USDA

Inside Agroforestry

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Stocker steers graze Bermuda grass under 20-year-old loblolly pine trees in Louisiana as part of a research project evaluating the financial potential and environmental impact of silvopastoral land-use production systems.

An Ongoing Study to Understand Tree, Forage, and Livestock Systems

by Dr. Terry Clason, Forestry Research Project Leader, Hill Farm Research Station, Louisiana State University Agricultural Center, Homer, Louisiana

What's in a title? Well, the title of this article refers to a simplified definition of "silvopasture." But, don't let the word scare you off before learning about this tree, forage, and livestock system. This combination of three enterprises, forms a mutually beneficial interaction that produces a practical, economic system.

Sometimes we need hard data to convince landowners to adopt new technologies. Yet, not a lot of data on silvopastures currently exist. This article describes an ongoing study that will improve our understanding of the key factors involved in developing silvopasture systems. The Louisiana Agricultural Experiment Station is cooperating with the USDA Natural Resources Conservation Service (NRCS), NRCS Grazing Lands Technology Institute (GLTI), and the USDA National Agroforestry Center (NAC) to evaluate the economic potential and environmental performance of silvopastoral land-use production systems in the southeastern U.S.

A 300-acre multifaceted silvopastoral research study was initiated in 1998 at the Hill Farm Research Station in Homer, Louisiana. Loblolly pine is the major tree species being used. It is being integrated with different combinations of native and introduced grasses in an effort to determine the potential of a system that allows

(See Ongoing on page 5)

Silvopasture: Trees and Pastures

Adapted from NAC Agroforestry Note - 8 "Silvopasture: An Agroforestry Practice." Klopfenstein et al. November, 1997

Many landowners are accustomed to managing their forest land or rangeland for a single purpose. But, "silvopasture" is the integration of trees *with* livestock operations. Silvopastoral systems are designed to produce a high-value timber component, while at the same time providing a short-term cash flow from the livestock operation. Silvopasture results when forage crops are deliberately introduced into a timber production system or when timber crops are deliberately introduced into a forage production system. Timber and pasture in a silvopasture are managed as a single integrated system.

> *"Overall, silvopastures can provide economic returns while creating a sustainable system with many environmental benefits."*

Silvopastures can provide increased economic returns while creating a sustainable production system that has many environmental benefits. When making tree and forage crop selections, it is

(See Silvopasture on page 6)

Inside This Issue

NAC Director's Corner

A commentary on the status of agroforestry
by Center Director, Dr. Greg Ruark

Sustainable Agriculture and The Role of Agroforestry

Agriculture provides many goods and services essential to human livelihoods and aspirations. However, demands on agriculture continue to expand due to the rapid growth in human population. Annually, nearly 90 million people are added to the global population -- mostly in developing countries -- with the U.S. population increasing by 3 million each year. For the agriculture sector to be sustainable, it must provide goods and services derived from agriculture in ways that meet the needs of the present without compromising the ability of future generations to meet their own needs.

Agriculture dominates many landscapes, with about 48 percent of all land in the U.S. (excluding Alaska) dedicated to agricultural purposes. However, America's agriculture is in transition. Agricultural land in the U.S. peaked at 1.15 billion acres in the 1950's, but has declined to around 0.95 billion acres today. The past 25 years have brought about a 30 percent decrease in the number of farms and a corresponding trend toward increasing size and greater mechanization. Pressure to develop land for other purposes has also been escalating, resulting in nearly 3 million acres of cropland, 6 million acres of pasture, and 10 million acres of rangeland being converted to commercial or residential use between 1982 and 1992. In many instances, this permanent loss to the agricultural resource base has involved some of our most highly productive lands.

Movement toward more sustainable agriculture will require the development of integrated whole-farm and whole-ranch operating systems that are capable of balancing the long-term social, economic, and environmental aspects of agriculture. It is becoming increasingly important to find ways to keep agricultural lands in production. New alternative sources of income must be developed so that producers can afford to remain on the land and the rural communities they belong to can remain viable.

