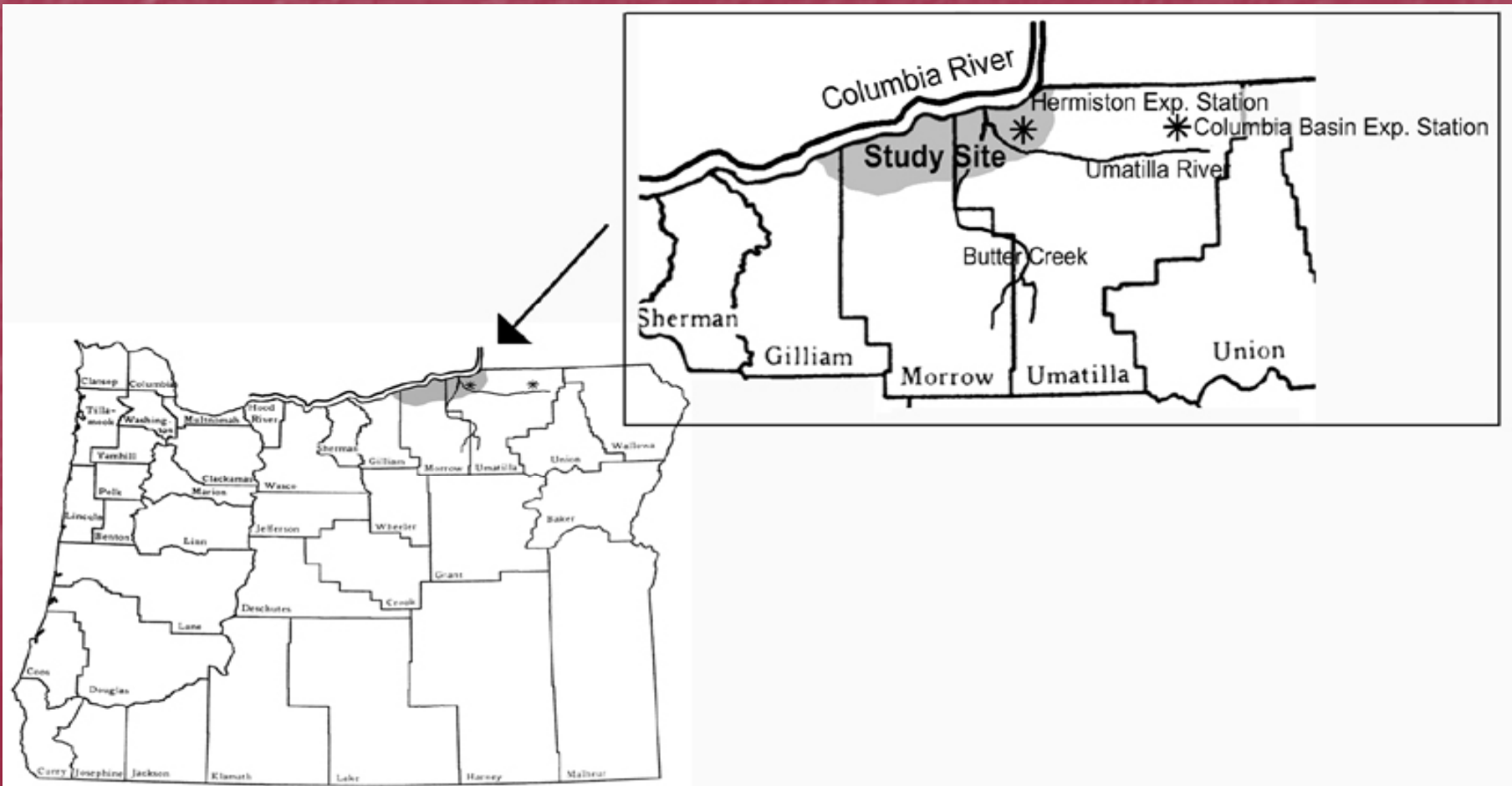


Hydrophobic Quincy Soil

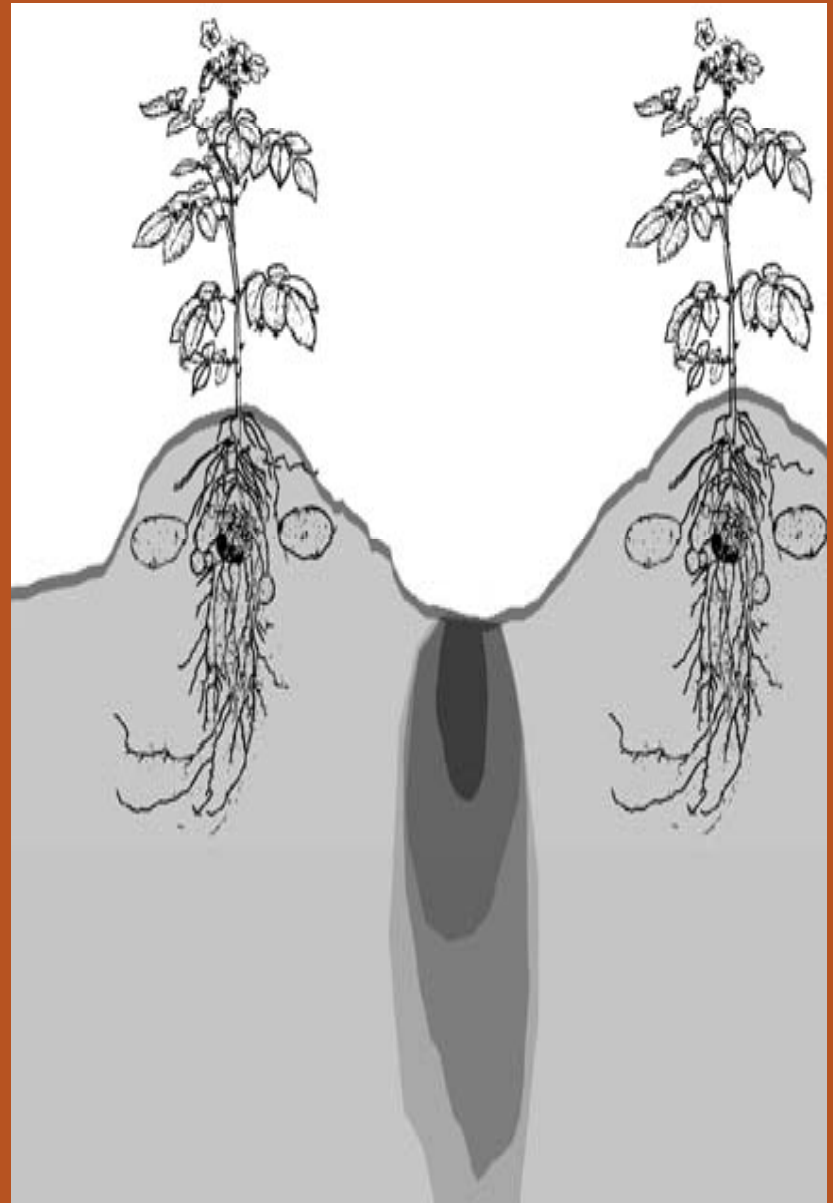


Loss of Arable Land

- Non-sustainable use of valuable water resource
- Water unavailable for use by plants
- Soil erosion-land degradation
- Soluble nutrient loss

Problems





Organic Matter amendments decrease Hydrophobicity of Soil

- Hydrophobic soil repels the infiltration of water. Water remains on the surface increasing runoff and decreasing plant water availability.
- Contact angle of water on Quincy soil illustrates that the cohesive forces between water molecules are greater than the adhesive forces between water molecules and soil particles.
- Soil particles are covered in organic matter layers that have polar and non-polar chains. The addition of hydrophilic organic matter layers (polar) may increase the infiltration rate of water into the soil.

Mass Balance Software

Soil Column in Contact with Surface of Water



Handwritten data in a notebook:

W	WATER	ANALYZED	SAND	WATER	SOIL
1	47.23	102.2	102.0	104.2	
2	48.43	103.6	102.7	104.9	
3	49.49	103.9	103.9	103.2	
4	48.70				
5	48.58				

