

No-till and Minimum-till Farming

What is it?

How does it compare to other farming practices?

How can the practice positively impact our environment?

Examples and Illustrations

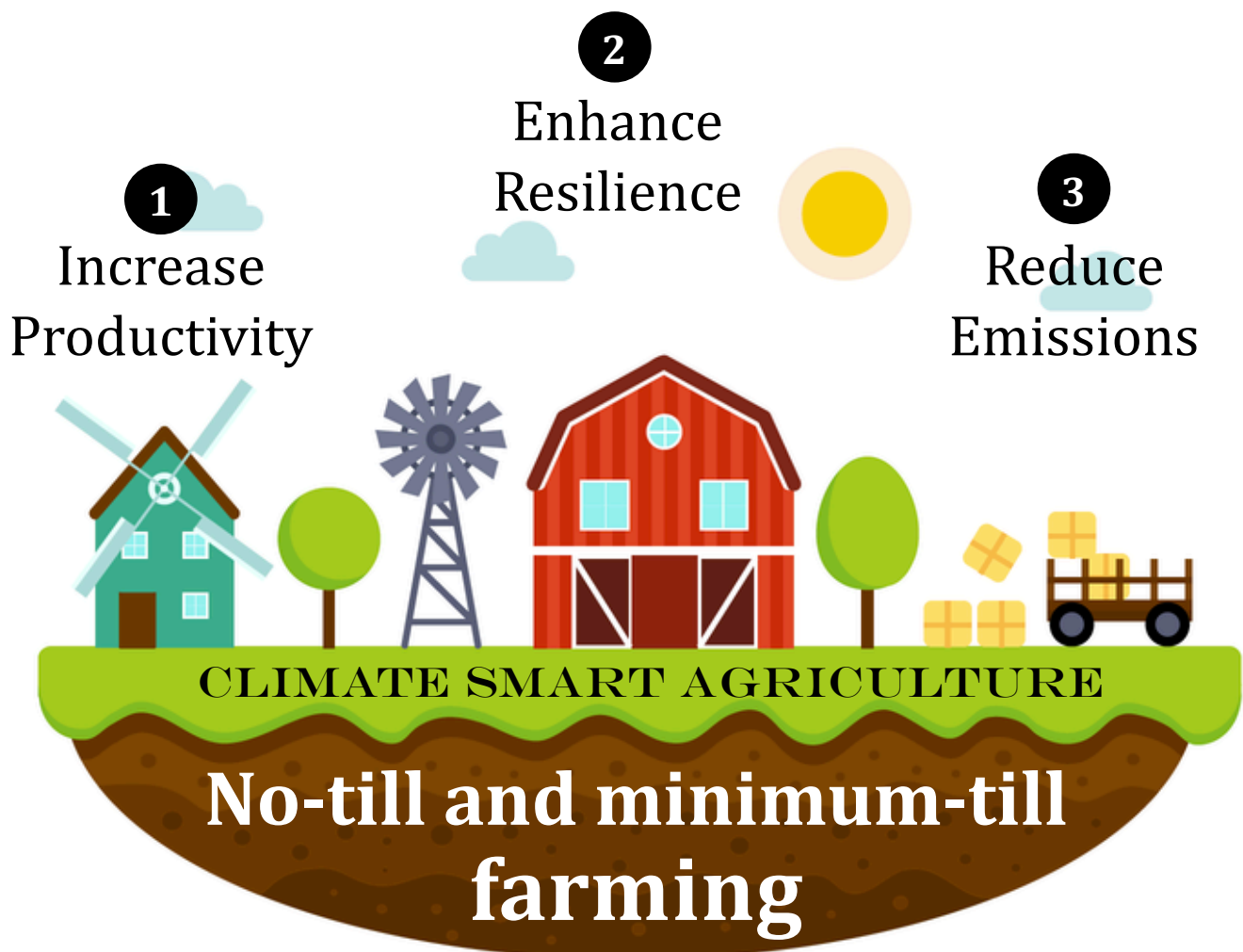
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What is no-till and minimum-till farming?