A more diversified agricultural sector means that producers will need to select from a broad portfolio of management practices -- practices that include agroforestry technologies. In many instances, the cost-effective incorporation of one or several agroforestry practices can be the difference between profitability and economic loss. This is especially true for "limited resource" farmers and ranchers who often need to find ways of generating additional income with modest inputs and on small holdings. Agroforestry practices such as tree/pasture systems that combine grazing operations with timber production or the growing of high-value specialty crops like ginseng and mushrooms under tree shade are examples of science-based technologies that can be readily incorporated into the existing operations of many farms and ranches.

Increasingly, agricultural lands are being looked upon to provide societal benefits beyond the production of food and fiber. In this regard, the use of trees in agricultural settings typically enhances the environment in many ways, such as helping to protect soil and water resources, providing wildlife habitat, improving aesthetics, or linking fragments of forestland. NAC

Working Trees for Livestock Brochures

Conventional wisdom has been that livestock and trees can't co-exist. Yet modern agricultural practice is showing that livestock and trees not only can co-exist but, if properly managed, can provide additional income from land formerly used for a single crop.

Coming soon is our new *Working Trees for Livestock* brochure, which will acquaint you with some of the specific ways you and your land can benefit by putting trees to work for your livestock. Trees can provide livestock with protection from cold wind and blowing snow in winter, as well as from the hot sun and drying winds of summer. And, if commercially desirable timber or nut trees are planted, landowners can enjoy significant additional income from this diverse use of their land.

Now available is our new brochure, *Working Trees for Livestock: Silvopasture in the Southeast*. This brochure defines silvopasture systems, discusses benefits, planning considerations, and management options as they relate to silvopasture in the southeastern part of the U.S.

E-mail Nancy at the Center to obtain either of these brochures: *nhammond/rmrs_lincoln@fs.fed.us*. You may want to inquire about the many other brochures, video's and displays available too. You can also call us at 402-437-5178. NAC

Top: Working Trees for Livestock: Silvopasture in the Southeast; Bottom: -- Coming soon... Working Trees for Livestock, which has a national scope.

Pasture or Silvopasture?

by James L. Robinson, NRCS Agroforester, National Agroforestry Center, Fort Worth, Texas and Dr. Catalino Blanche, Research Forester, USDA ARS, Booneville, Arkansas

This silvopasture system in Louisiana supports a cow/calf operation. If implemented and managed properly, silvopasture systems can be a viable alternative to a landowner, providing them with economic and/or conservation benefits.

For any agroforestry system to be considered a viable alternative it must provide economic or conservation benefits consistent with a landowner's goals. To help landowners assess economic tradeoffs, the USDA National Agroforestry Center has been working with the Agricultural Research Service to adapt the New Zealand Agroforestry Economic Model (AEM) to United States conditions.

This article presents the the results of an AEM model run for a hypothetical farm. A simplified scenario is used to compare a forage/livestock only enterprise to a silvopasture enterprise.
Tree growth and yield information were provided from a model developed by the USDA Forest Service and forage data were provided from local site and soil information coupled with experience. The AEM model requires input values such as: area in pasture, area to be planted, livestock carrying capacities, livestock values, costs, timber yields and timber values.

The example— The AEM model was used to analyze a 120 acre farm with 110 acres in pasture and a carrying capacity of three acres per animal unit. This farm supports 30 cows with calves that are weaned at 450 pounds valued at $.65 per pound. Annual fertilizer costs, fencing costs and management costs are estimated for the livestock. To compare the pasture operation to a silvopasture alternative, 10 acres are planted to loblolly pine at a spacing of 8 foot by 20 foot (272 trees per acre) each year until 100 acres of the 110 acres presently in pasture are planted to a silvopasture system. The rotation age for the final crop of trees is estimated to be 50 years. The trees are thinned periodically to remove canopy competition for the grass. The trees are removed and sold for pulp, chip and saw, or sawtimber as appropriate. Final crop trees are pruned to a four inch diameter limit or 30 percent of the crown, which ever is less. These trees are pruned twice during the rotation to produce quality sawlogs from open grown trees. Prescribed burning is conducted at four year intervals beginning at the age of 10 years. A fertility program is practiced to maintain forage production.

The AEM analysis can be displayed in both graphs and tables. Prices and costs used in evaluating actual situations are either those supplied by the landowner, and/or those assessed as reflecting the current market situation. It must be recognized that costs, prices and technology will change in the future and this analysis can only describe the present situation and provide a benchmark against which to note future changes.

