Biointensive gardening and minifarming
HOW MUCH SOIL DO WE HAVE?

- 75% of the earth’s surface water
- 2/3 if the remaining surface of the earth is unfarmable – mountains and deserts
- That leaves 1/12 of the earth’s surface as potentially farmable land
- 3/4 of that soil has been desertified by wind and water erosion due to our industrial and chemical farming practices
- That leaves 1/48 of the entire earth’s surface to raise food for 6.5 billion people and many times more animals
- That soil is scattered all over the planet with varying degrees of fertility and microbiotic life
“They’re making more people every day but they aint making no more dirt.” ~Will Rogers
Effects of industrial and chemical farming methods

- For each pound of food eaten in the U.S. approximately 6 pounds of soil are lost to wind and water erosion
- Twelve pounds of farmable soil are similarly lost in developing countries
- In China 18 pounds of farmable soil are lost for every pound of food eaten
- Approx 213,000 people are added to the planet daily, requiring 34,000 more farmable acres to feed them, acreage which does not exist
• 30% of the world’s cropland has been abandoned in the last 40 years due to severe erosion
• Using our current industrial agricultural methods less than 40 years of farmable soil remain globally.
• The U.N. has estimated that by 2014 only about 64% of the world’s population is likely to have an adequate diet
Of the world's 1.2 billion hectares with moderate to severe soil degradation, the largest areas are in Asia and Africa. Central America has the highest percentage and worst degrees of soil degradation.
WHERE DOES OUR ‘DISAPPEARING’ TOPSOIL GO?
Biointensive allows up to 20 pounds of growth of arable/fertile soil per 1 pound eaten.
WHERE HAVE ALL THE FARMERS GONE?

• Less then 0.2 percent of the U.S. population currently work in farming
• The average age of U.S. farmers is 55
• In the past 100 years our farming knowledge base has all but disappeared
• With mini-farming approaches, everyone can be part of rebuilding the nation’s farming skills.
FUTURE FARMER IN NIKKI’S CORN FIELD
THESE GROUPS ALL AGREE ON ONE THING

• The World Bank

• United Nations Food & Agriculture Org.

• The Group of 8 Countries (G8)

• The Bill & Melinda Gates Foundation
History of Biointensive – in a nutshell

- Examples throughout history of intensive, sustainable, small scale agriculture
  - China – 4,000 years ago
  - Greece – 2,000 years ago
  - Mayans, Bolivia, Peru – 1,000 years ago
  - French – 150 years ago what we know as French Intensive gardening
Combining knowledge

• Allen Chadwick combined knowledge of Rudolph Steiner’s biodynamic techniques with French intensive methods and J.I. Rodale’s organic methods

• John Jeavons further developed the techniques and published “How to Grow More Vegetables.”

• 40 years of research overwhelming confirms the efficacy of the methods
• “Give back to the soil as much as you have taken – and a little bit more – and nature will provide for you abundantly.” ~Alan Chadwick
Ecology Action research garden, Willits, CA
Biointensive bounty in Kenya
Biointensive in Uzbekistan
Double digging in Mexico
Biointensive in Chernobyl
Biointensive in Ecuador
New plantings in the Rift Valley, Kenya
Harvest in South Africa
Nikki’s garden
Biointensive at Janet’s house!
Elements of Biointensive gardening and mini-farming

- Deep soil preparation
- Use of compost
- Synergistic planting of crop combinations aka companion planting & crop rotation
- Close planting
- Carbon efficient crops
- Calorie efficient crops
- Use of open pollinated seeds
- A whole, interrelated farming system
"Grow Biointensive" Sustainable Mini-Farm
Approximate Crop Area Percentages for Sustainability

Approximately 40 beds (4,000 sq. ft.) for one person
(-5,000 sq. ft. including paths)

60% Carbon-and-Calorie Crops
for maximum carbon and satisfactory calorie production
(e.g. grains)
— 24 beds

30% High-Calorie Root Crops
for maximum calories (e.g. potatoes)
— 12 beds

10% Vegetable Crops
for vitamins and minerals
(e.g. salad crops)
— 4 beds

If desired, 50% to 75% of the Vegetable Crops area may be used for income crops.
Deep Soil Preparation

- Double digging
- Loosening the soil 24” is the goal
- Allows deep root penetration
- Creates more space for air and water
- Improves drainage
Double digging – step one
Double digging – step two
Benefit of deep soil prep!
Use of Compost

• Dual purpose
  – Improves structure – soil is easier to work, good aeration and water retention, resistant to erosion
  – Provides nutrients, organic acids make nutrients already in the soil more available to plants, fewer nutrients leach out
  – pH buffer
  – Soil toxin neutralizer
ROOTS AND SOIL
(from The Nature and Properties of Soils, 12th ed., p 423)

Roots remaining in soil after crop harvest
= 15 - 40% of aboveground crop (AGB)
(4.5 - 12 lb)

Amount of organic matter “lost to the rhizosphere during the growing season”
may be more than 2 times the roots at the end of the growing season
≈ 30 - 80% AGB
(9 - 24 lb)

Total OM contributed by roots
≈ 45 - 120% AGB
(13.5 - 36 lb)

Aboveground Biomass
(30 lb)
Compost crops

• Carbon producing crops
  – Food for soil and for humans
• Nitrogen producing crops
  – Maximum nitrogen at 50% flower
• Composting v. turning in
Fava beans beginning to flower
Sunflowers as a compost crop
Vetch in full flower
Golden amaranth – carbon compost crop
Alfalfa – perennial compost crop
Cereal rye – carbon/compost crop
Flour corn – food & compost
Calorie efficient crops
Close Plant Spacing

- Use off set spacing (grid)
- More plants in bed
- Made possible by double digging & compost
- Shades plant roots
- Protects soil from UV rays
- Controls weeds
- Creates mini ecosystem
  - Carbon dioxide bubble
  - Water bubble
Good soil preparation makes grow
and renovation fertility possible—up to 4
times the productivity per unit of area!
Crop rotation & companion planting

- Companion planting in time
  - 3 year rotation based on plant families
  - Heavy feeders followed by heavy givers

- Companion planting in space
  - Sun/shade considerations
  - Structure/support (3 sisters)
  - Shallow/deep rooting
  - Fast/slow maturing
  - Good neighbor planting
  - Attracting beneficials
Open pollinated seeds

• Estimated that 90% of all varieties used in human agriculture no longer exist today
• Preserve varieties for future generations
• Save cost and reduce reliance on outside growers
• Opportunity to save seed from healthiest most successful plants
A whole integrated system working together
40 years of research
• “I also know,” said Candide, “that we must cultivate our garden.”

~Voltaire