Traditionally, farmers would till their soil each time they planted a crop. This process turned the soil over allowing carbon that was stored in the soil to be released into the atmosphere. minimum-till and no-till farming practices disturb the soil less. In addition, overall soil health can be improved as organic matter is increased and soil nutrients are retained. Historically, farmers tilled soil to break it up and make it easier for seeds to sprout.

How does it help climate change?

No-till and minimum-till farming practices decrease carbon emissions compared to traditional farming methods using regular tillage.



Cover Crop

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Examples and Illustrations

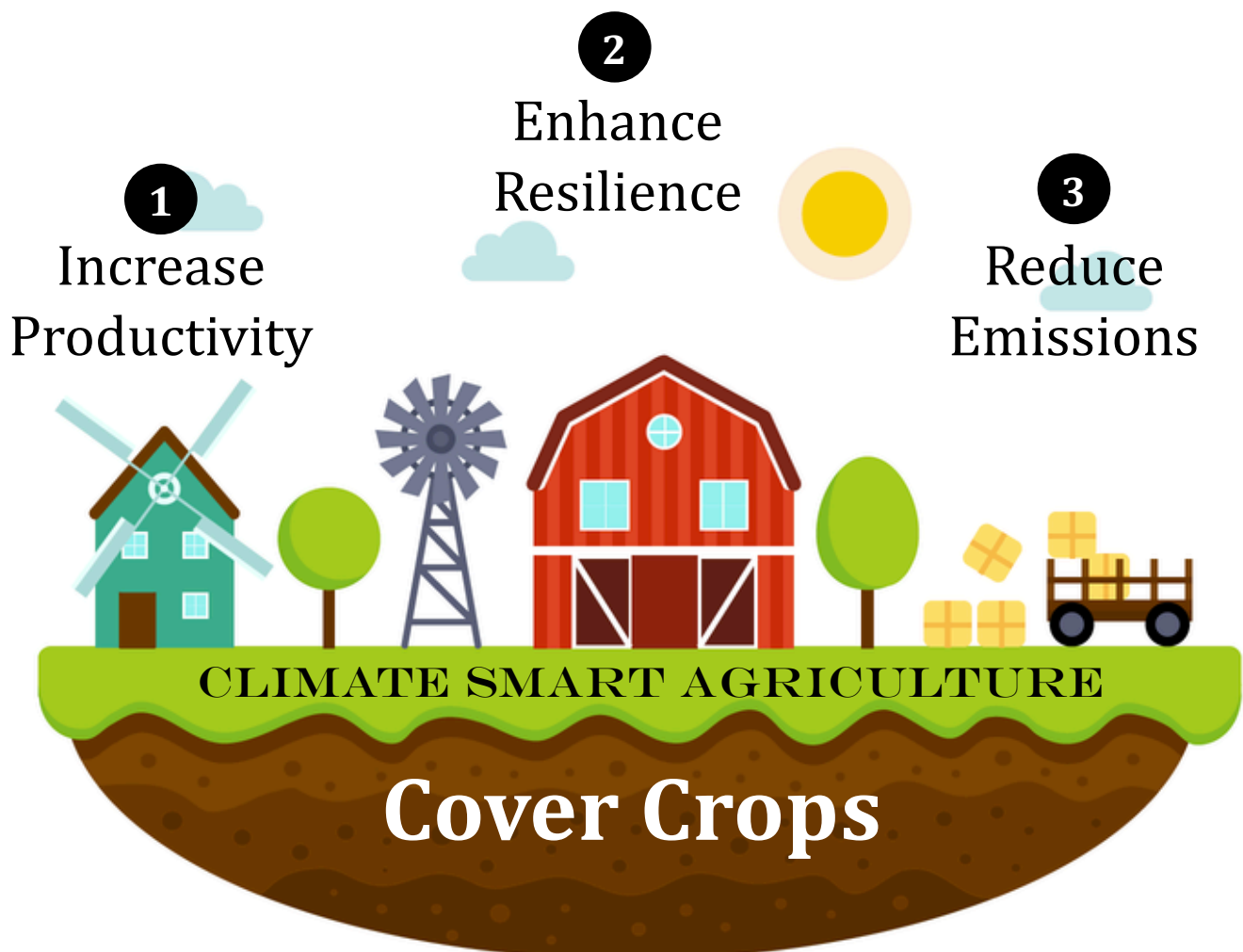
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What are cover crops?