Chart 1 shows the estimated net cash flow for the farm. Line (L) depicts a uniform annual return from the livestock only enterprise, whereas line (A) shows the variable annual return from the silvopasture enterprise (livestock and trees). The income spikes are due to thinning and the troughs to planting and management costs. The area (C) represents the cost of establishing the agroforestry system, including the income foregone due to livestock displacement by trees, and is the difference in income between that earned with the livestock only enterprise (line L) and the silvopasture (livestock and trees) enterprise (line A). The area (I) represents the additional income realized by implementing the agroforestry system and is the difference between the income earned through the silvopasture system (line A) and the income earned with the livestock only enterprise (line L). As with any system, there is an initial cost of

(See Pasture on page 7)

Chart 1: Net farm cash flow for a hypothetical farm.

Making A Difference In Silvopasture Research

by Clover Shelton, Technology Transfer Assistant, NAC, Lincoln, Nebraska

After a long, distinguished career with the USDA Forest Service, Cliff Lewis continues to work on disseminating his previous silvopasture research findings. Although this 1989 retiree no longer works in the natural resources field, he still puts his life's work on paper, adding to a collection of over 75 publications.

Cliff Lewis was one of the first U.S. researchers in the area of silvopasture and his work in cooperation with other forest grazing specialists has made the science of silvopasture in the Southeast what it is today.

Lewis began his career shortly after finishing his Master of Science degree in range management from Utah State University. This New Mexico native was offered a grazing research position at Ft. Myers, Fla., with the Southeastern Forest Experiment Station in 1960. This was his introduction to forest grazing which became the focus of his career. His research centered on grazing intensity, range improvement using rock phosphate, and fire ecology.

After six years, Lewis was transferred to the University of Georgia, Coastal Plains Experiment Station in Tifton, Ga. It was here that he became involved in some of the earliest research on planting pines in improved pastures. In the 1980's this activity became known as the agroforestry practice, silvopasture.

Forest grazing by domestic livestock actually began in Florida in the early 1500’s with the introduction of Spanish/Portuguese cattle.

“Forest grazing research was still new in 1960 when I first started with the Forest Service," Lewis said. "In 1955, the Forest Service began research in Florida while another research effort was started in Tifton in 1947. At this time, there was little interest by the state universities in forest grazing."

In 1972, Lewis returned to Florida to begin studies on grazing and wildlife in Marianna. He remained in Florida’s panhandle until 1981 when he was assigned to do cooperative research with the University of Florida, School of Forest Resources and Conservation until he retired.

Over the course of his career, Lewis was involved in numerous research projects including a 20-year study on tree density and tame pasture species in silvopastoral systems. He studied multiple combinations involving native forages and tree planting configurations, native forage and site preparation for planting pines, and use by both domestic livestock and wildlife.

Some research involved achieving higher native forage yields by planting trees in close configurations (usually double rows) instead of the traditional evenly-spaced plantings. Applying this concept to tame pastures, he pioneered what appeared to be a unique “alley cropping-grazing” system.

According to Lewis, his research did not initially receive a lot of attention in the United States. However, it was more readily accepted overseas, usually in the tropical and semi-tropical areas of developing nations.

Cattle graze on Bahia grass among Slash pine on a plot of private land in southcentral Georgia.

Lewis believes that the major barrier to acceptance in the U.S. is "the fear of the unknown."

"People are afraid that they don't have enough expertise in the new discipline," Lewis said. "Cattle producers do not want to become foresters, and forest managers do not wish to learn about livestock production and the interactions of mixing these disciplines."

Lewis looks upon his career with the Forest Service as rewarding. However, in retirement, he was fortunate enough to find a second rewarding career. Lewis currently works at Chipola Junior College in Florida on a federal grant called “Tech Prep”, designed to better prepare high school students for employment and advanced education. At the same time he also works with past Forest Service colleagues in publishing his research data on forest grazing and long-term ecological studies.

