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
Thanks to my family

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

2011

Just turned 13

2012

Fourth International Conservation Agriculture Conference, Battambang, Cambodia, December 9 to 14, 2013
Angkor Wat
Fourth International Conservation Agriculture Conference,
Battambang, Cambodia,
December 9 to 14, 2013
Funding for Study

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

Mitch Woodward
Greg Jennings
Bill Hung
Partnership of Countries with Flags of Red, White and Blue
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
Natuiculture
New Term
Natuculture

Pronounced as: Nā-chew-culture
Natuculture

Any human made system that mimics nature in human disturbed landscapes
Lawn
our drug addicted
carpet
Natuculture

Human disturbed landscape

Lawn our drug addicted carpet
Sockwell Lawn Before Rain Garden
Natuculture

Human made system

Rain garden
Natuculture

Mimics Nature

Infiltration enhancer and groundwater recharger

Rain garden - ‘just like a forest’

North Carolina Agricultural and Technical State University

USDA

USDA

SANREM CRSP

USAID

FROM THE AMERICAN PEOPLE
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
Outline

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

Site

North Carolina Agricultural and Technical State University

NC A&T Football Stadium

Sockwell Hall

Lawn
Natuculture Engagement
To see is to believe
Sockwell Lawn Before Rain Garden

Lawn
the drug addicted carpet
Ribbon Cutting by the Dean
October 2011 for Oasis sofas
Drs. Xiu & Michele, Fall 2011

Dr. Kelsi Bracmort
Bench donation
Annette building the Green Roof, May 2011
Dripped Irrigation installation

North Carolina Agricultural and Technical State University
Volunteers, Cleaning up Community
Art work
Green Roof and Rain Harvester painted
AGGIE PRIDE art work on Top of Rain Harvester
Cat!!!
Bird feeders
Hawk

North Carolina Agricultural and Technical State University
House Finch
Downy Woodpecker

North Carolina Agricultural and Technical State University
Cardinal
Mourning Dove

[Images of Mourning Doves]
Titmouse Bird
Grackle
American Gold Finch
American Gold Finch
Yellow garden spider
Butterflies
Wasp
Bumble bee
Honey bees
Do you know clovers attract honey bees?
Do you know clovers attract honey bees?

- Crimson clover
- Red Clover
- White Clover
Crimson clover
White Clover
Winter Pea
Austrian Pea
Buck Wheat
Do you know legumes can provide Nitrogen for the soil?
Abruzzi rye: cereal rye
Green roof and Rain Harvester
Green roof
Green roof
Green Roof Study

North Carolina Agricultural and Technical State University
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.
Rain garden Fall 2011
Eastern redbud (cercis canadensis)
Black Eyed Susan (Rudbeckia hirta)
Rain garden aquarium
Rain garden aquarium
Choke berry (Aronia)

Crab Apple (Malus)

Hornbeam (Carpinus petulus)
Hooray!!! Enjoy our vegetables!
Cantaloupes in our Community Garden

Yummy!!
Green and White Cucumbers
Mixed Vegetables and flowers, Spring 2011
Tomatoes
Vegetables, Summer 2012
The Circle Flowers and Kale mixed
Tillage radish
Tulip (Kingblood)

Narcissus (Pink Charm)

Hyacinth (Deft Blue)
Wild flowers
Lettuce flowers
The Bird Pond

Before

After

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Sweet william (*Dianthus*)
Crossvine (*Bignonia capreolata*)

Coral honeysuckle (*Lonicera*)
Shiitake Mushrooms
Blackberries, Blueberries

Before

After
Berries

- Powderblue blueberry
- Tifblue blueberry
- Thornless Blackberries
- Climax blueberry (Vaccinium corymbosum)
- Heritage Raspberries
Grape vines Spring 2012

Before

Landscape design, Summer 2011

After
Grape vines Spring 2012
Grapes varieties

- Carlos Bronze (*self-fertile Muscadine*)
- Dixie Muscadine (*self-fertile Muscadine*)
- Concord Grape
- Catawba Grape
- Jumbo Mus.
- Reliance Mus.
- Magnolia Mus.
- Higgins Mus.
- Noble Muscadine

Muscadines are native to South Eastern, USA
Butterfly, Bumblebee & Hummingbird Attraction

Before

After
Hope to have permission for painting this electrical box!
Old child care play yard
Becoming Green manure and Crops Demonstration sites

Southern pea planted Summer 2011
Green manure and Crops Demonstration sites

Proposed crops for Summer 2012

<table>
<thead>
<tr>
<th>Vegetables</th>
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</thead>
<tbody>
<tr>
<td>Sunflower</td>
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<tr>
<td>Corn</td>
</tr>
<tr>
<td>Wheat</td>
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<tr>
<td>Canola</td>
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<tr>
<td>Soy Bean</td>
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<tr>
<td>Cotton</td>
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</tbody>
</table>

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
General Greene Elementary School
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General Greene Elementary School
General Greene Elementary School
General Greene Elementary School
General Greene Elementary School
General Greene Elementary School
General Greene Elementary School
General Greene Elementary School
Neal Middle School
Pre-K
Pre-K
Pre-K
Pre-K
Conservation Agriculture in Urban Areas

‘Oasis Sofas’
Conservation Agriculture Works
About 130 million hectares are in Conservation Agriculture worldwide.
What is Conservation Agriculture
McD

Definition of Conservation Agriculture
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 guanensis
Cambodia – French study – July 2011
Mulch - Cambodia – French study – July 2011

EXCITING!!!!!!!!
Tree hugger
Mulch Hugger
McD

M - Minimal soil disturbance
C - Continuous mulch
D - Diverse species
McD

Definition of Conservation Agriculture
Conservation Agriculture is natuculture because it copies the forest

**M**inimal soil disturbance

**C**ontinuous mulch

**D**iverse species
Sockwell Hall Urban Conservation Agriculture Study

Site

North Carolina Agricultural and Technical State University
Treatments:

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

Several undergraduates: Don Immanuel Edralin, Lyda Hok, Anass Banna, Le Ngoc Kieu, and several others.
Sockwell Summer Vegetable Oasis

No cover crops

With mulch from previous cover crops

North Carolina Agricultural and Technical State University
General Greene Elementary
Summer Oasis Preparation
General Greene Elementary Summer Vegetable Oasis

North Carolina Agricultural and Technical State University
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
Cherry Tomatoes
Celebrity tomatoes
Eggplant
Okra
Sunhemp covercrop
Web of lines to support vegetables.
Posts and lines for vegetables
Setting-up of drip irrigation

North Carolina Agricultural and Technical State University
Soil quality testing
Visitors from Guilford County

North Carolina Agricultural and Technical State University
Establishing at least four ‘Oasis Sofa’s Studies in four high schools at NC
Engagement!!!!

Questions