

Glossary and Definition of Terms

June 28, 2024 v3

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ASABE – the American Society of Agricultural and Biological Engineers, a professional society of agricultural and biological engineers

Bioeconomy - the portion of the economy that is based on products, services, and processes derived from agricultural, forestry, and aquaculture sectors, and the conversion of their renewable resources into useful products, including food, feed, fiber, bioenergy, and other bio-based products.

CBS - Circular Bioeconomy Systems are bioeconomy systems in which nature’s ecosystems, human agrifood systems, and socio-economic systems are interwoven systems of systems and in which biomass resources cycle and stay in productive use as long as possible with minimal wastes and losses of resources.

CBSI – Circular Bioeconomy Systems Institute is a virtual institute of the ASABE, with members and affiliate members from ASABE and other science and engineering disciplines and stakeholders collaborating to advance innovations and adoption of more sustainable circular bioeconomy systems.

Circularity - The intentional design of a system to eliminate waste and pollution (reuse, recover, recycle) while keeping resources in use and regenerating natural resources.

Circular Bioeconomy - the biomass-based economic space that uses renewable natural resources, focusing on keeping products, materials, and resources in use for as long as possible with near zero generation of wastes and replacing the wide range of non-renewable, fossil-based products currently in use.

Constituent System – a subset of a more holistic system that in itself is also a group of interacting or interrelated elements that act based on its own boundaries, structure, and purpose. Some may refer to this as a subsystem embedded within a larger system.

Economy – a system of interrelated production, distribution, trade, and consumption of goods and services with activities that fulfill the needs of those living and operating within it. (Adapted from Wikipedia)

Five CBS Principles adopted by CBSI – When developing CBSI, the ASABE Task Force developed and adopted the following five principles, the first three of which were adapted from the Ellen MacArthur Foundation two were added that were deemed critical in advancing toward circular bioeconomy systems. These were adopted by CBSI and are summarized below:

- Design out waste and pollution (recover discarded wastes for productive use)
- Keep products and materials in continued use as long as possible
- Regenerate natural systems
- Increase input efficiency
- Provide economic benefits

Indicators – The specific aspect of a system that is measured to determine its performance (e.g., greenhouse gas emissions, quantity of wastes, recycled water, profitability)

Innovations – The introduction of new things, ideas, or ways of doing something

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Linear Bioeconomy Systems – Linear systems follow the “Take-make-use-waste” method for supplying food and other bio-based products to consumers, which are prone to degrading and depleting the natural resource base (g., soils, surface and ground water, nutrients)

Metrics – The quantitative measurement of indicators (e.g., MT CO₂e, mass of N discarded or loss, volume of water used in processing operation, Return on investment)

Principles of CBS – fundamental concepts that serve as a foundation for designing, managing, or controlling bioeconomy systems to achieve more sustainable economic, environment, and natural resource systems and address major societal challenges.

Sustainability – satisfying current human needs without compromising the ability of future generations to meet their own needs. This includes sustaining economic, environmental quality, and the natural resource systems base of society as a whole. (Adapted from USDA)

System – a group of interacting or interrelated elements that act according to a set of rules to form a unified whole. A system, surrounded and influenced by its environment, is described by its boundary, structure, and purpose, and is expressed in its functioning. Each system has inputs and outputs that flow across its boundaries and cycling, and transformation of resources occur due to processes in components of the system inside its boundary.

System of Systems – in the bioeconomy represent supply (or value) chains that consist of multiple constituent systems acting together to provide one or more desirable products that benefit society. (Adapted from Wikipedia)