Although his current career is quite different than that with the Forest Service, he still goes home from work in the evenings feeling that he has made a difference. Clifford Lewis is a man who truly made a difference in the field of agroforestry through his innovative silvopasture research. NAC

Double-row Slash pine configuration planted on natural forage example. This research plot in Florida was initiated by Cliff Lewis and his associates.

(Ongoing from page 1)

for annual timber harvests while maintaining a livestock/forage program on the same acres. Researchers will also be checking the effect of the competition between the trees and grasses on their productivity.

Tree growth plays a central role in the success or failure of silvopasture because tree-to-tree competition influences both timber and forage production. Reducing the number of trees, altering their spatial arrangement, or manipulating the amount of crown cover all influence the competition of the tree crop with forage species and the ultimate environmental and economic outcome.

The study incorporates six different tree-age classes, five types of arrangements, and an array of pruning options. Trees were planted at densities as sparse as 220 trees per acre and as dense as 680 trees per acre. The trees were arranged in one, two, or three-row sets on 8, 12, 16, 24, and 32 foot centers. Intermediate harvests will be made at 10 and 15 years to reduce tree density. Final harvests will be made at 25, 35, and 45 years. Mechanical and chemical pruning methods will be used to manipulate the amount of crown cover (shade). The pruning practices will be applied at tree ages of 4, 7, and 10 years. Tree growth and log quality will be evaluated in reponse to annual nitrogen fertilization, tree spacing density, and naturally occurring damage such as hail or ice.

It’s important to examine grass production at the same time as tree production. Of major importance is assessing the influence of timber management practices on the performance of perennial warm-season grasses. Production of warm season grasses (bahiagrass, common bermudagrass, and coastal bermudagrass) and cool season forages (ryegrass and subterranean clover) will be evaluated under tree canopy densities of 50, 75, and 150 trees per acre at various tree ages. Influence of different fertilizers and application rates on the grasses and forages within the different research scenarios will also be assessed. The potential for alley crop hay production will also be investigated.

In areas where beef cattle will be utilizing the forages, electric fencing and portable watering systems will be used to control grazing patterns and pressure. The fencing will also be used to control excessive grazing pressure commonly associated with riparian zones along existing streams and ponds.

A beef cattle production cycle includes a gestation phase, a cow/calf phase, and stocker phase. In order to maintain animal ownership through the production cycle, a silvopastoral land base must contain six acres for every animal in the stocker phase of the cycle. The study area will be managed to sustain nine months of grazing by overseeding a warm-season perennial forage with ryegrass and/or subterranean clover. Designated alley crop areas will be managed to produce Coastal bermudagrass hay for winter feed supplementation. Subsequently, cattle will be introduced and managed to produce 50 yearling stockers per year. In addition to beef cattle production, the study area will be used to evaluate the potential to background dairy heifers in silvopastoral situations.

Silvopastures are neither timber nor forage production systems. Instead, they are biologically responsive land management systems that enhance long-term value of the timber component, and sustain the short-term cash flow value of the livestock component. Periodic timber harvests and annual forage production fluctuations limit the financial potential of individual silvopastures. However, a commercial land-use production system that combines several individual silvopastures could be a financially successful and environmentally sensitive option.

Management practices applied on a landscape basis would sustain annual timber and livestock production at marketable levels. Distributing production costs between the timber and livestock components would provide affordable, reliable, and flexible sources of raw material for primary and secondary manufacturing facilities. Since management intensity would be reduced across the landscape, environmental quality would be enhanced by increasing nutrient cycling, minimizing pesticide and fertilizer usage, restricting mechanical tillage practices, and protecting riparian zones.

Portions of the research results will be available in 1999. For more information contact, Terry Clason at 318-927-2578. NAC

First Call for Papers and Posters for Sixth Agroforestry Conference in 1999

Sustainable Land-Use Management for the 21st Century

The sixth conference on agroforestry in North America will be held June 12-16, 1999 at the Arlington Resort Hotel in Hot Springs, Arkansas

Anyone involved in research, technology development, or implementation of agroforestry practices in North America or other temperate regions is invited to submit titles for proposed presentations to conference organizers. Submissions should include title, agroforestry category (alley cropping, forest farming, riparian zones, silvopasture, windbreaks, or general) and subject area (management, biology, economics, environmental, societal, policy, modeling or general).

