



Continuous Living Cover Practices



Summer 2015
Continuous Living Cover Series

Photo: Intermediate wheatgrass roots compared to annual wheat; from The Land Institute



Cattle on lush pasture; photo from Laura Paine, Southwest Badger RC & D Council

Perennial Forages:

Perennial forages are the green plant material (leaves and stems) of perennial grasses and legumes used for livestock feed. Perennial forages include plants eaten directly by animals in pasture, and also preserved forages that can be fed to the animals after the growing season ends.

Well-managed pastures can provide highly nutritious, fresh food for animals to graze, and can add value to marginal fields where row crop production is difficult. Lands used for pasture can show significantly reduced rates of soil erosion and nutrient losses, especially when placed on steep (>5% slope) and highly-erodible lands; and provide habitat for wildlife, birds, and beneficial insects. Production of hay or haylage crops can add valuable organic matter and nutrients back into the soil. Alfalfa is an example of a crop grown for livestock feed which can help improve conditions for row crops grown in succession – alfalfa grown in rotation with corn can reduce the need for nitrogen fertilizer following rotations of corn. Whether grown on marginal cropland or incorporated into rotations, well-managed pastures or forages grown for harvest are also a way to diversify farm income streams.



Cover crop in corn; photo from Rick Cruse, Iowa Water Center

Cover Crops:

Cover crops are used in traditional row crop farming systems to increase productivity and to manage soil erosion and nutrient losses from the field. Shortly before or immediately after harvesting the primary row crop, the

cover crop is seeded into the soil in time for it to establish itself before winter sets in. In spring, the cover crop starts re-growing before it is killed prior to planting the primary crop. The choice of cover crop, and the timing and methods used for planting and tillage, depend on numerous factors including: the primary cash crop planted, the climate and growing season for the region, the soil type of the field, and other agronomic considerations for both the cash crop and the cover crop. Cover crops hold soil in place and add vital nutrients and organic matter to the soil. Cover crops improve productivity of the entire system, but usually do not directly produce an income stream. An exception is the grazing of cover crops, which can offset purchased feed for livestock in the fall or early spring.

Examples of cover crops used in the Midwest include winter small grains, brassicas, legumes, and other crops such as buckwheat. The small grains, including rye, millet, oats or wheat, are typically winter hardy, so they establish well in the fall and regrow in the spring, providing winter soil cover as well as early spring weed control. Brassicas, such as winter canola, rapeseed or field mustard, are fast growing and produce a large amount of aboveground and belowground biomass that can serve as a “green manure” (add organic matter) when tilled in before a subsequent crop. Legumes, including clover, vetch, or field pea, fix nitrogen in the soil as well as producing biomass for a further benefit as a green manure.

Agroforestry:



Hazelnuts; photo from Brent McCown, University of Wisconsin (emeritus)

Agroforestry is an intensive agricultural land-use system where trees or other woody species are integrated with crops and/or livestock.

Incorporating woody species into traditional agricultural systems helps farmers diversify their farm’s product markets and income, while improving soil and water quality, and retaining or enhancing wildlife habitat. Saleable agroforestry crops include high quality timber, pulpwood, fruit/nut crops, and Christmas trees as well as specialty crops that can be grown in forests such as mushrooms and ginseng.

The various ways that agroforestry is implemented include: alley cropping, forest farming, silvopasture, riparian buffers and windbreaks or shelterbelts.

Perennial Grains:

Perennial grains may have many advantages over the annual row crops that currently



Kernza (intermediate wheatgrass) harvest; photo from The Land Institute, Salina, KS

dominate agriculture. Because perennial grains live for many years, they develop roots that are much deeper than annual roots allowing better access to moisture and nutrients. Because perennial grains cover the ground all year, soil erosion is greatly reduced, soil health is radically improved, and the need for inputs is reduced as a result.

Over the past 10,000 years, humans have increasingly relied on cereals and other grains to provide a stable source of food. Today, grains provide about 70% of our food worldwide and occupy about 70% of agricultural lands. As our early ancestors selected plants with more and bigger seeds, their biggest successes -- with

regard to ease of cultivation and taste and nutrition -- were with annual forms. It took humans thousands of years to develop the high yielding, easy to harvest annual varieties we grow today. Fortunately, through modern genetics tools and plant breeding techniques, we should be able to speed up the process to produce a next generation of edible grain crops that are perennial.

Research is being done on several promising perennials including sunflower, wheat, corn, sorghum, rice, and “Kernza,” an intermediate wheatgrass developed by The Land Institute. Kernza is currently being studied for multi-purpose grain, forage, and biofuel production.

Biomass:

Perennial plants can provide a sustainable feedstock supply for emerging biofuel and bio-product industries throughout the Midwest. Advantages to integrating perennial plants for biomass include, erosion control, sequestration of nutrient run-off from adjacent agricultural practices, and wildlife habitat. Examples of perennial plant material used for biomass products include native grasses, switchgrass, and short rotation willow.



Native, warm-season grasses can be harvested for livestock feed, bedding, and biomass pellets to be used as an energy source. These grasses can be grown on marginal lands with fewer nutrient and water inputs than cool season grasses.

There is a growing demand for woody species biomass to be used as erosion control in disturbed soil projects such as road construction. Wood “strands” and wood “shreds” being produced for this purpose are weed free, wind-resistant, economical, and long-lasting.

Universities and other partners are engaged in research and development projects that advance plant material selection, yield, cropping systems, measure water quality improvements, and evaluate the economies of these systems.