

RECYCLED NUTRIENTS – FEEDING THE SOIL THAT FEEDS YOU

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GIVING BIOSOLIDS A VOICE

Utilities, regulators and universities banded together to build a unified Washington State biosolids rule. Pooling resources to:

- Establish research
- Participate in regulations development
- Create accessible information for all



THE SPECIAL INGREDIENT

Research...it's key

- Early on, we realized that the foundation for everything is rooted in research.
- Nearly half of our annual budget goes to this every year.



Aldergrove Pit, British Columbia



Before

After

SAMPLING OF PAST PROJECTS

- Biosolids Risk Analysis
- Voluntary Trace Organics Survey
- Voluntary Dioxin Survey
- Amicus in Class B Land Application Ban
- Fertilizing with Biosolids
- Biosolids in Landscapes and Gardens
- Literature Review on Environmental Effects
- Biosolids Management Guidelines
- ...and much more



RESEARCH APPROACH & PRIORITIES

Information & Education

Research & Demonstration

Organization Support

Community assistance & info.

Identified projects

Committee & staff support

• Research & Demonstration

– Soils

- C, N and S fate in soils
- Microplastics from biosolids in agriculture
- Biosolids and soil conservation
- Biosolids to improve soil health
- Biosolids in urban agriculture (soil quality/food quality)

– Products:

- Bioretention soil mixtures
- Biosolids based potting mixes
- Lime stabilized blend product

– Climate change:

- Carbon accounting for compost
- Greenhouse gas calculator for biosolids





AGRICULTURE

Fact Sheet

Biosolids recycled on agricultural lands provide plants with essential nutrients that enhance growth and increase crop yield.

SEEKING SOLUTIONS

We all need food to survive, and that means someone needs to grow that food. Maintaining healthy crop production and sustaining the environment are constant challenges to modern agriculture. Growing crops and raising livestock removes nutrients from the land and can make the soil unhealthy. Degraded soils also tend to have poor soil structure and are not able to hold water effectively, which can result in erosion and negative impacts to water quality.

Given the challenges of sustainable agriculture, biosolids are an ideal soil builder and fertilizer replacement. They are renewable, sustainable, and provide essential plant nutrients to help plants grow greener and increase crop yields. Biosolids can also repair unhealthy soils quickly and effectively. Unlike synthetic fertilizers, biosolids increase organic matter. Organic matter can help suppress plant disease, help beneficial microorganisms like earthworms thrive, improve soil structure, increase soil water holding capacity and reduce erosion. The addition of biosolids can also help to moderate highly alkaline or acidic soil conditions.



Farmers in Eastern Washington who are lucky enough to use biosolids get healthy, green wheat fields like this one.

BENEFITS OF BIOSOLIDS

Benefits of biosolids in agriculture	
Soil Property	Benefits
Biological	Increases soil microorganisms
Chemical	Adds macro and micronutrients
	Increases cation exchange capacity
	Provides slow release nitrogen and other nutrients
	Keeps soil pH neutral
	Increases soil carbon storage
Physical	Helps soil hold water
	Improves soil structure (tilth)
	Loosens compacted clay soils
	Increases water drainage (infiltration)
	Add air to the soil (aerates)
	Provides organic matter



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Research Note

IMPROVING DEGRADED URBAN SOILS USING ORGANIC AMENDMENTS

Researchers and Collaborators: Craig Cogger, Washington State University, Puyallup Research and Extension Center

Background

Urban and suburban development degrades the soil environment, resulting in loss of soil organic matter, loss of structure and permeability, increased compaction, decreased macroporosity and aeration, increased runoff, and an overall decline in the environment for plant growth. Organic amendments can ameliorate these negative effects. Increasing concern about the effects of development on soil and water quality, and increasing volumes of locally produced biosolids and composts provides opportunities for high value use of local organic materials to improve urban soils.

