

Discuss two ways in which human activities have impacted on soils

(80 marks)

Marking Scheme:

Number of aspects discussed:	3 @ 20 marks each	4 @ 15 marks each
<u>For each aspect:</u>		
Identifying aspect	4 marks	3 marks
Discussion	8 x SRPs	6 x SRPs

Overall Coherence 20 marks graded* 20 marks graded*

In this answer, I choose 2 aspects to discuss (Negative impact (Overgrazing/ Deforestation) and Positive (Soil Conservation/ Varying Farming Practices). Overall coherence means how well your answer is structured (Introduction, main section, conclusion – well-structured and coherent) and do you keep to the point/ answer the question directly.

Answer

Introduction:

Human activities impact on soils in both a positive and a negative manner. I will discuss how overgrazing and deforestation impact soils negatively, and positive soil conservation can be practised through Improving farming practices and practicing soil conservation.

Body of Topic:

Humans impact on soils by damaging the structure of the soil (the shape of the soil peds). When the peds of soil are rounded it gives soil a crumbly structure, which is the best structure for soil fertility. Overgrazing occurs when large numbers of animals are allowed to graze in one area for too long. In the Sahel region, animal ownership is considered the main criteria for defining wealth. Nomadic farmers allowed too many animals to graze the land than it had the ability to support, resulting in desertification. This is where the soil cannot sustain the herd numbers and is therefore gone beyond its 'carrying capacity'. Herders then moved to marginal areas, which made the situation more dire. Alongside this nomadic farmers were gradually replaced by more sedentary farming practices and villages were established. Wells were sunk to provide water for animals; however, these wells used up groundwater further reducing soil fertility in the region. With an increasing population, more pressure on the land meant that farmers were forced to farm the land more intensively and remained in the one area for a longer period. Once the grazing animals removed the vegetation, the soil was exposed to the weather (wind erosion, also known as Aeolian erosion) resulting in soil erosion and eventual desertification.

Deforestation also reduces soil fertility. Deforestation is the removal of large areas of forest. Currently half a million hectares of trees are cleared and burned in Mali alone. With an ever increasing population trees are cut down thirty times as fast as they are replaced. Even young trees, small bushes and scrub vegetation have been removed. In more densely forested areas, nomadic farmers use a 'slash and burn' method to clear areas of forest. The trees are burnt and the fertility of the soil is reduced. Here, the process of leaching increases as the soil can become exposed to heavy, daily rainfall, in the Amazon rainforest for example, further reducing soil fertility. In the Amazon rainforest the Brazilian government encouraged the habitation of the rainforest and cleared large areas of rainforest. Once the rainforest vegetation is removed the soil is deprived of humus which acts to bind the soil and prevent Aeolian erosion.

Human activity can counter this negative impact however through a number of practise such as soil conservation and improving farming methods practised in the region. There are a variety of soil conservation practices available. The building of stone lines is one such practice, where small stones are placed across the slope of a hill, following the gradient. This reduces the flow of run-off water which may carry any organic matter on the hillside, thereby hindering growth (practised in Burkina Faso). As the stone lines run parallel to the slope they allow water to drain into the soil, topping up the water table of the area, as well as trapping soil, seeds or any other organic matter behind the wall. These lines take up only 2% of the land but can increase yields by 50%. Contour ploughing acts in much the same way, as furrows are dug across the slope to allow water/ soil/seeds gather within them. If the furrows were plough up the slope they would increase erosion as all water would run down the slope quickly, carrying soil etc with it. This practise can reduce erosion by up to 50%. When terracing takes place, large steps are cut into the hillside, with the front of each slope having a lip/bund on it, trapping material behind it. This is a widely used farming practise in South-East Asia, increasing soil fertility.

Finally humans can impact on soils through varying farming practises in that region. Where a region has suffered from soil erosion, farmers can positively impact growth through creating shelter belts, strip farming, and introducing new animal strains to decrease pressure on the land. Shelter belts are created when farmer plant trees/ shrubs in lines across flat landscapes in the path of winds. They break the force of the wind thus reducing erosion, as well as binding the soil together in that area with the tree roots. A further benefit can be provided when fruit-producing varieties are planted as an additional source of food. Strip farming involves the planting of crops in widely spaced rows, with the spaces between each row being filled with another variety of crop. This slows water run-off, and ideally each crop is reliant on different nutrients from the soil and grows at different heights. The final positive impact humans can have is introducing different animal strains to the region, reducing the impact on soil. In the Sahel for example, sheep and goats were introduced to the region as they were able to survive on poor quality scrub land.

Conclusion:

Therefore as discussed, humans can impact soils in two ways – through the negative processes of overgrazing and deforestation, as well as the positive processes of soil conservation and varying farming practices.