community





Oasis sofa, October 2011





asis sofa, October 2011



Green Roof, October 2011



Building Bird Pond, July 2011



Bird pond, Spring 2012





Art work





Green Roof and Rain Harvester painted



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AGGIE PRIDE art work on Top of Rain Harvester



Ma



Groundhog





Cat!!!



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Bird feeders





Hawk



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House Finch





Downy Woodpecker



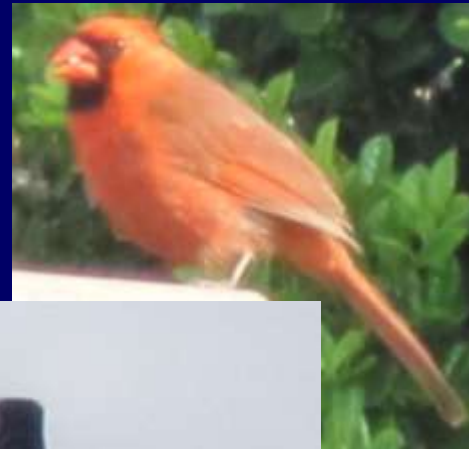
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Cardinal



ural
iver





Cowbird





American Robin





Mourning Dove



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Titmouse Bird





Grackle





Mockingbird





American Gold Finch





American Gold Finch



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Yellow garden spider





Butterflies





Wasp



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Bumble bee





Honey bees





Do you know clovers attract money bees?



North
Carolina



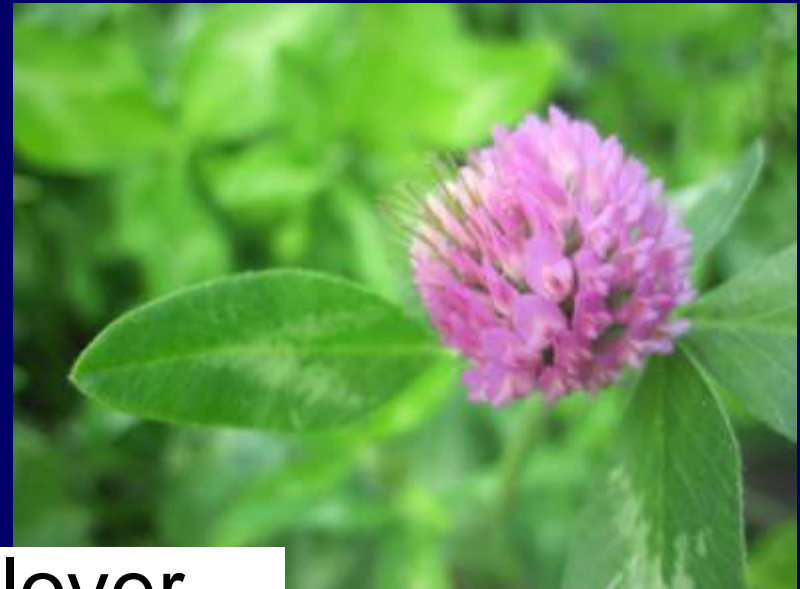


Do you know clovers attract money bees?

Crimson
clover



Red Clover



White Clover





Crimson clover



Not
and





Red Clover





White Clover



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Winter Pea





Austrian Pea



Buck Wheat



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Do you know legumes can provide Nitrogen for the soil?





Abruzzi rye: cereal rye



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Green roof and Rain Harvester





reen roof





Green roof





Green Roof



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Green Roof Study



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Rain garden

Before



Now



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Rain Garden, Summer 2011



Rain Garden

Garden with layers of gravel, sand, aggregates, and mulch that will gather rainwater from the roof - reducing runoff & erosion - and filter out up to 30% of pollutants.



N
ar

ity





Rain Garden Summer 2011



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Rain garden Fall 2011





Rain garden Fall 2011





Rain garden in Spring 2012



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Eastern redbud (*Cercis canadensis*)





Black Eyed Susan (Rudbeckia hirta)





Rain garden aquarium



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Rain garden aquarium



Choke berry

(*Aronia*)



Crab Apple (*Malus*)



Hornbeam (*Carpinus petulus*)



Community garden, Summer 2011





Hooray!!! Enjoy our vegetables!





