Designing an agricultural field trial

The research farm at Rothamsted, Hertfordshire, UK.

Background

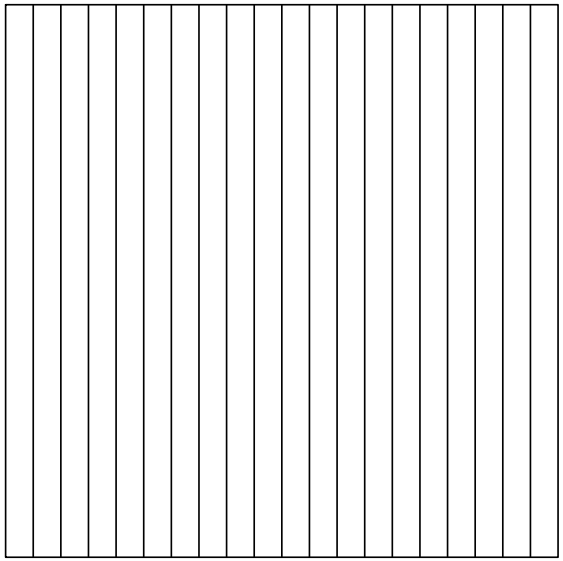
- **agricultural field trials are conducted to compare the yields of different varieties of crop-plants under realistic conditions**
- **experimental units are contiguous plots of land, typically long, narrow strips within a square or rectangular field.**
- **design questions include:**
  - **how to orient the strips (eg North-South or East-West)?**
  - **which treatments to apply to which strips?**

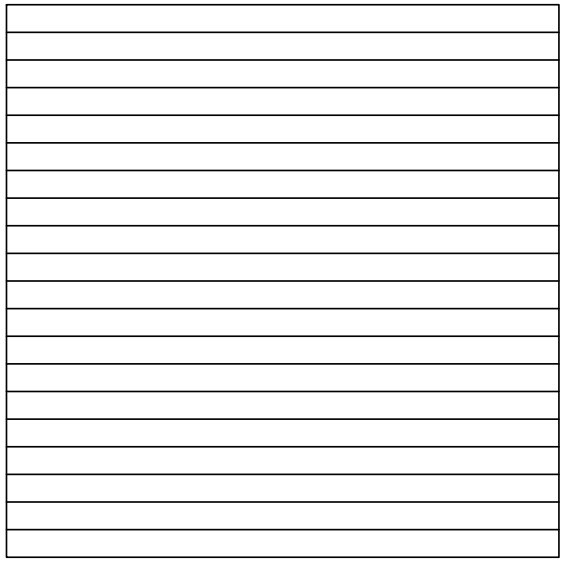
Example

- **compare yields of four varieties of wheat**
- **experiment to be run on a 100 metre by 100 metre square field.**
- **experimental units are 100 metre by 5 metre strips, hence 20 units in all.**
- **there is a suspected North-South fertility gradient over the field.**

Two possible layouts of the experiment

North





South

Points for discussion

- **What precisely might we mean by compare the yields of four varieties of wheat?**
- **Would you prefer to have the strips running North-South or East-West?**
- **How would you allocate varieties, A, B, C, D say, amongst the 20 strips?**
- **How might you alter your design if the precise objective was to find which varieties give the largest yields:**
  - **on fertile ground?**
  - **and on infertile ground?**