Building soil carbon at Hardwick – an interaction with biodiversity-

feeding people and planet

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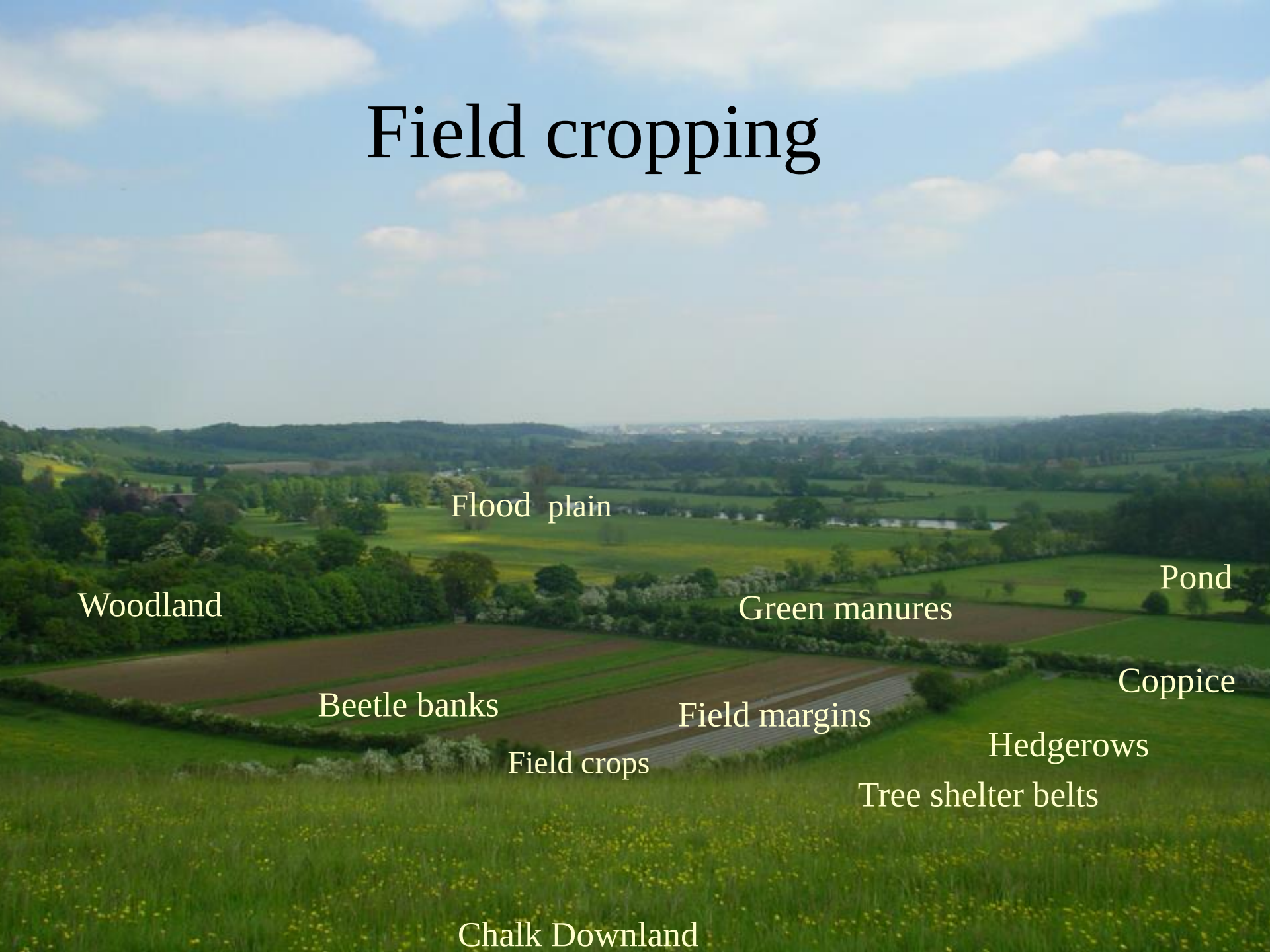
The farm business

- Established organic 1976
- Present site 28 years stockfree
- Produce over 70 crops-100tonnes pa
- Self sufficient system
- Local sales