Cantaloupes in our Community Garden



Yummy!
!!



Green and White Cucumbers





Okra



**Yellow
Squash**



Eggplants



Banana

**Southern
Pea**



**String
bean**



Water Melon



Pumpkin





Community Garden





Mixed Vegetables and flowers, Spring 2011





Tomatoes





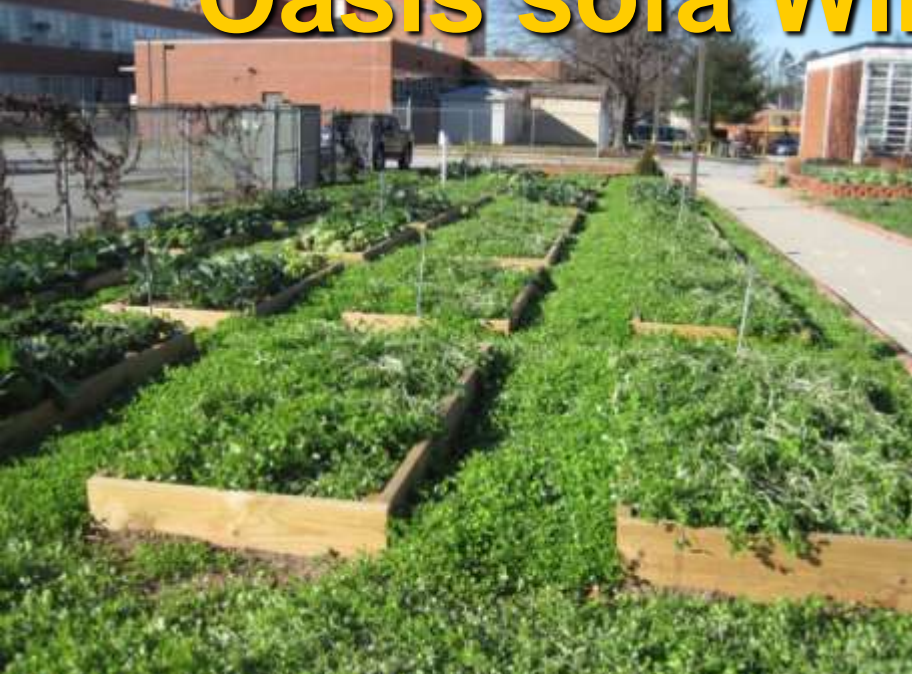
Vegetables, Summer 2012



Mixed Clover Oasis sofa Spring 2012



Oasis sofa Winter 2011



Broccoli



Kale



Collard



Lettuce





Kieu's Circle





The Circle Flowers and Kale mixed



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Collard radish





Hyacinth (Deft Blue)



Wild flowers







Lettuce flowers



e Bird Pond

Before



After





The Bird Pond



Sweet william (*Dianthus*)



Crossvine (*Bignonia capreolata*)



Coral honeysuckle (*Lonicera*)



