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LAND MANAGEMENT
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LAND MANAGEMENT, ENVIRONMENT & SOLID-WASTE: INSIDE EDUCATION AND BUSINESS IN CENTRAL ASIA
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MICRO-CREDENTIAL

CLIMATE CHANGE FOR SUSTAINABLE LAND MANAGEMENT IN CENTRAL ASIA

3.- The Carbon Cycle, Land Use and SLM

Activity

Simple carbon-budget exercise for a hypothetical farm or rangeland

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Instructions

For this activity, you will explore how land use and management practices influence the carbon cycle. You will work with a hypothetical farm or rangeland and estimate a simple carbon budget by identifying the main sources of carbon emissions and the main processes that store or remove carbon from the atmosphere.

Begin by examining the characteristics of the farm or rangeland. Consider the type of land use, such as cropland, pasture, mixed farming, or grazing land. Think about the vegetation present, the soil condition, livestock numbers (if applicable), and common management practices.

Next, identify the main carbon inputs and outputs within the system. Carbon inputs may include plant growth, crop residues, manure additions, or soil carbon accumulation. Carbon outputs may include soil carbon losses, crop harvesting, livestock emissions, biomass burning, land degradation, or excessive tillage.

After identifying the carbon sources and sinks, estimate whether the farm or rangeland acts as a net carbon sink (absorbing more carbon than it emits) or a net carbon source (emitting more carbon than it absorbs). A detailed calculation is not required; simple estimates and qualitative reasoning are sufficient.

Then, evaluate how different Sustainable Land Management (SLM) practices could improve the carbon balance. Examples may include conservation tillage, rotational grazing, cover crops, agroforestry, residue management, improved irrigation practices, erosion control, or restoration of degraded land.

At the end of the task, prepare a short written or spoken response explaining your carbon budget assessment and recommending management practices that could enhance carbon sequestration and support climate change mitigation.

Student task format:

1. Describe the hypothetical farm or rangeland.
2. Identify the main carbon sources (emissions).
3. Identify the main carbon sinks (carbon storage processes).
4. Determine whether the system is likely a net carbon source or a net carbon sink.
5. Suggest at least three Sustainable Land Management practices that could improve the carbon balance.
6. Explain how these practices contribute to climate change mitigation and sustainable land management.

Example Scenario (Optional)

A 500-hectare rangeland supports cattle grazing and contains areas of degraded grassland. Overgrazing has reduced vegetation cover, increasing soil erosion and carbon losses. The land manager is considering rotational grazing and grassland restoration.

Questions:

- What are the main sources of carbon emissions in this system?
- What carbon sinks currently exist?
- How would rotational grazing affect the carbon budget?
- Which SLM measures would most effectively increase carbon storage?