Zero Waste
is the goal.

Tom Wright
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Afternoon Agenda, speakers

- Tim Greiner, Pure Strategies
- Tom Wright, SustainableBizness.com
- Chad Smith, Earthbound Farms
- Greg Cumberford, Gaia Herbs
- David Levine, Green Harvest Technologies

Zero Waste is the Goal.

- Zeri.org:
- Transition to no landfill
- Then no incineration (molecular garbage in the air)
- Then no mining of toxic materials

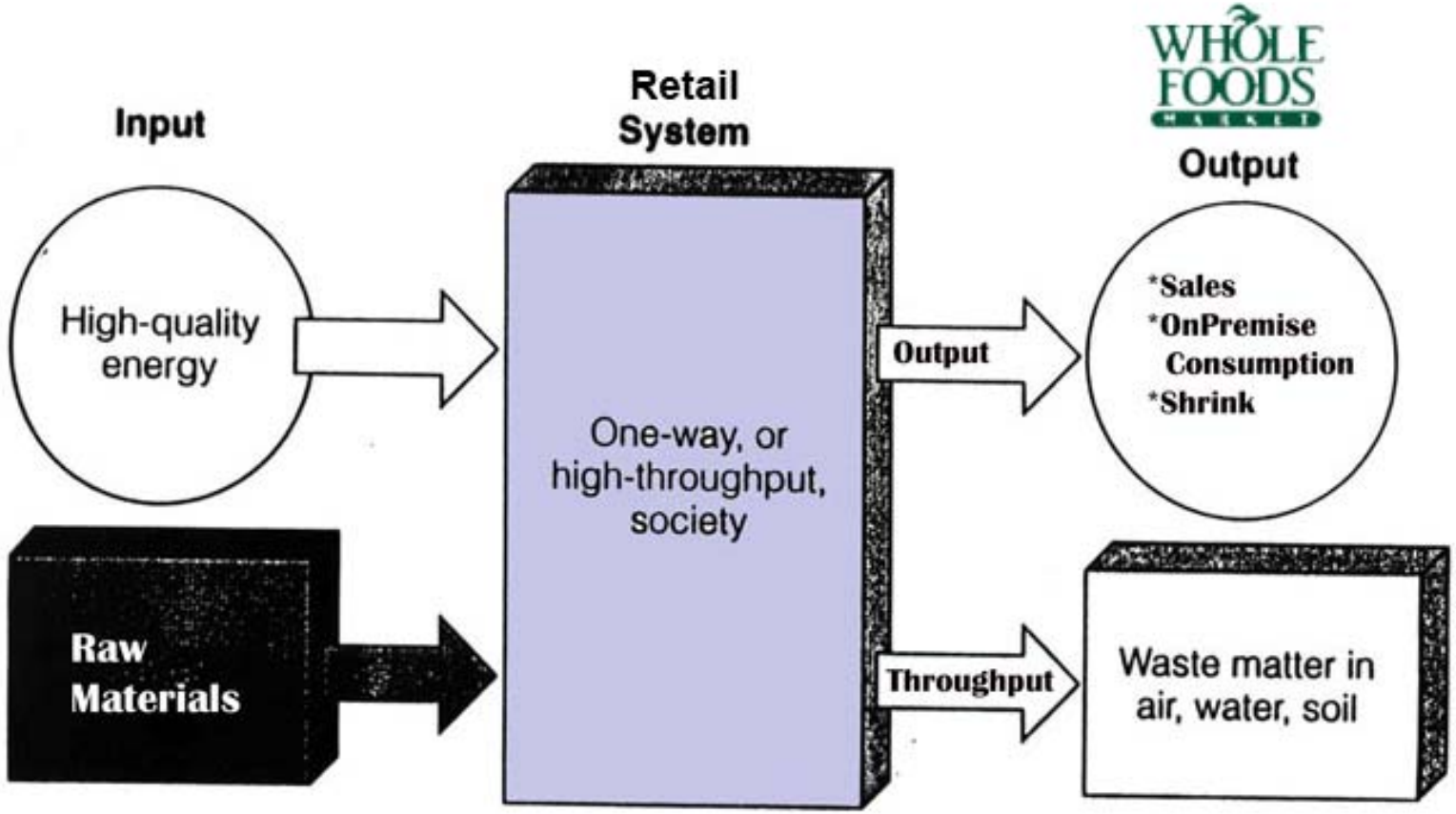
Sustainability:
2 simple rules to follow

- Live off of current solar income

- The cyclic principle: waste = food for something else; there is no bioaccumulation of persistent human-made molecules

Input Output Throughput

All stores and facilities have energy and material input, output and throughput (often what we call “waste”).



Waste matter in air, water and soil needs to be food for something!