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Shiitake Mushrooms





Blackberries, Blueberries

Before



After



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Berries



Powderblue blueberry



Tifblue blueberry



Thornless Blackberries

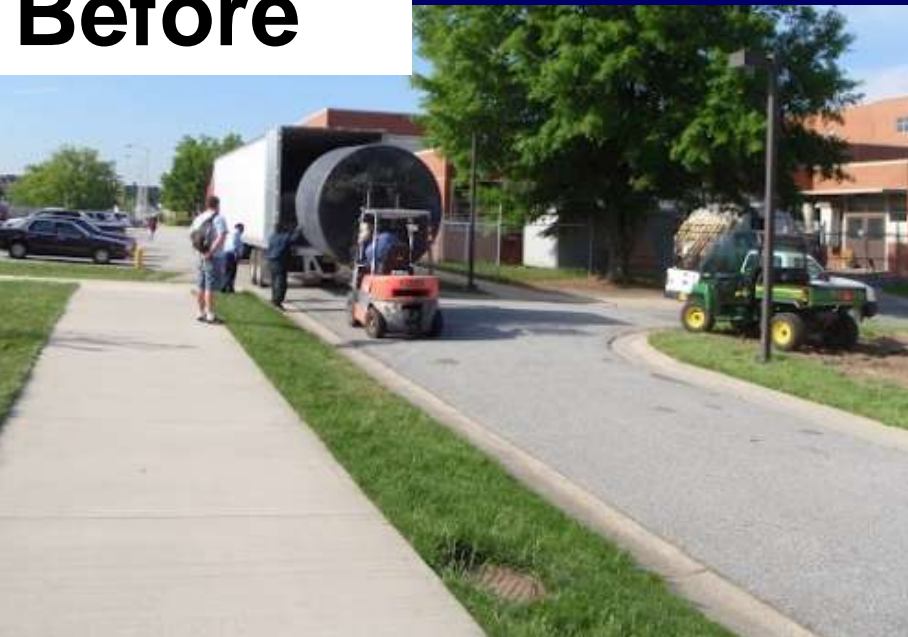


Heritage Raspberries



Grape vines Spring 2012

Before



After



Landscape design, Summer 2011





Grape vines Spring 2012





Grapes varieties



Jumbo Mus.



Reliance Mus.



Magnolia Mus.



Higgins Mus.



Noble Muscadine



Carlos Bronze (self-fertile Muscadine)



Dixie Muscadine (self-fertile Muscadine)



Concord Grape



Catawba Grape

Muscadines are native to South Eastern, USA

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Niagra Grape





Butterfly, Bumblebee & Hummingbird Attraction



Before



After



Butterfly, Bumblebee & Hummingbird Attraction



Hope to have permission for painting this electrical box!



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Old child care play yard Becoming Green manure and Crops Demonstration sites

Southern pea planted Summer 2011



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Green manure and Crops Demonstration sites



Proposed crops for Summer 201



Vegetables

Sunflower

Corn

Wheat

Canola

Soy Bean

Cotton

Strip-Clovers: White, Crimson & Red clover and vegetables





Green manure and Crops Demonstration sites

Strip-Clovers: White, Crimson & Red clover and vegetables





Green manure and Crops Demonstration sites

Proposed crops for Summer 2012



Vegetables

Sunflower

Corn

Wheat

Canola

Soy Bean

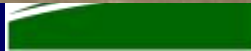
Cotton



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Erosion Project



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Pre-K



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Conservation Agriculture in Urban Areas 'Oasis Sofas'



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Conservation Agriculture Works



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**About 130 million
hectares are in
Conservation
Agriculture
worldwide**



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What is Conservation Agriculture



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McD

Definition of Conservation Agriculture



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McD

Minimal soil disturbance

No tillage



To see is to believe

Cambodia (French study began 2004)