Field cropping



The walled garden

Carbon farming

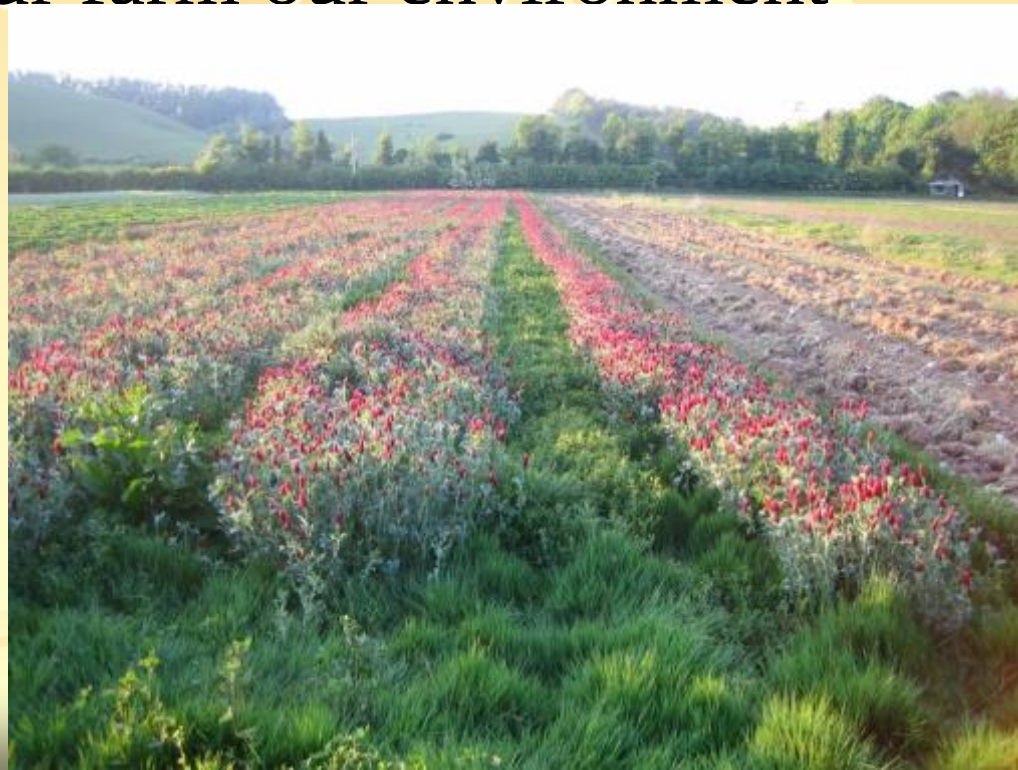
- Vegetable production dependant on the soils carbon collection
- Build carbon
- Use carbon
- Replace carbon + bit extra
- Sustainable farming=Carbon management-good soil management

Manage inputs

- Energy
- Materials
- Growing system
- Labour

Functional agricultural bio-diversity

- Systems approach
- Integral with whole farm system
- Working for you, your farm our environment
- Not a bolt on extra



Bio-diversity on the ground

1.The soil

2.The understory

3.The heavy carbon

1.The soil-ultimate bio-diversity

- Organic material –compost
  -plant roots
  -green material
- Rotation-diverse plant types
- Minimal tillage
- Revere the earthworm
- Retention/increase

of carbon

Woodchip Compost

Feeding soil-the green manure systems

- Fertility from within farm
- Adding nutrient and carbon
- Valuable contributor to bio-diversity
- Recycle all nutrients
- Recycle off farm losses-compost applications
- As far as possible closed system
- Cropping up to 70% land area

Soils-Main fertility building

- Lucerne
- Red or white clover
- Grasses
- Sainfoin

Short season G, manures

- Trefoil
- S W Clover
- Vetch
- Crimson clover
- Phacelia
- Mustard
- Cereals
- Chicory

Soils-Undersowing green manures (UGM)

- Improves pest/predator balance
- Improves soil fauna and fertility
- Controls some weed species
- Over winter- protection of soil
- Allows for soil carbon stability

Soils-Relay Green manures

2. The understory

Understory-Long term beetle banks

Understory- short term refuges

Understory-Wild Flower mix

Understory-Flowering crops

Understory-Weeds

Understory-Field boundaries

3. The heavy carbon

Heavy Carbon-Hedges

Heavy carbon-shelter belts

Heavy carbon-Permanent coppice

Agro-forestry

The farm carbon picture-emissions 2012

Fuel for tillage/transport/irrigation	19%
Produce delivery	33%
Electricity	17%
Materials	2.5%
Embodied energy-van<10yr old	6.3%
Green manures (N2O)	11%
Waste management	10%

The farm picture-sequestration

- Hedges 17%
- Coppice 24%
- Field margins 9%
- Soil organic matter increase 49%

Total emissions- 16.6 tonnes CO2e*

Sequestration 21 tonnes CO2e*

Balance = 4+tonnes*

*as calculated for year ending 2012 Farm Carbon Cutting Toolkit case study/Tolhurst