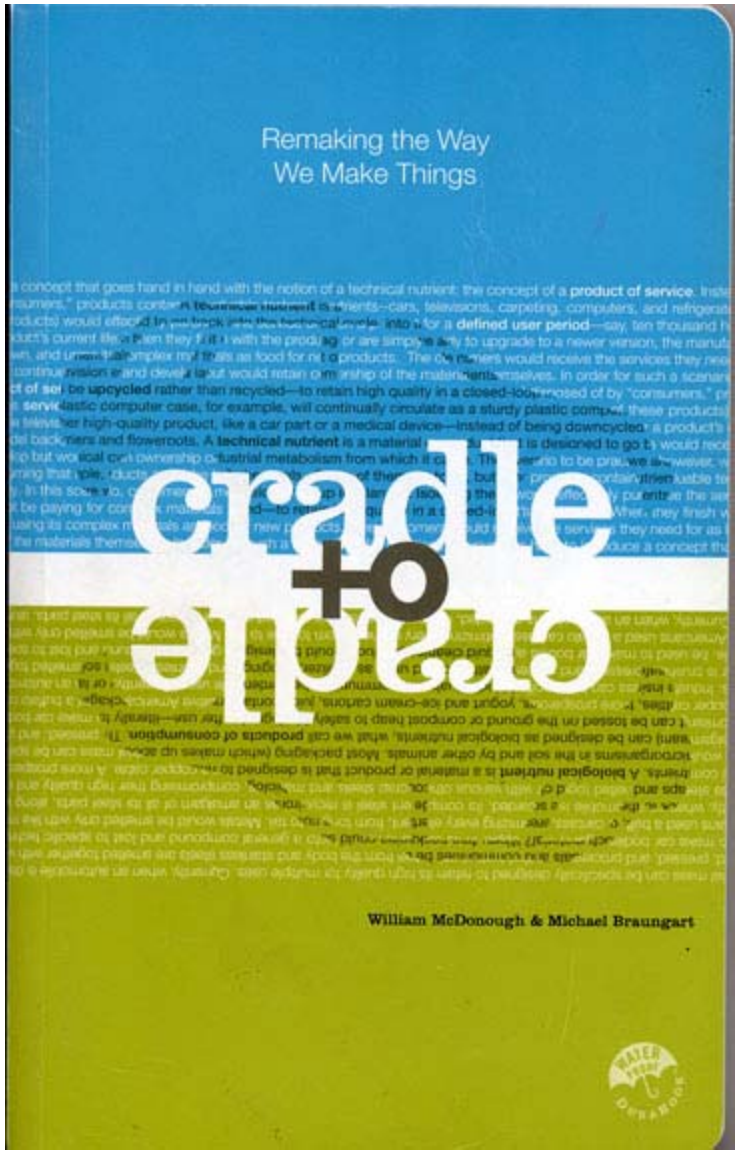
What is recycling?

- Involves the separation and collection of materials for processing and remanufacturing into new products .

- A material becomes itself again, and again. (e.g. clear glass)

Infrastructure

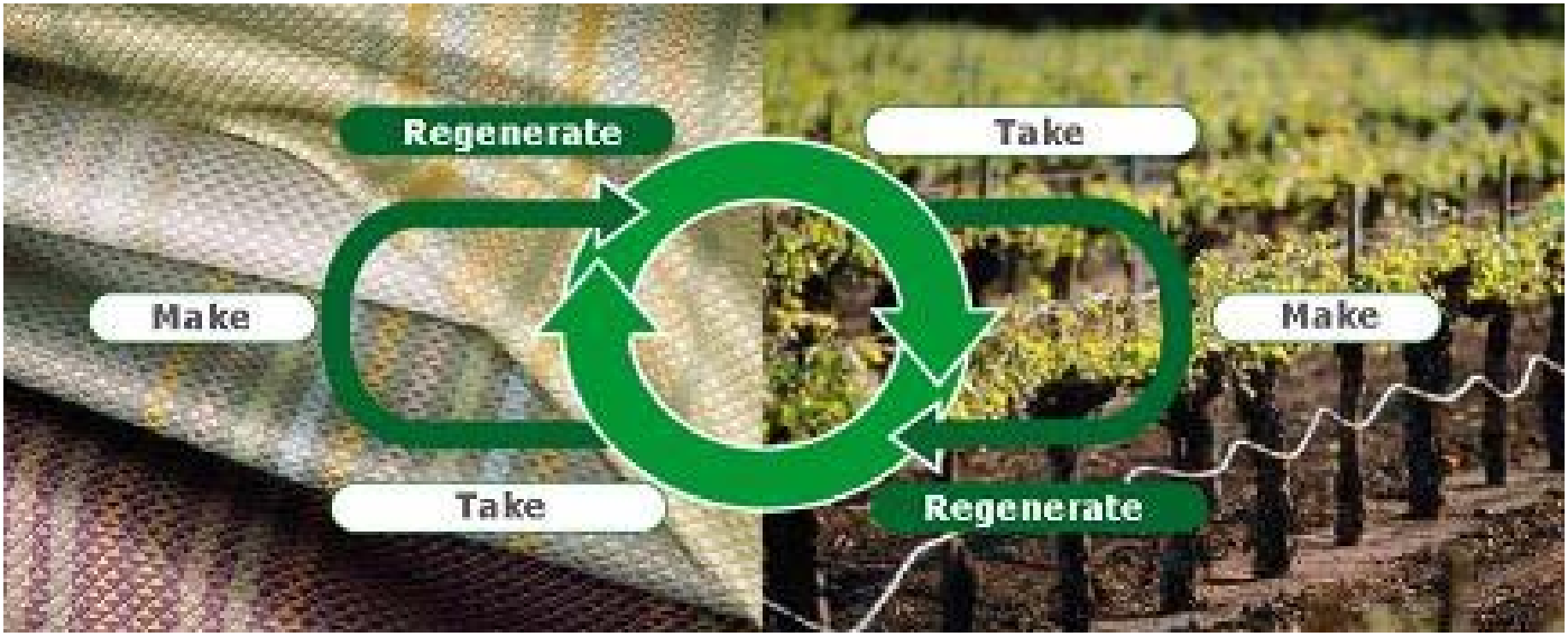
- How many US have curbside for beverage containers: 50% - 60%
- How many states have deposit laws: 18 (and they recycle at 3 times the rest)
- How many industrial scale composters take food wastes: 25 with grinders
- How many cities take food waste compostables at curbside: 50 - 100


Remaking the Way
We Make Things
cradle
to
cradle
William McDonough & Michael Braungart

Bill McDonough

- “There are two fundamental frameworks for metabolism: biological and technical nutrients. So we ask a company, ‘Are your materials safe and healthy for human and ecological systems? Do you have reverse logistics – do we know where this stuff comes from, where it goes, and how to get it back and it onto closed, zero-waste cycles?’ ”