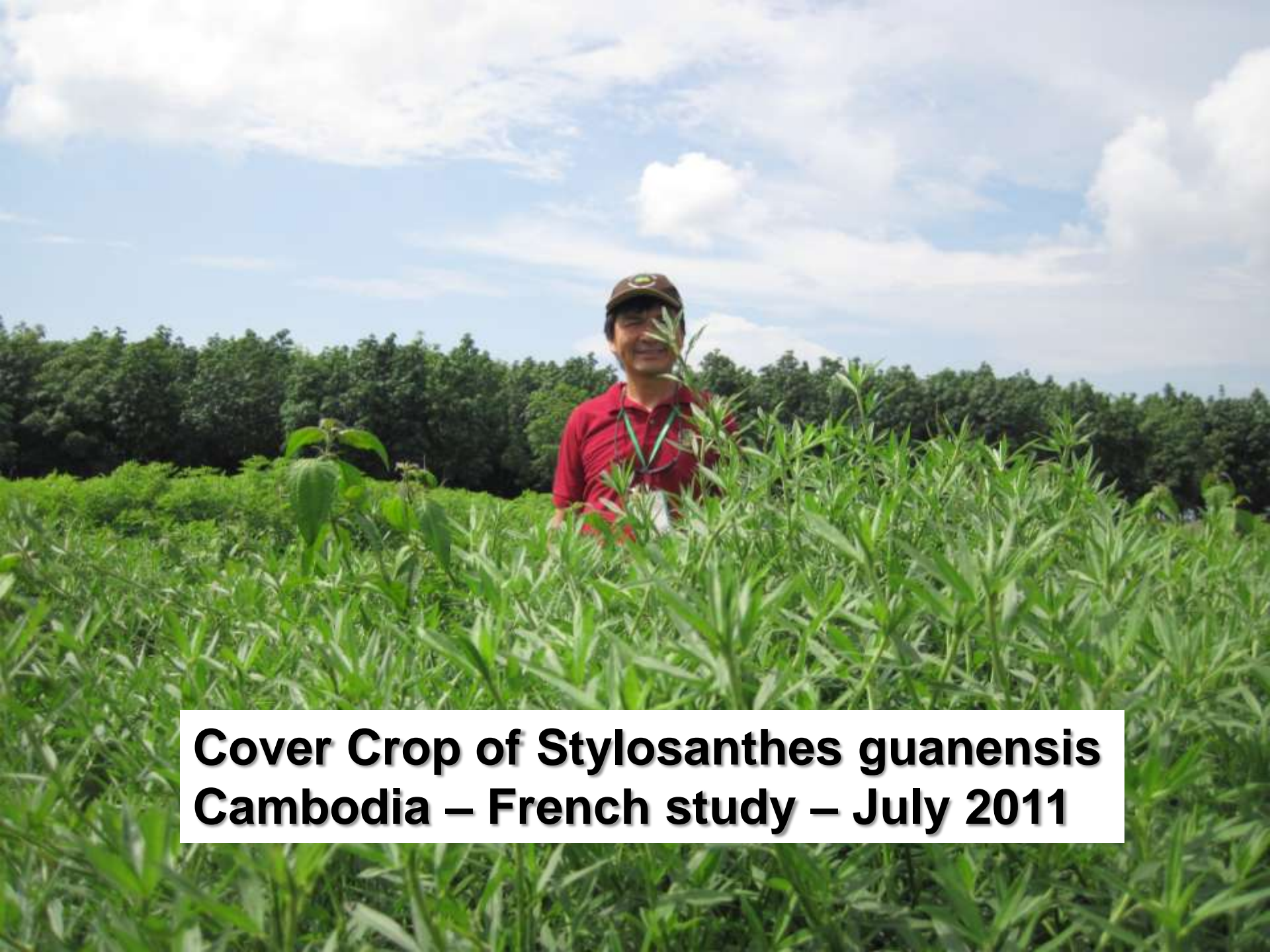


From PADAC - Soybean sowing (on Brachiaria) with "VENCE TUDO" –
June 2009



McD

Continuous mulch



**Cover Crop of *Stylosanthes guianensis*
Cambodia – French study – July 2011**

A wide-angle photograph of a field covered in dry, brown mulch. The mulch is spread unevenly, with some clumps and gaps. In the background, a line of green trees is visible under a clear sky. A white rectangular box is overlaid at the top of the image, containing black text.

Mulch -Cambodia – French study – July 2011

EXCITING!!!!!!



Tree hugger



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Mulch Hugger



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McD

Diverse species



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McD

Minimal soil disturbance

Continuous mulch

Diverse species





McD

Definition of Conservation Agriculture



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Conservation Agriculture is
naturculture because it copies the forest

Minimal soil disturbance

Continuous mulch

Diverse species



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Sockwell Hall Urban Conservation Agriculture Study

