

# Participatory Plant Breeding with diverse wheat populations

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A Duchy Originals Future Farming Programme  
Field Lab



## What is PPB?

- Collaboration between farmers and researchers
- Decentralised selection in target environment
- Farmers selecting breeding material on their own farms
- Approach initially with farmers in developing countries
- Can PPB also work with UK organic farmers?



# Why PPB for organic farmers?

## The Problem:

- Erosion of local genetic resources
- Lack of varieties suited to organic conditions
- Lack of interest from formal breeding programmes
- Unable to control variable field conditions with inputs

## The Solution:

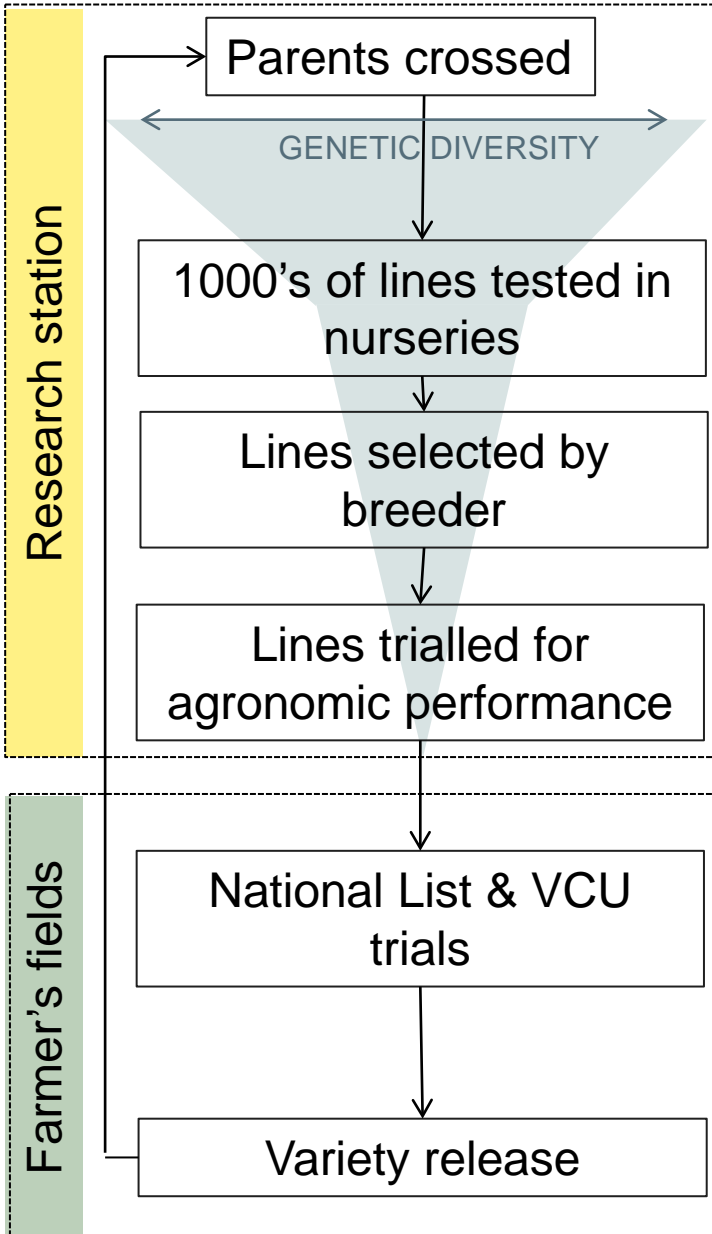
- Lines tested in target environment to create locally adapted varieties
- Organic farmers supplying local niche markets