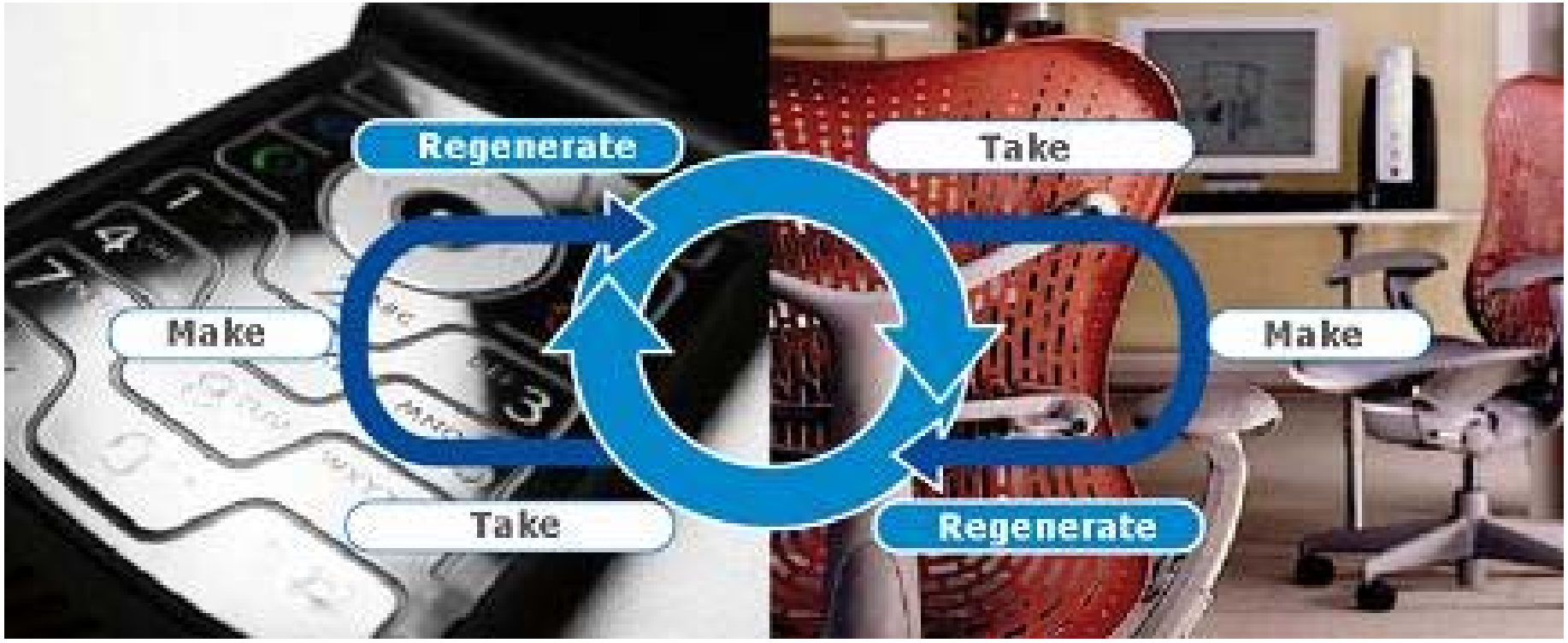
Biological Nutrients



Cradle to Cradle, William McDonough and Michael Braungart

Technical Nutrients

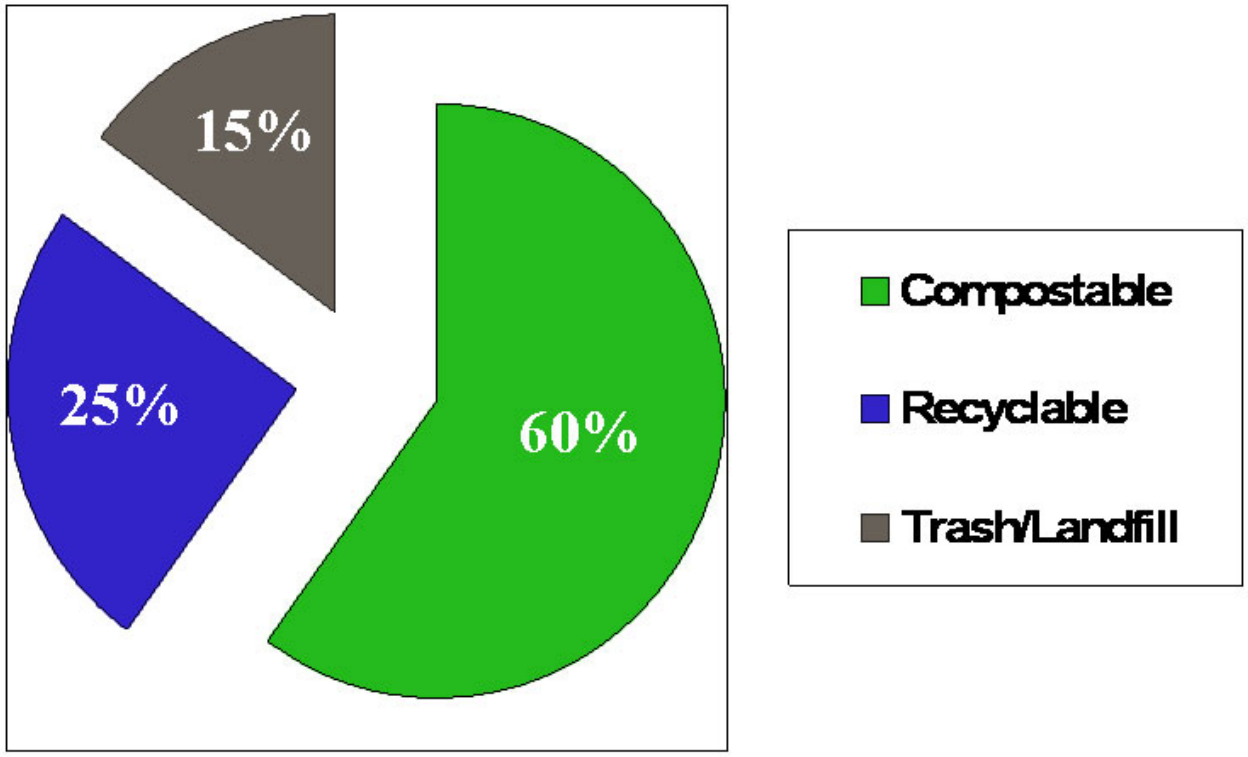
For example, plastics and metals



Cradle to Cradle, William McDonough and Michael Braungart

W HOLE Trash Audit
21 Hour Sample

60% Compostables: zero waste initiative



Supermarket Compost Program

Compost prepared for agriculture

Fruits and vegetables grown in our compost complete the recycling process.