Cover crops are plants that are grown primarily for the benefit of the soil or for livestock to graze rather than to harvest. Cover crops suppress weeds, reduce soil erosion, take up excess nutrients, and recycle the soil nutrients for use by next season's crops. Prior to using cover crops, farmers simply planted the crop they intended to harvest and left the soil bare in the off season.

How do they help our environment and climate change?

Cover crops increase biodiversity in the soil, prevent erosion, and improve the health of the soil. Healthy soil stores more water and reduces the loss of nutrients available for plants to use. This results in increased resiliency of crops to drought and other extreme weather events brought on by climate change. Healthy soil also decreases greenhouse gas emissions by increasing soil carbon storage.



Diverse Crop Rotations

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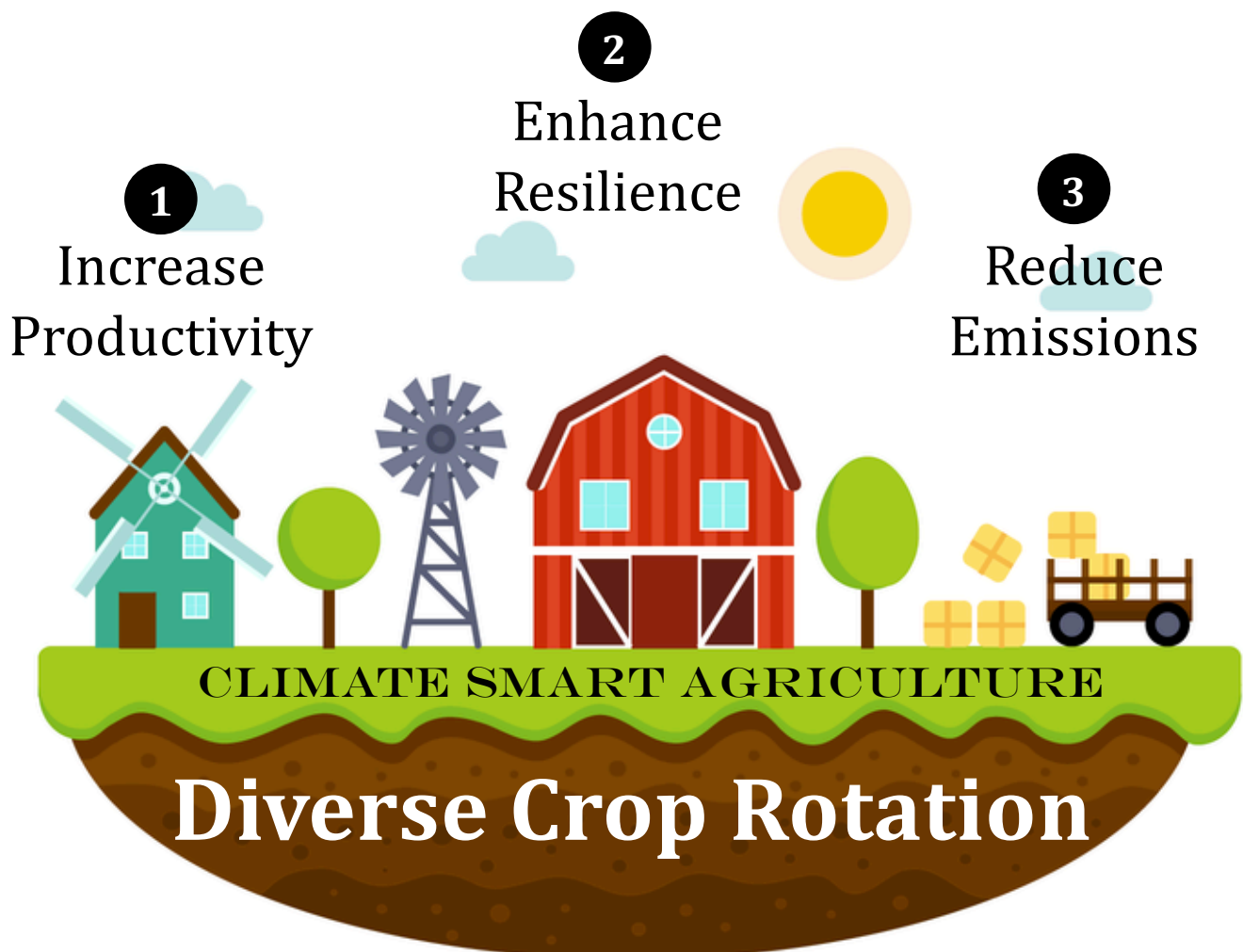
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What are Diverse Crop Rotations?