Objectives

The scientific literature on organic soil amendments was evaluated to provide a basis for guidelines for biosolids and compost use in urban soils. We reviewed scientific literature from

the 1970s until the present, along with selected recent articles available from universities and other research institutions. We also include some unpublished information from our own research and demonstration projects at WSU Puyallup. This review addresses the following questions:

- Is there a good scientific basis for the expected benefits of organic amendments in urban soils?
- Do biosolids composts and other biosolids products offer any specific advantages or disadvantages?
- How long are the organic amendments effective?
- How much organic matter should be added to achieve these benefits?

Discussion

Most of the research on the effects of organic amendments on soil physical properties has been done in agricultural soils, with application rates ranging from about 5 to 200 dry tons/acre/year. Results of this research have consistently shown significant positive effects of organic amendments. The stability of soil aggregates increases, bulk density declines, macroporosity and infiltration rates increase, and total water holding capacity increases, leading to a better environment for plant growth. Higher rates of amendments led to greater improvement in soil properties. Although few studies have assessed the effects of organic amendments on runoff and erosion,

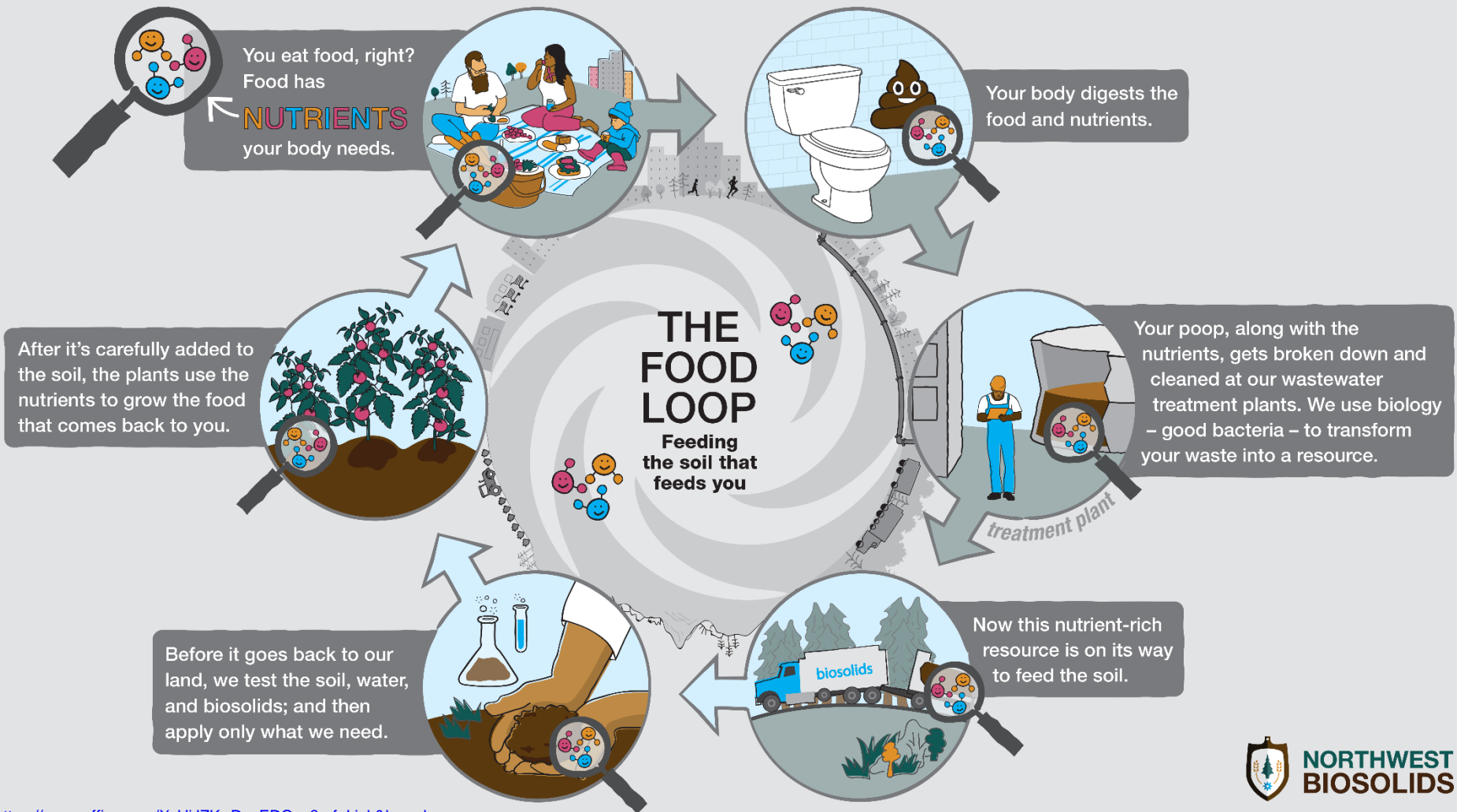


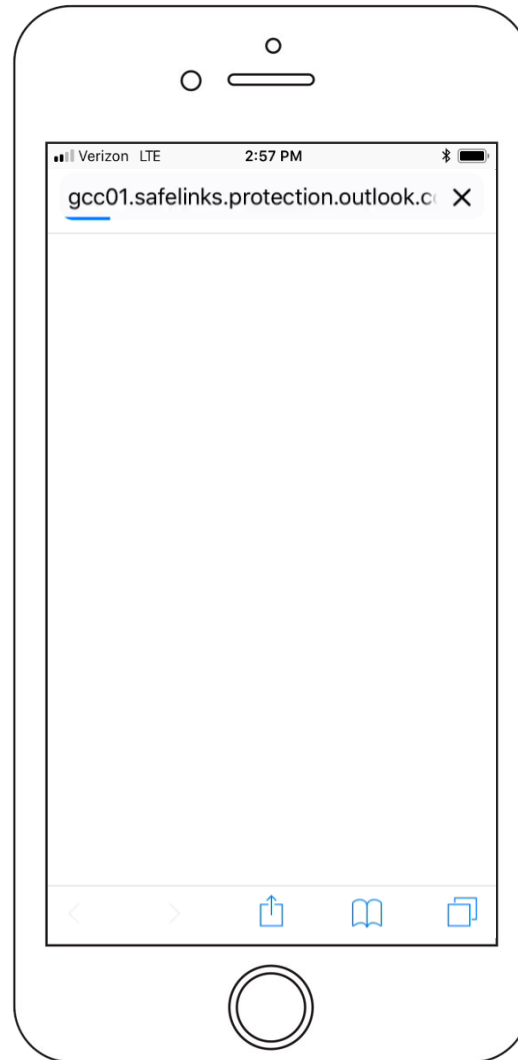
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RESEARCH
NOTES