Single Stream Sign

Special Thanks to the

Algalita Marine Research Foundation (AMRF)

For significant contributions to this summary presentation, and for their stewardship.

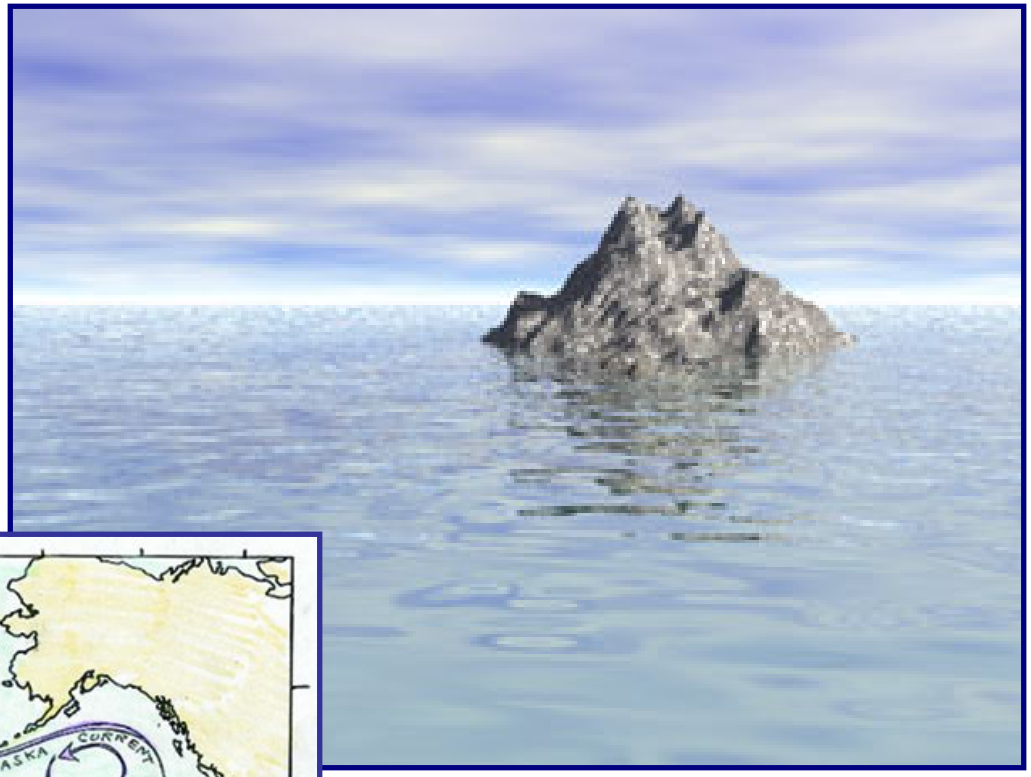
Fossil Plastic is Polluting our Ecosphere at an Alarming Rate

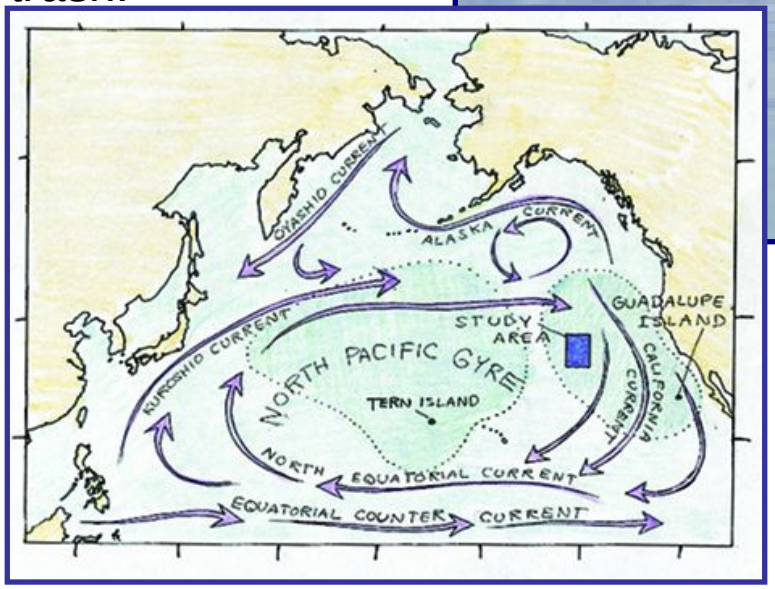
We can't close our eyes anymore and pretend it "goes away".

It doesn't go away- "Every piece of fossil plastic ever manufactured still exists!"