Crop rotation is a farming practice where farmers change the crop they grow on a piece of land each year. For example a farmer may rotate from a grain crop like wheat or corn one year to a legume crop like alfalfa or soybean the next year. This practice helps to control weeds, adds biological diversity to the soil, reduces occurrence of pests, and increases the health of soils. Farmers who do not use crop rotations plant the same crop year after year.

How does it help climate change?

When crops are planted in a rotation, less nutrients in the form of fertilizers are needed (such as nitrogen fertilizers) for plants to grow well. Reducing the amount of fertilizers (nitrogen) needed by plants can reduce the amount of nitrous oxide (a greenhouse gas) that is released into the atmosphere. Reducing fertilizer use also reduces greenhouse gas emissions.



Precision Agriculture

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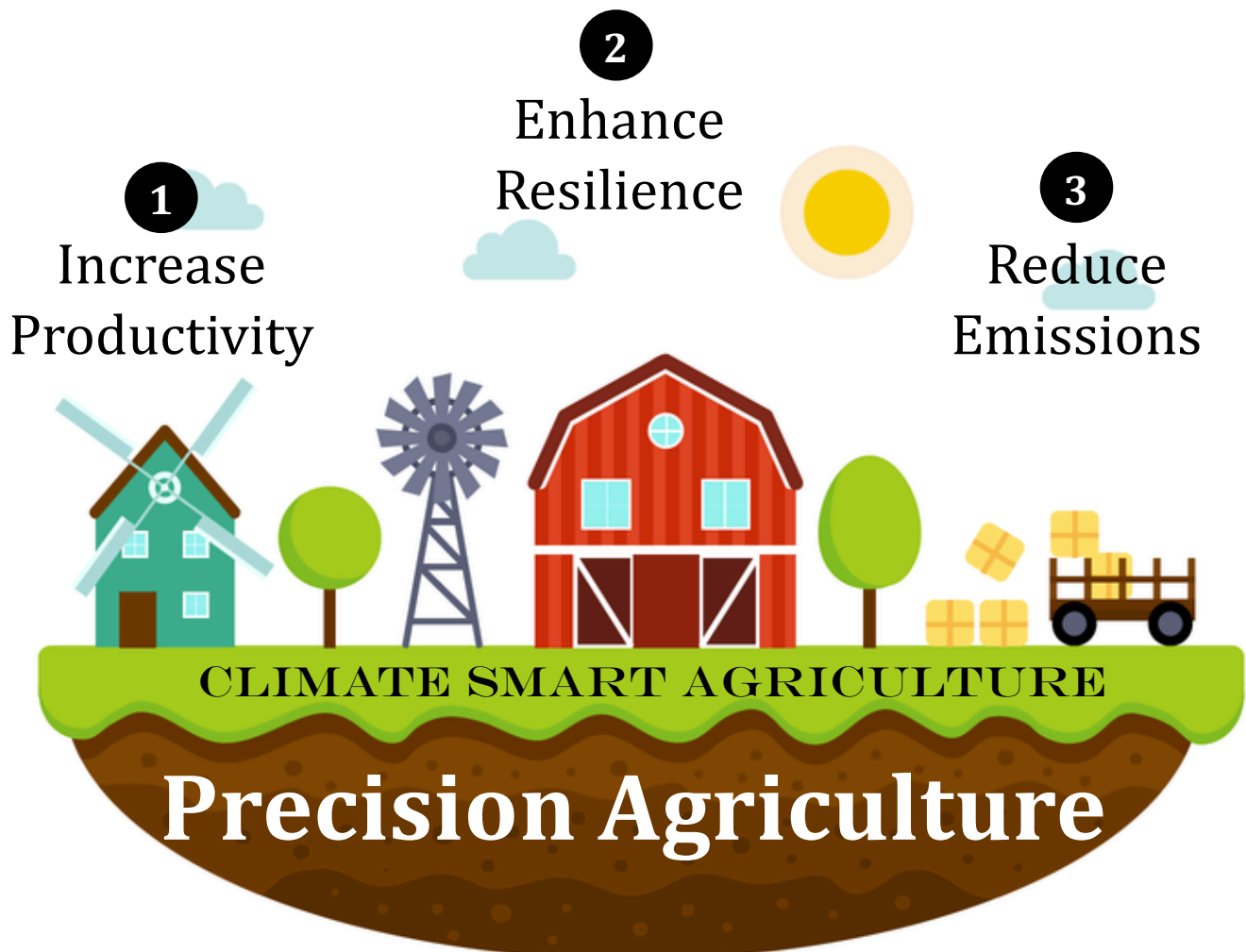
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What is Precision Agriculture?

Precision agriculture is the use and application of numerous farm technologies designed to make agriculture more productive with more precise inputs. For example, using GPS and GIS technology, farmers can vary the amount of water and fertilizer applied to different areas of a field depending on the needs of the plants in each area of the field. Varying these amounts saves resources such as water, fertilizer, and pesticides. Farmers without precision agriculture technologies irrigate and apply fertilizer and pesticides equally across an entire field with the risk of over or under application.

How does it help climate change?

Precision agriculture increases productivity and efficiency of crop production leading to a higher yield. It accomplishes this by only applying the amount of nutrients and pesticides needed for the plants to grow well. Precise application of nutrients and pesticides decreases the chance of their moving from the field to surrounding land or water areas. Movement to other areas can lead to negative impacts on the health of humans, animals, and the environment.



Selective Breeding

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What is Selective Breeding?

Selective breeding is the process by which humans select genetic traits to perpetuate in plants and animals. These traits are typically measurable and could include growth rate and milk production in livestock or time from seed to harvest and cold tolerance in plants. The opposite of selective breeding is natural selection where plants and animals reproduce only by “survival of the fittest” rather than humans helping to select helpful traits. In terms of food production, plants and animals would be less productive without selective breeding.

How does it help climate change?

Selective breeding enhances our resilience to climate change. Scientists are researching ways to breed plant varieties that thrive in our changing climate. For example, scientists are working to select corn varieties that grow well in drought conditions. Selective breeding also increases the productivity and efficiency of food production. For example, we can improve the genetic potential of a cow to produce more milk or a wheat plant to produce more wheat. This gives us more food at the same environmental cost.