Site



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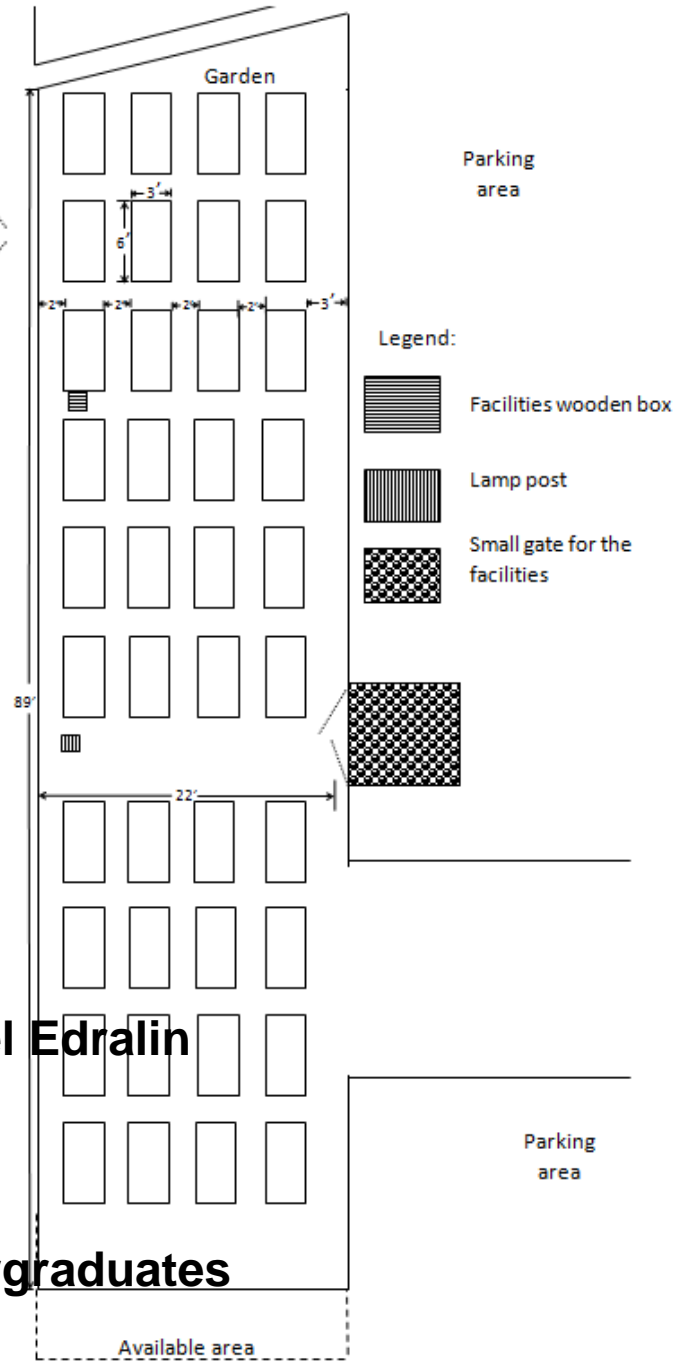


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Sockwell Hall



- Don Immanuel Edralin
- Lyda Hok
- Anass Banna
- Le Ngoc Kieu
- Several undergraduates

Treatments:

- CA summer cover crop
- CA winter cover crop
- No tillage no cover crop
- Conventional tillage



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Objective

Ultimately Zero Inorganic Fertilizers in Urban Conservation Agriculture Systems



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Sockwell Summer Vegetable Oasis

No cover crops

With mulch from previous cover crops



vegetables





General Greene Elementary Summer Oasis Preparation



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General Greene Elementary Summer Vegetable Oasis



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Smith High School Summer Oasis Preparation



INVOLVED:
HS Student
HS Student Parent
HS Science Teacher





Summer Oasis Sofa's



Plants for summer

- Cherry tomatoes
- Celebrity tomatoes
- Eggplant
- Okra

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Cherry Tomatoes



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Celebrity tomatoes



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Eggplant



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Okra





Sunhemp covercrop



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Web of lines to support vegetables



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Posts and lines for vegetables





Setting-up of drip irrigation



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Soil quality testing





Visitors from Guilford County



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Establishing at least four 'Oasis Sofa's Studies in four high schools at NC



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Engagement!!!!

Questions



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