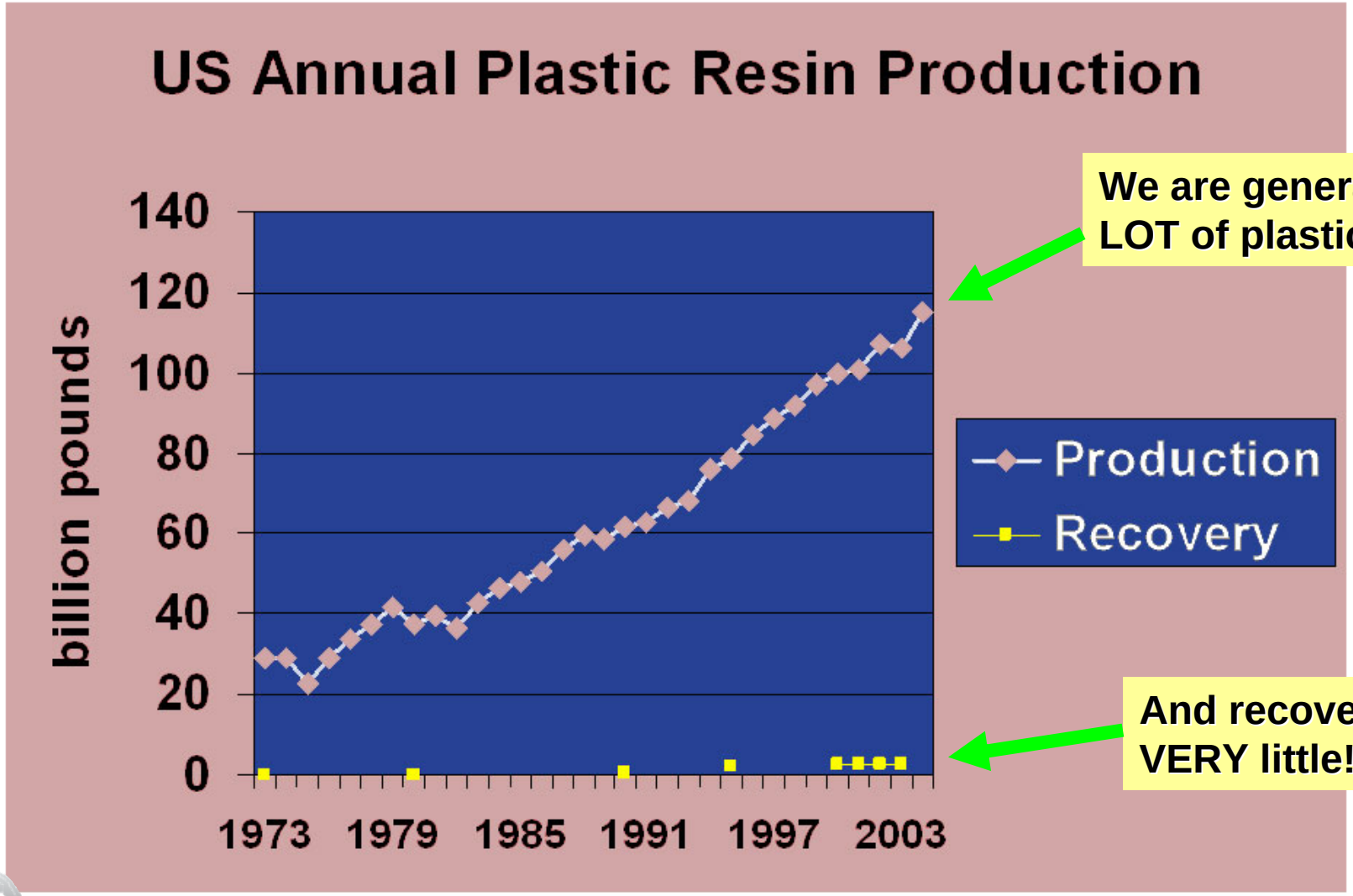
Garbage Island in Pacific Ocean

An entire "island" composed of trash has been discovered in the Pacific Ocean between California and Hawaiian islands . It is as large as the Central Europe. Fossil plastic objects prevail among the trash.





Virgin Plastic Production is Still on the Rise



(APC, 2004)

Hydrocarbon Plastics – (The Myth of) the Chasing Arrows

All trash generated

Figure 10. Generation of materials in MSW, 1960 to 2005

Do we really need Fossil Plastics?

Only if they REALLY recycle.

A ZeroWaste Alliance:
http://container-recycling.org/zbcwaste/links.htm

How would we navigate to zero waste?

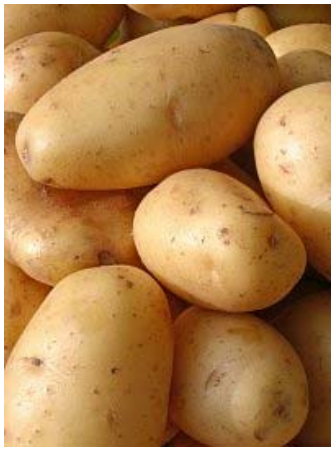
What are Green Plastics?

We learned:

Fossil plastics are 100% HYDROCARBON polymers that DON'T biodegrade in many lifetimes.

Green plastics contain CARBOHYDRATE polymers that can be designed to biodegrade.

It is now technologically possible to make plastics using green cells rather than fossil fuels.



Sources of Biopolymers for Green Plastics

Cellulose (Ag and forest wastes)

Wood

Cotton

Corn

Wheat

Soy

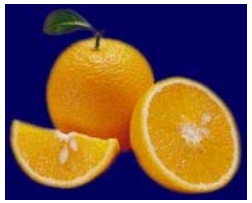
Tapioca

Potatoes

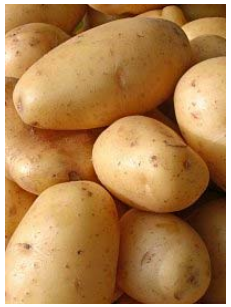
Etcetera

Zero Waste Mission- USDA Ag Service

Commodity






Product

Cheese, juice, ethanol, flour, vegetable oils, biodiesel, eggs, textiles

"Waste"

Whey, pulp, glycerol, feathers, peel, sugar beet fiber

Biobased Packaging

Biopolymers, PLA, PHA, composites, films, coatings, monomers

From USDA Agricultural Research Service- Eastern Regional Research Center: Kirsten Dangaran, Charles Onwulata and John Cherry (Center Director) 2006 "Packaging Films and Coatings"

Common polymers designed to recycle, not compost.

- PE (polyethylene) can be derived from a green cell; sugar cane being used by Braskem in Brazil.