Forage & Biomass Planting

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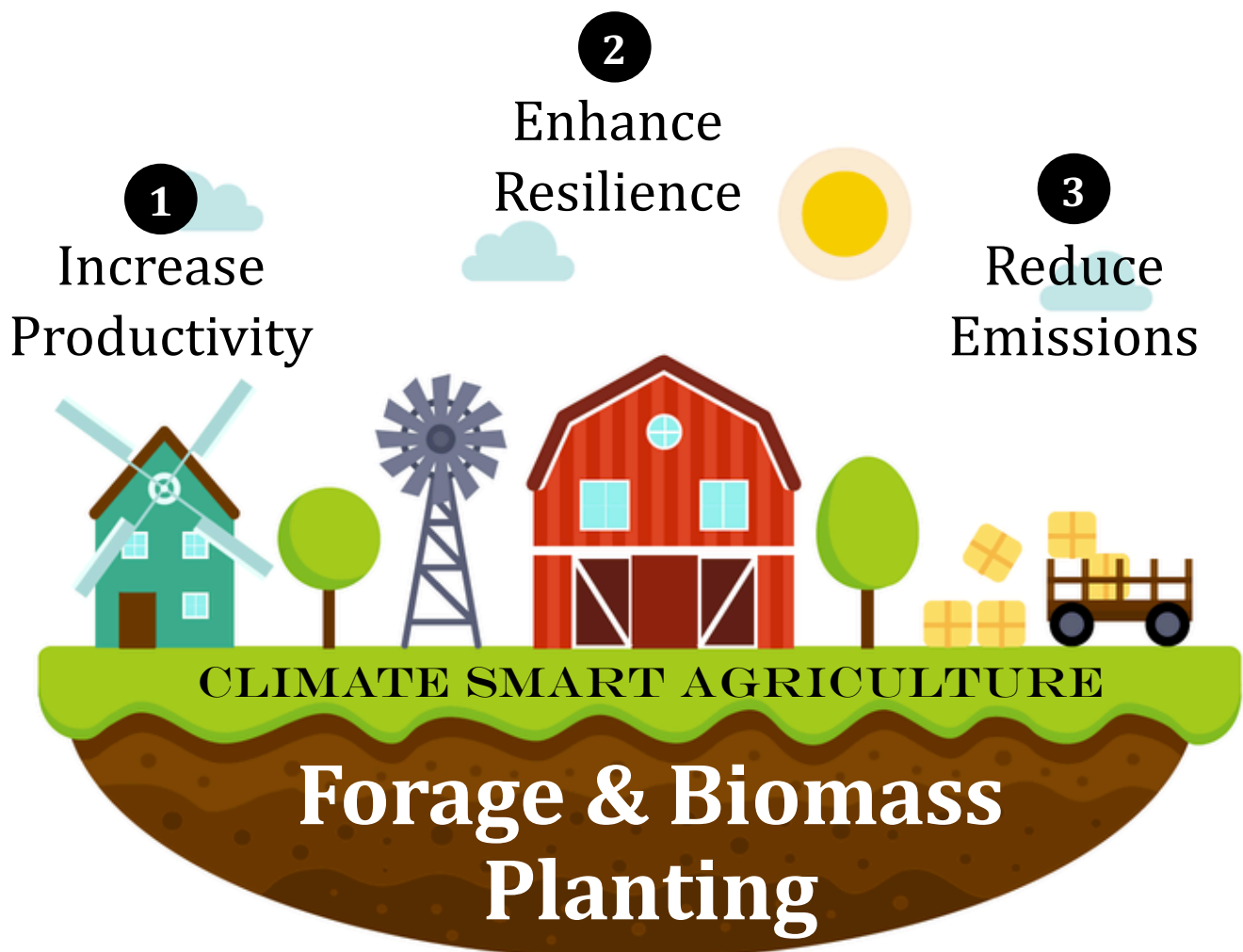
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What is Forage and Biomass Planting?