FACT
SHEETS







THE FOOD LOOP

Feeding the soil that feeds you





**NORTHWEST
BIOSOLIDS**
Unearthing Sustainable Solutions

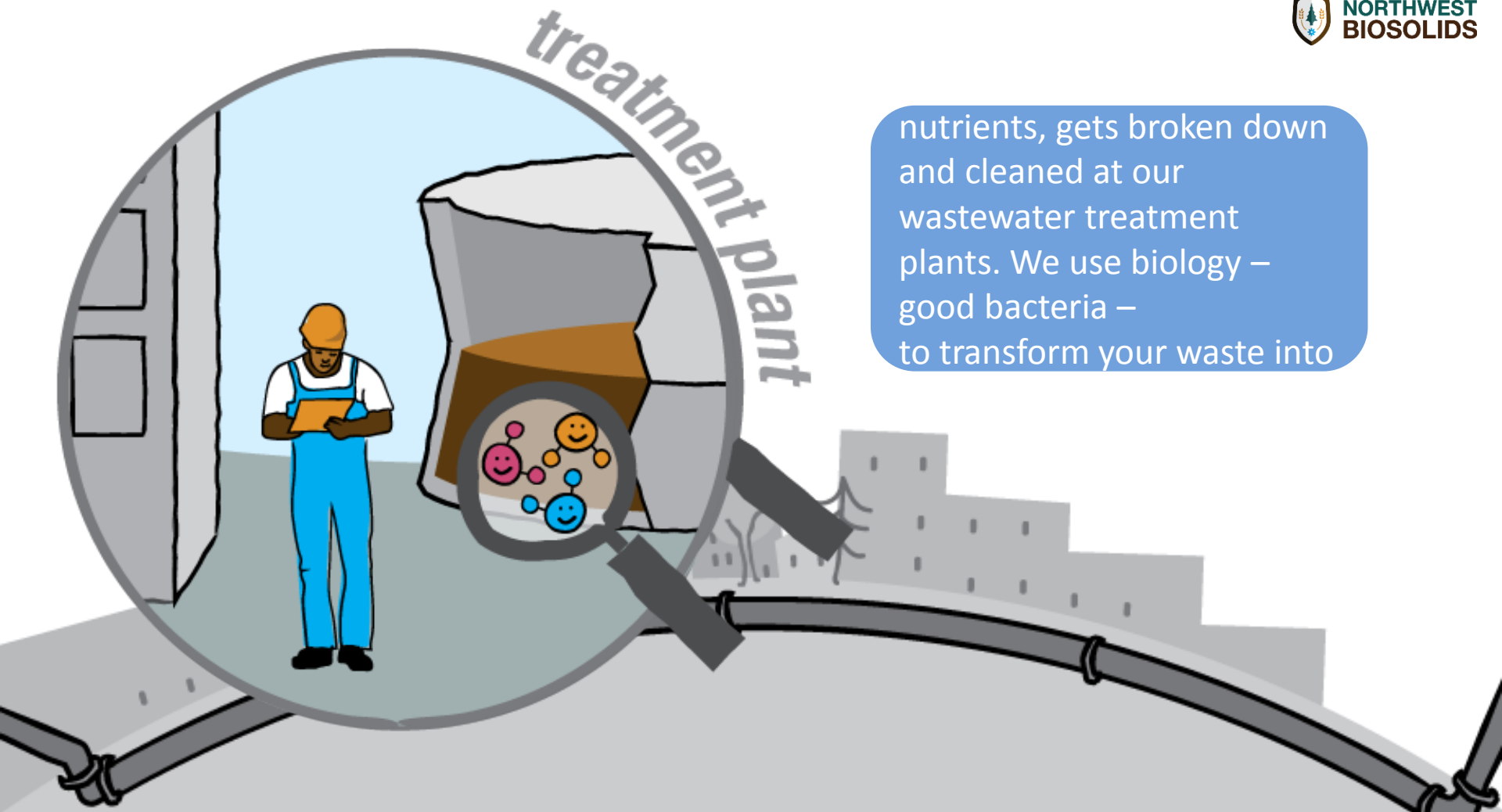