Submit title information by October 1, 1998 to:
Terry Clason
Hill Farm Research Station
Route 1, Box 10
Homer, Louisiana 71040-9604.
E-mail: tclason@agctr.lsu.edu.

For more information about the *conference program,* contact:
Dr. Catalino Blanche
Dale Bumpers Small Farms
Research Center
6883 South State Hwy 23
Booneville, Arkansas 72927-9214.
E-mail: cblanche@yell.com

Co-Hosts of Conference
Dale Bumpers Small Farms Research Center and Hill Farm Research Station.

important to consider potential markets, soil type, climatic conditions, and species compatibility.

The timber component should be: marketable, high quality, fast growing, deep-rooted, drought tolerant, and capable of providing the desired products and environmental services. On marginally productive lands, conifers are well-suited for silvopastures because they can adapt to diverse growing sites, respond rapidly to intensive management, and permit more light to reach the forest floor. Select and use trees and planting/harvesting patterns that are suitable for the site, compatible with planned silvopastoral practices, and provide desired economic and environmental returns.

The forage component should be a perennial crop that is: suitable for livestock grazing, compatible with the site (soil, temperature, precipitation), productive under partial shade and moisture stress, responsive to intensive management, and tolerant of heavy utilization.

Potential livestock choices include cattle, sheep, goats, and horses. In many instances it is possible to incorporate turkeys, chickens, ostriches, emu, or rhea along with the grazing livestock, or game animals such as bison, deer, elk, caribou, etc. The selected livestock system must be compatible with tree, forage, environment, and land use regulations. In general, browsing animals such as sheep, goats, or deer are more likely to eat trees; whereas, large grazing animals such as cattle or elk are more likely to step on young trees. Younger livestock are more prone to damage trees than are older, more experienced animals. Livestock are more likely to impact hardwood trees than conifers.

Design and Establishment: Silvopastures can be established on any land capable of simultaneously supporting tree and forage growth. However, silvopastoral systems can require a relatively large land base to sustain timber and livestock production continuity. Appropriate establishment methods depend on: woodland/forest type (e.g., site conditions, and tree species, age, pattern, and spacing) or existing pasture situation and landowner objectives (e.g., timber products, environmental benefits, wildlife, etc.). Appropriate grazing systems depend on climate, terrain, tree species, tree age, other vegetation, kind of livestock, labor requirements, and extent of fencing, water supplies, and supplementary equipment.

Tree spatial arrangement is an important factor for silvopasture success. Trees can be evenly distributed over the area to optimize growing space and light for both trees and forage. Alternatively, grouping trees into rows or clusters concentrates their shade and root effects while providing open spaces for pasture production. Trees are typically pruned to increase light penetration and develop high-quality sawlogs. Silvopasture systems of varying ages can be managed to achieve landscape-scale objectives.

Management: Livestock grazing should be closely managed. A successful silvopasture requires understanding forage growth characteristics and managing the timing and duration of grazing to avoid browsing of young tree seedlings or elongating shoots. Livestock should be excluded from tree plantings during vulnerable periods. Similar approaches can minimize damage by trampling or rubbing. Improper management of silvopastures can reduce the number of desirable woody and herbaceous plants by overgrazing and soil compaction.

Economic: Integrating trees, forage, and livestock creates a land management system that can produce marketable products while at the same time maintain long-term productivity. Economic risk is reduced because the system produces multiple products, most of which have an established market. Production costs are reduced and marketing flexibility is enhanced by distributing management costs between timber and livestock components. Comprehensive land utilization in silvopastoral systems provides a relatively constant income from livestock sale and selective sale of trees and timber products. Well-managed forage production provides improved nutrition for livestock growth and production.

Woodland and Forage: Grazing can control grass competition for moisture, nutrients, and sunlight, thereby enhancing tree growth. Well managed grazing provides economical control of weeds and brush without herbicides, maintains fire breaks, and reduces habitat for gnawing rodents. Fertilizer applied for forage is also used by trees. In addition, livestock manure recycles nutrients to trees and forage.

Livestock: Some forage species tend to be lower in fiber and more digestible when grown in a tree-protected environment. Trees that provide shade or wind protection can have a climate-stabilizing effect to reduce heat stress and windchill of livestock. Protection from trees can cut the direct cold effect by 50% or more and reduce wind velocity by as much as 70%. Livestock require less feed energy, so their performance is improved and mortality is reduced.

