AS2: Human impacts on biodiversity revision questions - answers

Answer the following questions with a paragraph summarising the main points related to each:

1. How important are hedgerows to biodiversity in Northern Ireland?

- Native hedgerows boost species diversity
- Primary habitat for protected/endangered endemic species e.g. butterflies, moths, birds, bats
- Very important as providers of shelter, nest sites and food for animals
- Wildlife corridors between isolated populations/allow dispersal and migration for many species including small mammals, birds, reptiles, amphibians and insects; increasing genetic variability within populations
- Can act as refuges for natural predators of crop pests
- Increase soil stability/crumb structure and help prevent soil erosion by wind and rain
- Act as shelter for livestock
- Provide song posts for birds

2. What strategies used in sustainable farming are beneficial to the environment, and why?

- Traditional management of hedgerows e.g. coppicing and laying can benefit biodiversity (reasons listed above)
- Plant native species, in double rows and trim on a rotation every 2-3 years in January-February so as not to disturb nesting birds or destroy berry crop
- Promote the use of polyculture (reasons listed below)
- Leave set-aside/predator strips to boost biodiversity and create wildlife corridors
- Using organic fertiliser improves soil structure, reducing erosion and leaching/run off which can lead to eutrophication
- Crop rotation improves soil fertility and avoids likelihood of diseases specific to one crop
- Growing species rich hay meadow as opposed to silage will boost biodiversity
- Using pest management schemes rather than solely pesticides can boost biodiversity, especially alongside the use of predator strips
- Grow species rich grassland for hay and allow plants to set seed before harvesting i.e. don't cut before July

3. What problems have arisen from the use of intensive farming practices such as fertilisers and pesticides?

- Continual harvesting ensures that fertiliser must be applied continually i.e. poor humus/crumb structure to the soil
- This can lead to erosion of soil and increased risk of flooding
- Inorganic/artificial fertiliser is easier to dissolve and therefore leach and run off into natural bodies of water causing eutrophication
- Native plants adapted to low nutrient soils e.g. the greater butterfly orchid have become outcompeted by other species of grass which are able to grow much more quickly in the now nutrient rich soils
- Heavy doses of slurry (liquid manure/natural/organic fertiliser) kills earth worms which are vital for soil aeration, for adding humus and maintaining soil structure
- Pesticide use has led to decrease in vegetation diversity and therefore the resultant drop in animal diversity
- Also leads to the destruction of invertebrates that aren't pests, and who may be natural predators of the pests
- Results in drop in diversity of organisms further up food chain e.g. birds and small mammals
- Pesticide use can lead to pesticide resistance, pest resurgence and secondary pest outbreak
- Pesticide spray e.g. herbicides can drift into hedgerows and weed areas

4. What care should be taken when applying fertiliser?

- Use more organic fertiliser to improve soil structure and release nutrients slowly
- Only apply during times of crop growth i.e. not in the winter months
- Do not apply during times of heavy rain to avoid likelihood of run off and eutrophication
- Test soil for nutrient levels and only apply the nutrients that are required

5. What is polyculture and its benefits?

- Growing different crops in the same area
- Can improve biodiversity by providing more species of vegetation, habitats for animals, pest predator refuges
- Can add more nutrients to the soil

6. What are the benefits of crop rotation?

- Improves soil fertility
- Helps to avoid crop specific diseases

7. What problems can arise from growing monocultures?

- Crop specific diseases
- Lack of genetic variation leading to disease susceptibility
- Lack of habitat variation leading to a decrease in animal species diversity
- Monocultures tend to encourage larger fields which means less boundaries such as hedgerows and dry stone walls, which encourage biodiversity through the provision of extra habitats

8. How has habitat destruction led to the loss of native species

- Habitat removal such as woodland and hedgerow removal decreases the vegetation diversity and niches available to animals therefore decreasing their diversity also
- Less nesting sites for birds, food plants for animals such as butterflies, less shelter dwelling areas for small mammals
- Less habitat has created isolated populations of plants and animals which can lead to a lack of genetic variability within a species and resultant inbreeding depression and susceptibility to extinction through natural selection

9. What action can be taken to preserve important species within Northern Ireland?

- Designation of sites for the protection of habitats and wildlife
- Enforcing laws/legislation from the EU and directives such as the nitrated directive to reduce eutrophication
- Creating Biodiversity and Species Action Plans (BAPs and SAPs)
- Set aside, predator strip, wildlife corridor creation
- Planting native species of trees and hedgerow on non-fertile land
- Creating artificial nest boxes/sites for species of conservation concern

10. How would you provide a quantitative value of biodiversity for a hedgerow wildlife corridor running alongside fields of wheat?

- Mark hedgerow into a grid/transect line using tape measures
- Randomly generate numbers to select areas to sample
- For vegetation, use presence out of 25 squares in a 0.25m2 quadrat to allow for accurate percentage cover values
- For animal sampling, use pitfall traps for the ground/sweep nets for the margins/beating tray for the upper branches of the hedge
- Invertebrates can be preserved using alcohol for later identification
- Use identification keys to classify and record number of each species
- Take at least 20 samples
- Repeat at least 3 times, using the same technique
- Use Simpson's index to calculate diversity for the area