**NORTHWEST
BIOSOLIDS**

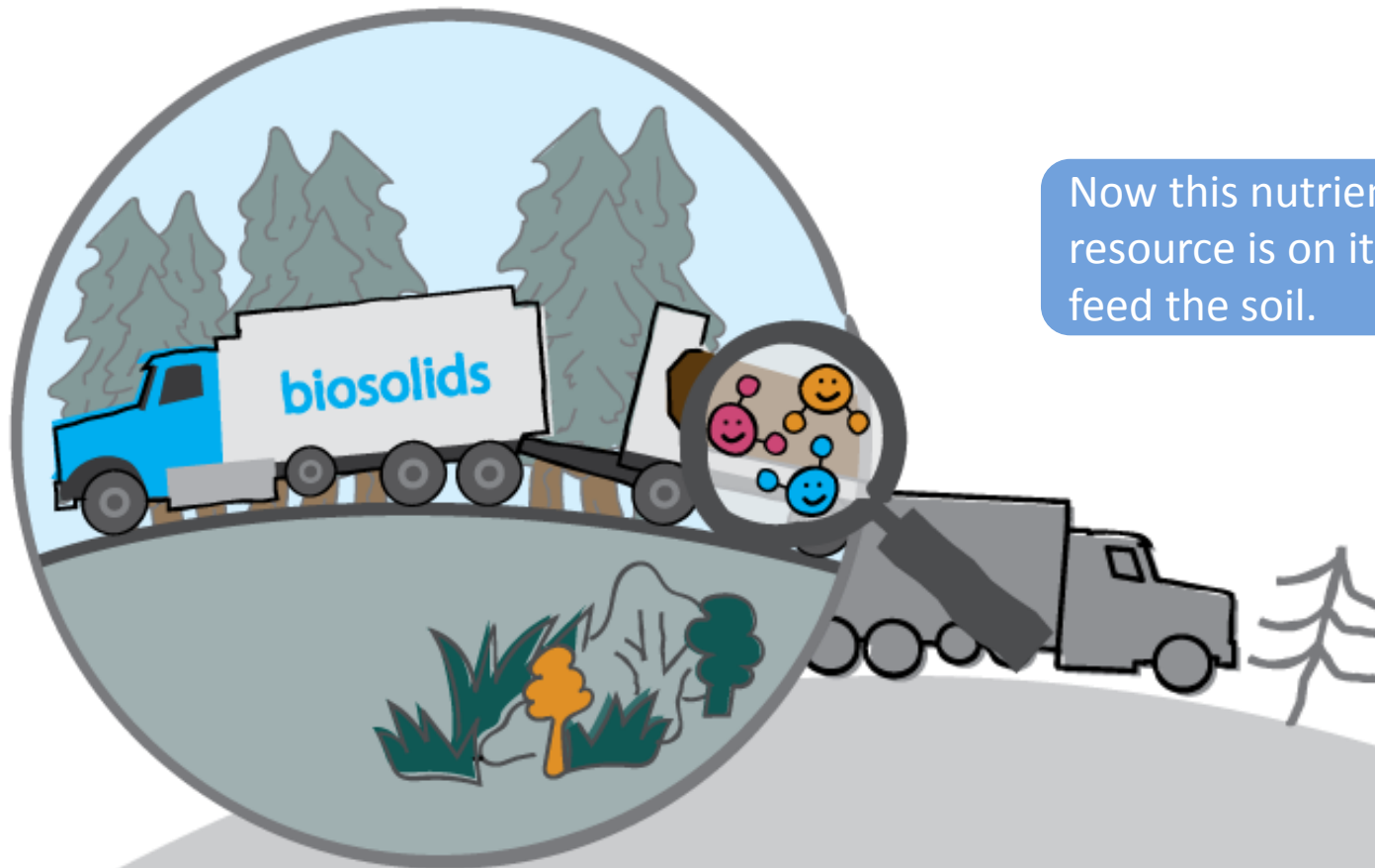


So, *you* eat food, right?
Because food has
NUTRIENTS
your body needs.