All livestock farms have manure waste that needs to be controlled and managed. Manure is an excellent resource for the soil that enhances soil biology and provide nutrients to plants. Proper manure management also protects water quality by preventing manure from running off livestock farms and into water sources such as streams, rivers, and lakes and contaminating them. Once nutrients found in manure move to natural water areas, they move from being beneficial to plant to reducing the quality of our natural water areas. Without forage and biomass planting lands follow natural patterns of growth. In some cases this would mean less plant growth.

How does it help climate change?

The addition of manure to fields increases the amount of organic matter in the soil that increases the ability of the soil to store water for plants against a time of drought. Manure also contains and holds onto nutrients well, which can reduce the amount of fertilizers needed by plants to grow well. The reduction of fertilizers needed and the storage of carbon by proper manure management results in reduced greenhouse gas emissions.



Manure Management

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What is Manure Management?

All livestock farms have manure waste that needs to be controlled and managed. Manure is an excellent resource to the soil to enhance soil biology and provide nutrients. Manure management also protects water quality by preventing runoff from livestock farms. Without proper management of manure waste, water sources can be contaminated and the nutrients found in manure would not be used for their benefit. Without using manure for nutrients, plants would be less efficient or would require full use of synthetic fertilizers.

How does it help climate change?

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Pest Management

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What is Pest Management?

Some insects feed on plant leaves and seeds, reducing the growth and yield of plants. Farmers who follow integrated pest management practices use several techniques to reduce the number of harmful insects. Examples include using combinations of rotating crops, planting crops that are resistant to the bad insects, and spraying chemicals that kill the insects. Integrated pest management helps increase the population of beneficial insects by encouraging farmers not to spray chemicals that kill **ALL** insects until the number of bad insects reaches a certain population. Farmers who do not follow integrated pest management guidelines may choose to spray their crops with chemicals that kill both the bad and good insects at any time during the year. This approach may lead farmers to spray chemicals when bad insect populations are not high enough to substantially reduce crop yield.

Following integrated pest management practices protects crops from the damage of insects. Climate change puts crops at greater risk of damage from pests. Without pest management, crops could be damaged or killed by pests leading to greater losses.

How does it help climate change?

Controlling pests with chemicals only when bad insect populations are high enough and following established guidelines lowers the amount of chemicals sprayed. This practice also reduces risk to the health of humans, animals, and the environment.