- PP (#5, polypropylene) from biobased source being designed for use in Mazdas

Green Plastics

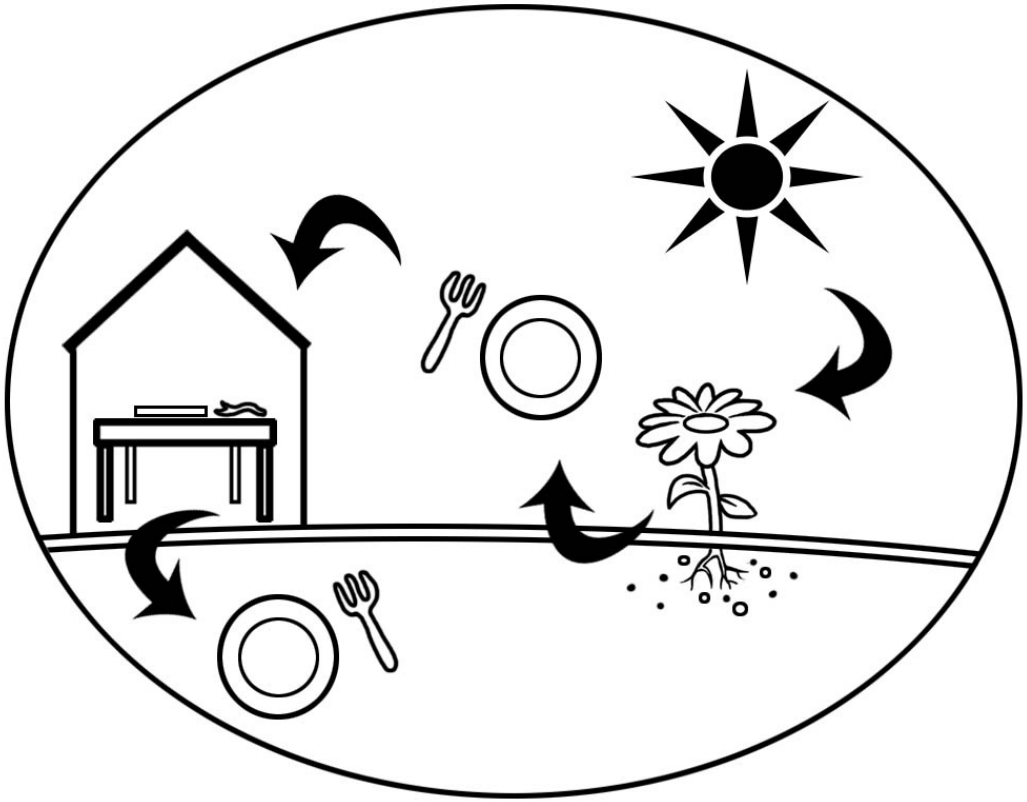
- Biopolymer(s) +
- Plasticizer(s) +
- Other additives

= BIOplastic

SOME bioplastics are certified compostable (ASTM 6400). Yet that does not mean marine biodegradability.

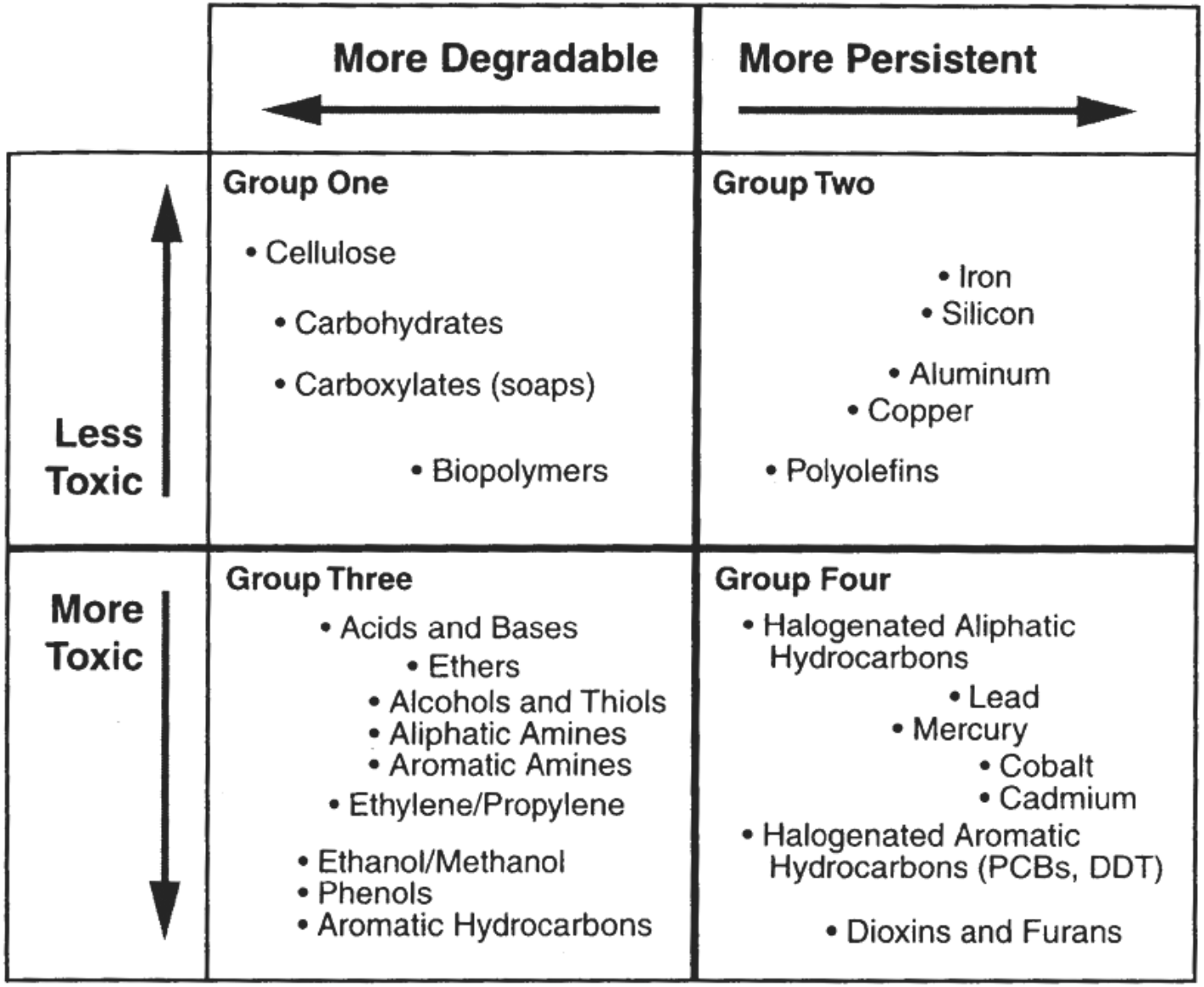
To Stop Accumulation of Waste We Must Focus on Two Principles

1. **Live off current solar income**
2. **There is no waste (waste is food for something else).**



Moving Materials Towards Sustainability

The following matrix describes a way to think about all the materials on earth. They range from very toxic and very persistent, to non-toxic and compostable. Sustainability implies making group four obsolete, and making group one the primary operating realm.