PLEASE DO NOT CLOSE - P. UNDAVETAN

Calculate Degree of Hydrophobicity of Soils with Different OM Content

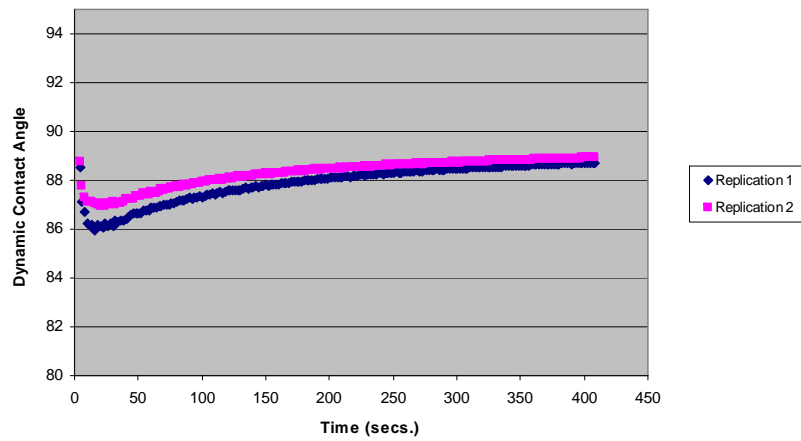
$$w^2 = (\gamma^2 [\pi R]^2) \left(\frac{\rho^2 \cos \alpha_{\text{dynamic}}}{2\mu} \right) t$$

$$C = m \left(\frac{\rho^2 \gamma \cos \alpha_{\text{dynamic}}}{\mu} \right)^{-1} = m/A$$

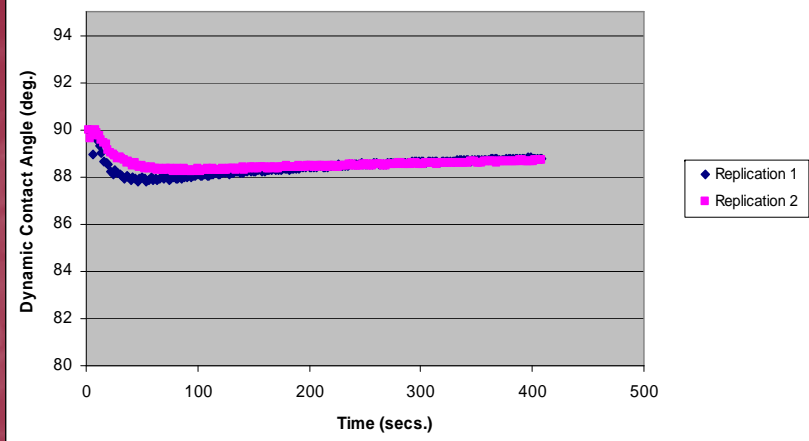
$$w^2 = C \left(\frac{\rho^2 \gamma \cos \alpha_{\text{dynamic}}}{\mu} \right) t \quad \longrightarrow \quad \cos \alpha = \frac{\mu_{\text{water}}}{ct\rho_{\text{water}}\gamma_{\text{water}}} w^2$$

Washburn's Equation

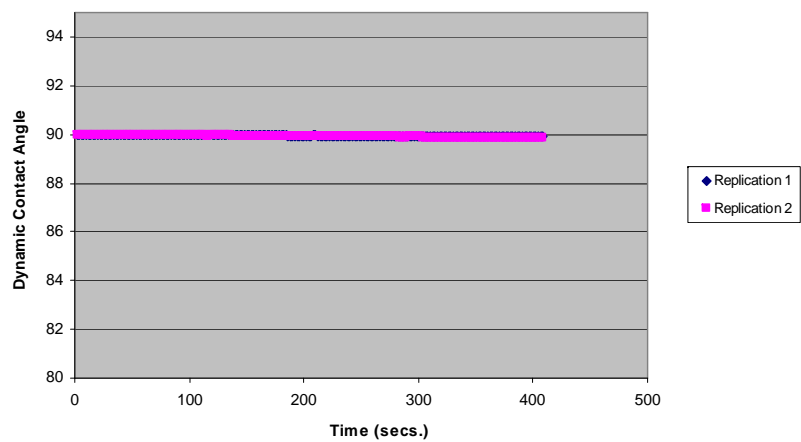
An #5 Aug. 20 Dynamic Contact Angle



2 #5 Aug. 20 Dynamic Contact Angle



Cf2 #11 Aug. 20 Dynamic Contact Angle



E #25 Aug. 20 Dynamic Contact Angle

