

STEM Outreach

A-Level Biology — Future of our Farms (Biodiversity)



Curriculum Links: Year 12— Biodiversity with a Community
Year 13— Populations in Ecosystems

In the workshop (The Future of our Farms—An Introduction to Agriculture) we look at global issues that face today's farmers. These include: their impact on global warming, their water consumption, soil erosion and animal ethics. We are going to focus on another issue—the **biodiversity of a farm** as this links closely to your A-Level studies.



Biodiversity — the variability among living organisms.

Context: We are seeing more oil seed rape across our farmers' fields, mainly because of its profit value. However, this has caused populations of lapwing to dramatically fall by 80% since 1960. The introduction of oil seed rape has also created a monoculture of plant species on many farms.

Loss of Biodiversity is a big problem for today's farms. Below is a factsheet of key terms that you will need to know for your A-Level that link to 'Biodiversity on a Farm':

Year 12

- 1) **Species richness** is a measure of the number of different species in a community.
- 2) An **index of diversity** describes the relationship between the number of species in a community and the number of individuals in each species.

This is the formula for **index of diversity**:

$$d = \frac{N(N - 1)}{\sum n(n - 1)}$$

where N = total number of organisms of all species and n = total number of organisms of each species.

Year 13

- 1) Populations of different species form a **community**. A community and the non-living components of its environment together form an **ecosystem**.

Year 13 continued...

- 2) An ecosystem supports a certain size of population of a species, called the **carrying capacity**.

- 3) This **population size can vary** as a result of: the effect of abiotic factors *and*

interactions between organisms: interspecific and intraspecific competition and predation.

- 4) The **size of a population can be estimated** using:

randomly placed quadrats, or quadrats along a belt transect, for slow-moving or non-motile organisms *and*

the mark-release-recapture method for motile organisms.

If you are interested in studying an Agricultural related degree at Newcastle University go to <https://www.ncl.ac.uk/nes/undergraduate/agriculture/> to find out more.