More Degradable
More Persistent
Group One
• Cellulose
• Carbohydrates
• Carboxylates (soaps)
• Biopolymers
Group Two
• Iron
• Silicon
• Aluminum
• Copper
• Polyolefins
Less Toxic
More Toxic
Group Three
• Acids and Bases
• Ethers
• Alcohols and Thiols
• Aliphatic Amines
• Aromatic Amines
• Ethylene/Propylene
• Ethanol/Methanol
• Phenols
• Aromatic Hydrocarbons
Group Four
• Halogenated Aliphatic Hydrocarbons
• Lead
• Mercury
• Cobalt
• Cadmium
• Halogenated Aromatic Hydrocarbons (PCBs, DDT)
• Dioxins and Furans

PLA is a molecule, not a brand. (**Polylactic acid** or **Polylactide)**

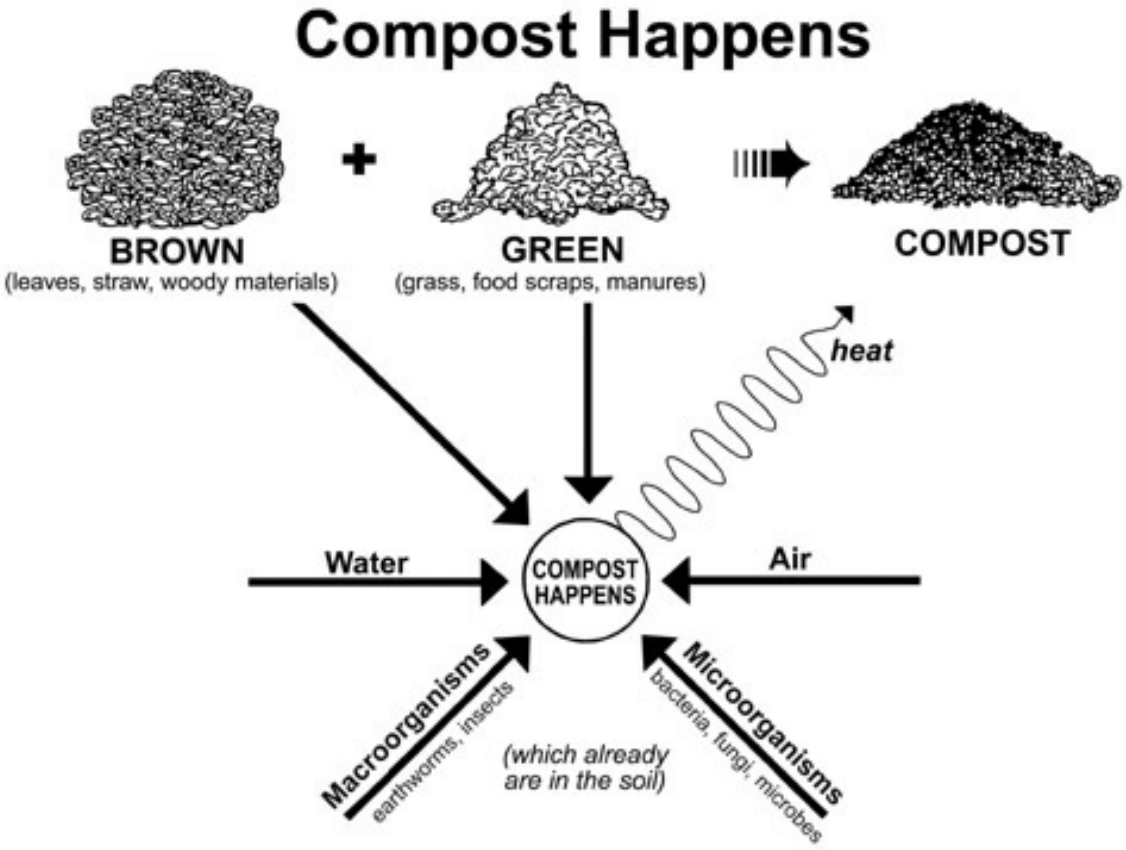
- PHA, & PHB are also molecules.
- Green cell based “bioplastics”
- Also synthetic and biobased hybrids that refer to themselves as “green”
- Certified compostable: BPI, DinCertco, etc.
- Goal: non-GMO crop source

It deserves it’s own identity and number.

What is industrial-scale composting?

- Large-scale facilities designed to process organic “wastes” into stable, humified and re-usable products which can be used in landscaping, horticulture and agriculture and a number of specialized applications
- Controlled decomposition of organic “wastes” with minimum impacton air, soil and water quality
- Hot composting process –achieve pasteurization of materials (>55°C)
- Key infrastructure to recycle organic “wastes” into re-usable products, and to reduce our dependence on landfilling
- Facilities designed to process organic materials on a regional basis from municipal, commercial / industrial and construction / demolition sources

Food wastes blend with yard wastes.



So What is the Answer?

Changing Views, Taking Action

Problem:

Plastic Accumulation Worldwide

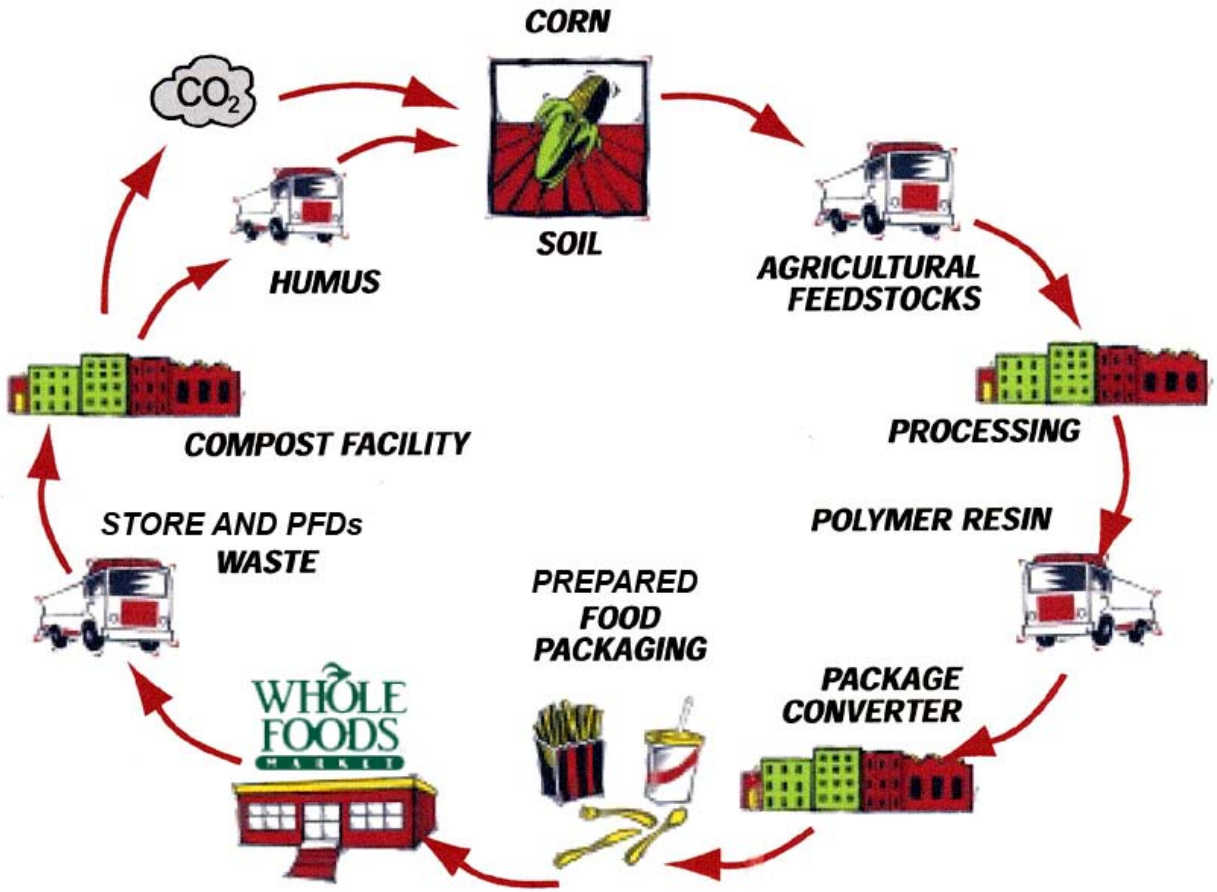
Plastic doesn't biodegrade. Beaches around the world are inundated with fossil plastic debris.

Solution:

Change How We Think About Plastic

If civilization is to survive healthily and indefinitely on this planet, then we must change the way we create, consume, and discard plastic.

We pack our lunch in a bag that will be around long after we're gone.



The Green Cell Packaging Cycle

This is an example of moving towards group one.

Producers of Green Plastics

The list is growing. For information on compostable green plastics and 3rd party certifiers go to:

US: Biodegradable Plastics Institute

http://www.bpiworld.org/BPI-Public/Approved.html

European Union: DIN Certco Certification

http://www.din-certco.de/index.php?lang=en

Brussels: Vincotte International nv/sa

http://www.aib-vincotte.com

Japan: Biodegradable Plastics Society of Japan

http://www.bpsweb.net/02_english/03_new_e/what_g/what.htm

Green Products Now Available

BioBag®

Mater-Bi

EcoWorks

Eco Film
100% BIODEGRADABLE

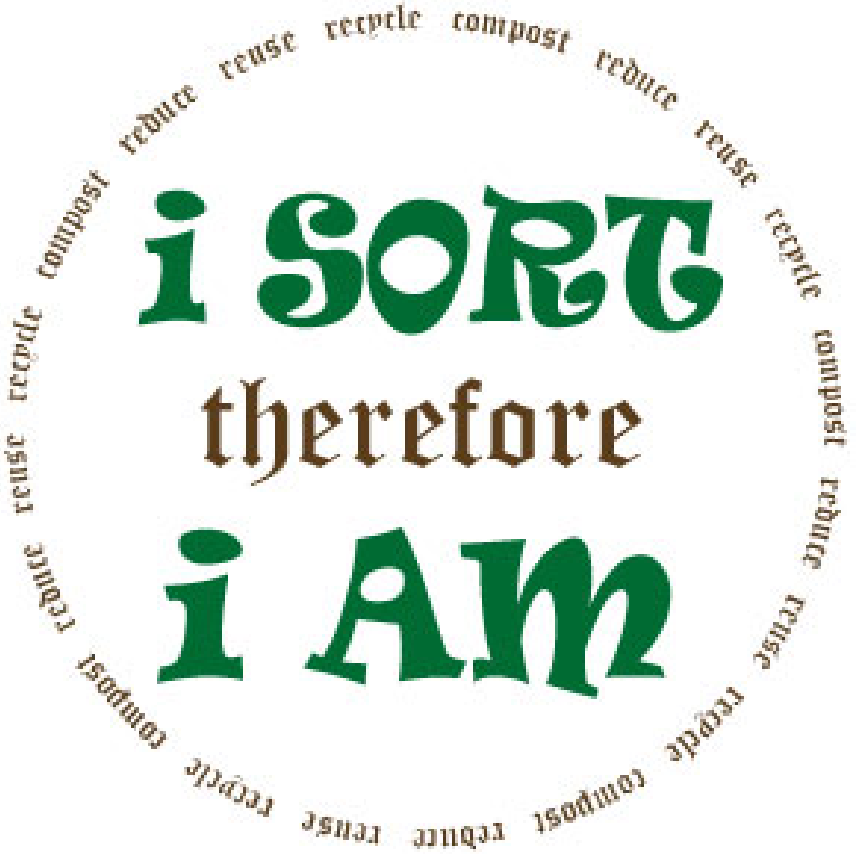
NāT -Ur
Plastic Made of Corn

Greenware

innovia FILMS

cellulose films

We all have the choice.



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Responsible Inquiry

- In your group select a problem in the lifecycle of biobased materials that if solved would aid us in making it more sustainable.
- Try to design a solution using Aggregated Demand /Materials Pooling or another collaborative strategy.