Prescribed Grazing

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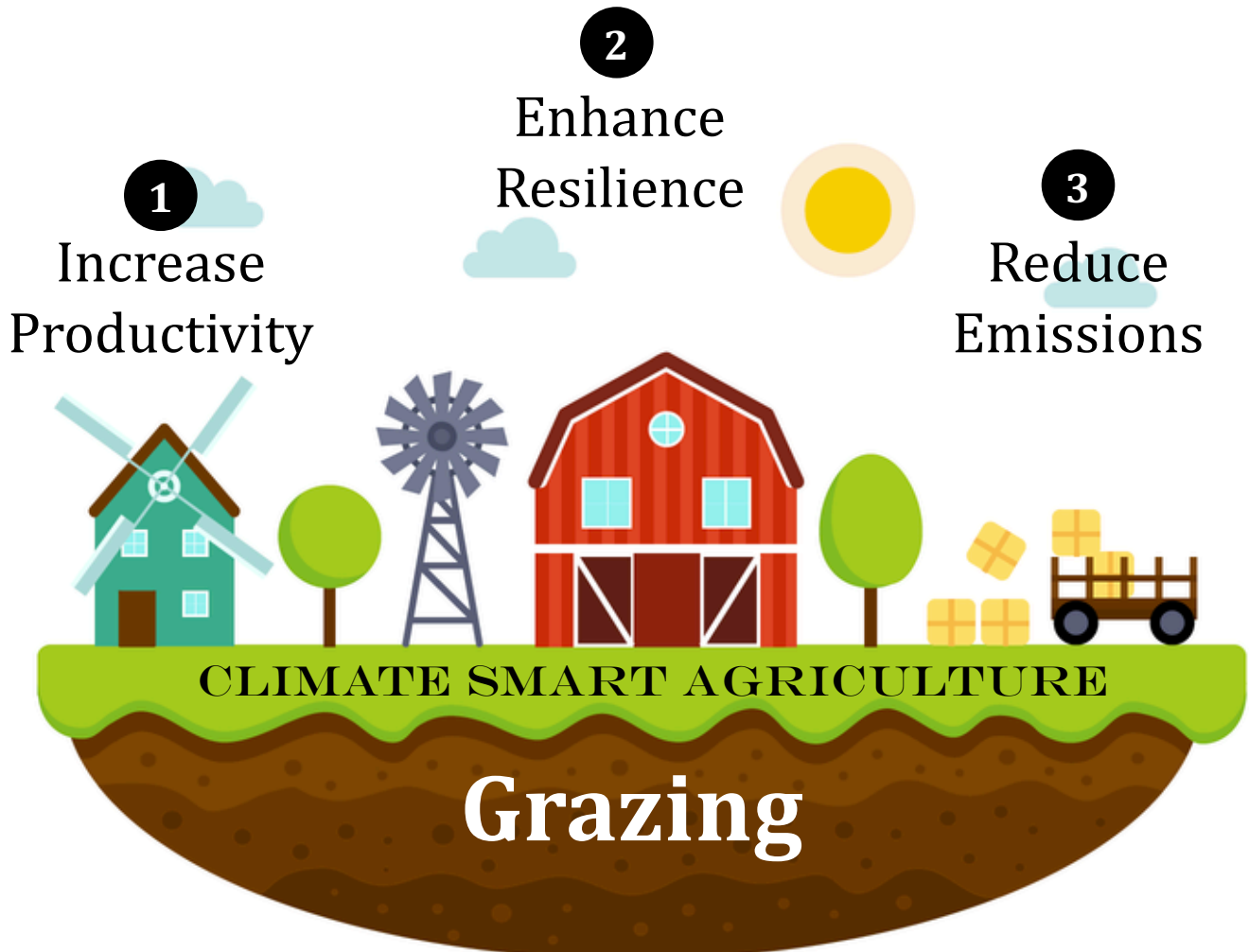
What is Grazing?

Animals such as cattle, sheep, and goats have unique digestive systems with a multi-chamber stomach that allows them to gain nutrition from grass and other forages that other animals like horses cannot. These plants grow on public and private land throughout the United States. Following prescribed grazing practices improves plant growth and water quality. It also allows livestock animals to convert non-useable food energy (grass and forages) to useable energy in the form of meat and milk. Without managed grazing practices these lands would be less efficient in the production of food, have increase fire hazards, and plants would lack the stimulation of new growth caused by grazing.

How does it help climate change?

Grazing grasses and forages properly increases the productivity of the grass and forages and the animals grazing, which increases their productivity in overall food production.

Proper grazing improves and encourages the growth of plants which capture carbon dioxide from the atmosphere. Plant growth also improves soil health and reduces soil erosion which can release carbon stored in the soil.



Eliminating Food Loss & Waste

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What is Food Loss & Waste?

Everything produced on a farm is dependent on natural resources such as water and fertile soil. All food is produced with a cost to our environment. The loss to our environment is counterbalanced by creating a food supply. However, not everything farmers produce actually makes it to grocery store shelves. On the farm, food can be lost to pests, disease, and drought. Even after harvest, food is perishable and can be wasted if it is not used within a specific window of time.

How does eliminating food loss and waste help climate change?

Picture the food thrown away in your school's cafeteria. Now think of the environmental cost of water, soil nutrients, and greenhouse gases it took to produce food that is thrown away. Reducing food loss (food that never makes it to the consumer) and food waste (food that is thrown away) increases the productivity and overall efficiency of our food system.