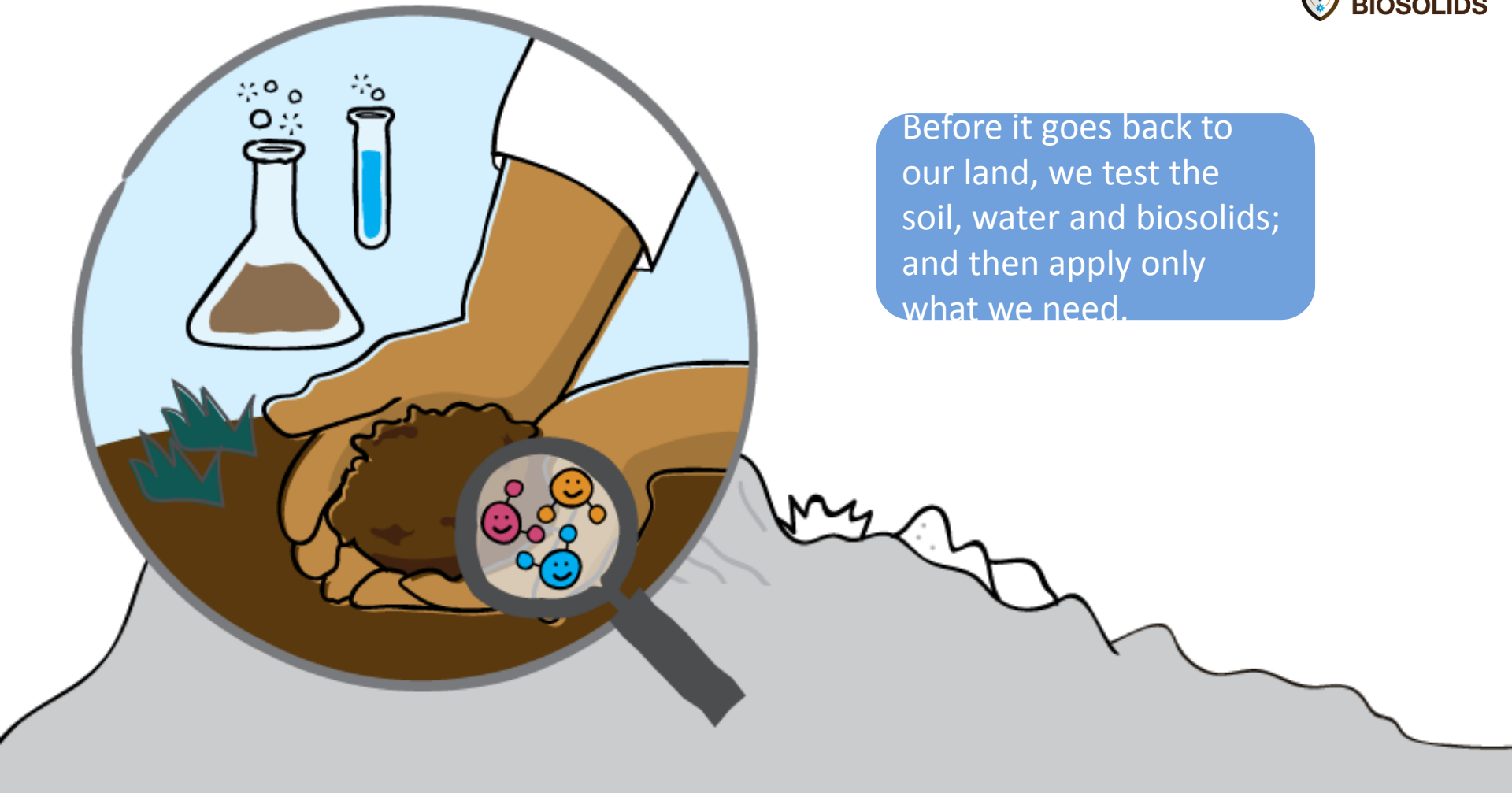




nutrients, gets broken down
and cleaned at our
wastewater treatment
plants. We use biology –
good bacteria –
to transform your waste into