# What is a CCP? (Composite Cross Population)

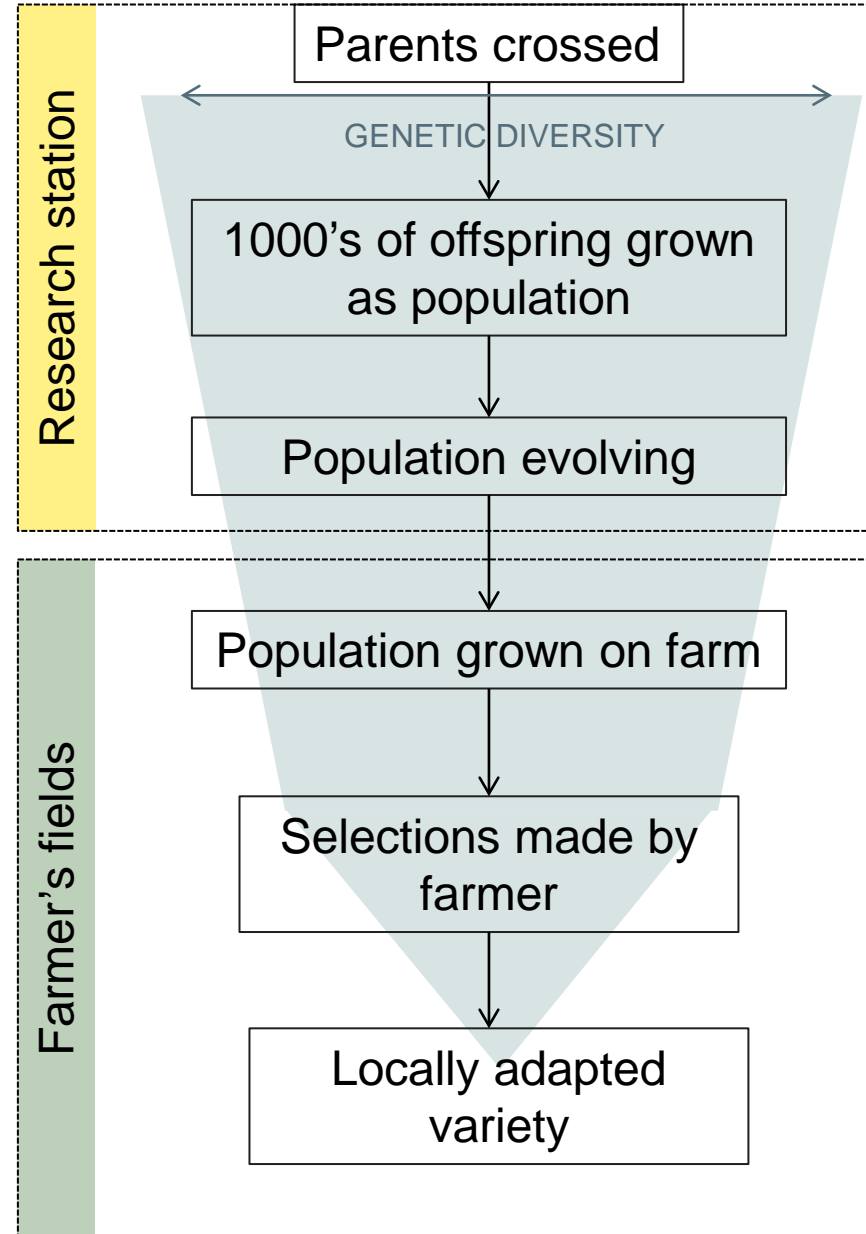
- Many parent varieties crossed to create wide genetic diversity
- A CCP is a mixture of thousands on genetically 'fixed' lines
- Can be used as an evolving 'modern landrace'



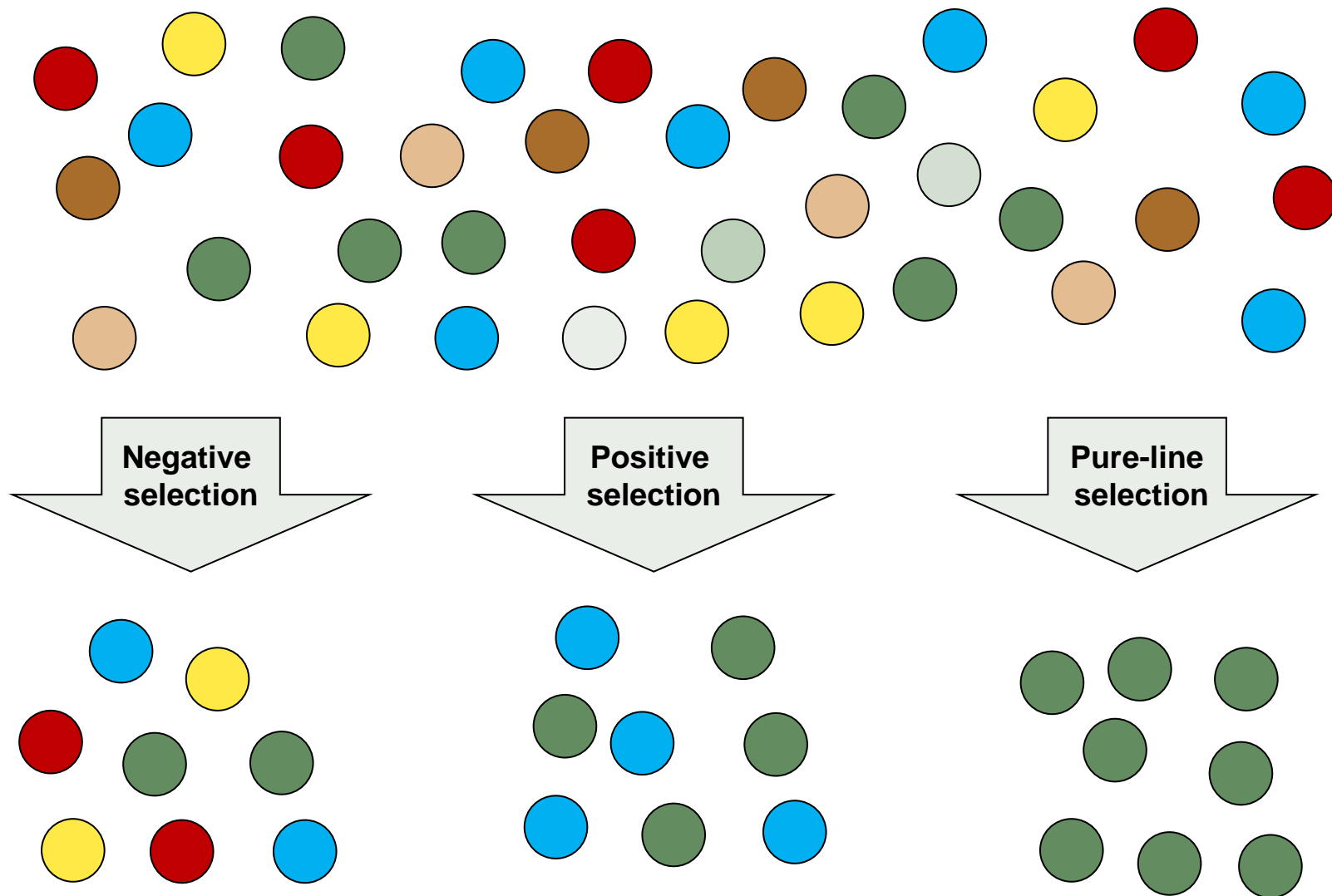
### Formal breeding programme:



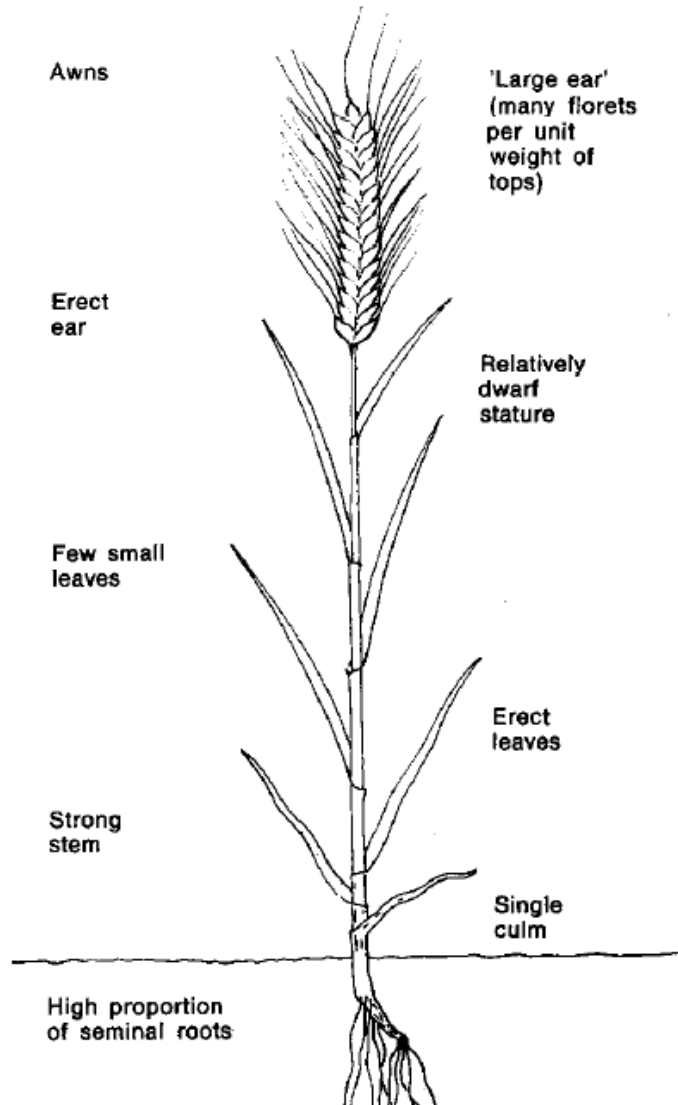
### Evolutionary plant breeding:



# How can we use a CCP for selection?



# Donald's wheat ideotype:



Relies on:

- No competition from weeds
- High soil fertility
- High crop density / good establishment rates
- Disease control

Fig. 1. A basic wheat ideotype, designed to give a high grain yield as a crop community

**What is the organic wheat ideotype:**



**And how can we select for it?**