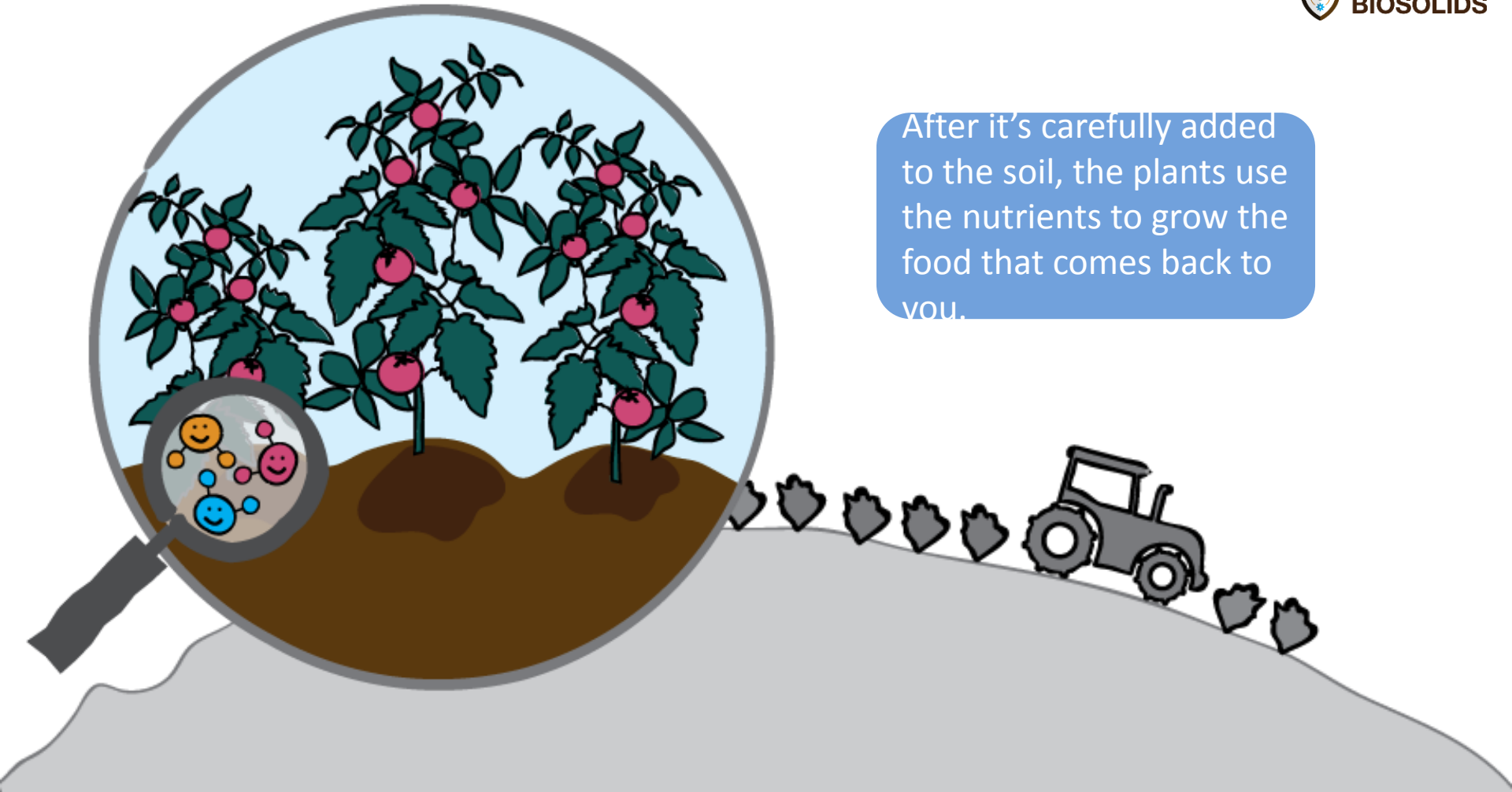
Now this nutrient-rich resource is on its way to feed the soil.



Before it goes back to
our land, we test the
soil, water and biosolids;
and then apply only
what we need.



After it's carefully added
to the soil, the plants use
the nutrients to grow the
food that comes back to
you.





Then the cycle begins
again!



NETWORK AT WORK & PLAY

BIO SOLIDS CAN YOU DIG IT?



September 9-11, 2018 ↓ Campbell's Resort ↓ Lake Chelan, WA