Environment and Aesthetics: Silvopastures can increase wildlife diversity, and improve water quality. The forage protects the soil from water and wind erosion, while adding organic matter to improve soil properties. Silvopastures provide an attractive landscape with an aesthetically pleasing “park-like” setting. In contrast to concentrated livestock operations, silvopastoral systems are less likely to raise environmental concerns related to water quality, odors, dust, noise, disease problems, and animal treatment.

Agroforestry Notes 8 and 9 provide more details. NAC

Exploring Agroforestry Opportunities in the South

October 19-21, 1998
Huntsville, Alabama

Presentations by researchers and specialists will explore different agroforestry systems and opportunities for agroforestry in the south.

For more information, contact: Dr. George Brown, Alabama A&M University • Phone: 256-858-4189
Sponsored by: Alabama A&M University • USDA NRCS • USDA Forest Service

Grazing Sheep in Forests

People have been grazing livestock in the forest for centuries. But, producing both livestock and trees under a symbiotic relationship is a much newer idea. Researchers in the foothills of western Oregon have been studying sheep and forests for some time now. And, overall, they've found that the two really can coexist.

For the past 30 years, agroforesters in New Zealand have been successfully producing sheep and timber crops. Research in Oregon is building upon efforts in New Zealand. An initial Oregon project conducted during the late 1970's showed a 38 percent increase in income by switching from conventional pasture systems to agroforestry. However, early successes also led to a lot of questions that had no research base. And, this is where Rick Fletcher and Garry Stephensen, Oregon State University Extension agents, and business sponsor Rising Oak Ranch, owned and managed by Jim and Lou Moroe, come in. In 1990 this group, along with several other sponsors, established test plots evaluating three tree species, two planting designs, and two establishment schemes against traditional forest-only and pasture-only controls.

The researchers have begun to evaluate their technical results. They also have preliminary estimates on the costs of establishing an agroforest and on browse damage as well as data on seedling mortality and forage production.

To date, researchers have learned several primary lessons. These include:

Establish the pasture first. In New Zealand, they have a concept of establishing trees on pasture. We believe that this should also be the preferred sequence for landowners in western Oregon. This allows the farmer to do soil preparation, and have ample room for equipment needed for pasture establishment. It is then quite a simple operation to spray out small strips or spots to use for tree planting.

Manage your herd carefully. There is no substitute for vigilance on the part of the shepherd. At every age up to eight years, the livestock were capable of doing damage to the trees if left unattended for long periods of time. The younger the trees, the more frequent the monitoring needed. For very young trees, the flock should be monitored every couple of hours. For trees above browse height, they should be checked daily.

Weed out tree eaters from your herd. In the case of sheep, it was very apparent that tendency to browse a conifer tree was linked to certain animals and their offspring. Certain ewes did all the damage, and they passed this characteristic on to their lambs at an early age. These animals should be identified early and shipped to a pasture-only farm.

Matching tree species to site is critical. The biggest variation in growth and survival is linked to soil-tree species interactions. Agroforesters must pay close attention to the soil requirements of the trees they are planting and the soil characteristics at the planting site.

Researchers plan to include a commercial thinning to remove lower quality trees, leaving approximately 100 pruned trees per acre. Forage production will continue to be monitored annually. Tree growth will be assessed at year 10 and again at year 20. At year 20 an economic assessment and project summary is expected. NAC

Adapted from "Agroforestry for Linn County Foothills," by Rick Fletcher, Gary Stephenson, and Brad Withrow-Robinson.

(Pasture from page 3)

establishment, but once in place net income is increased and sustained through time. This analysis shows that the income from the silvopasture system over the 50 year rotation is significantly greater than that of the pasture system alone. The age at which net income from the silvopasture system begins to exceed that of the pasture-only system is 16 in this example, but would vary depending on when the first commercial thinning could be scheduled. The ideal scenario would be an implementation program that would remove the spike incomes and provide a steady state with a constant schedule of planting and harvesting.

Chart 2 reflects the cash flow that would be achieved under this ideal scenario. This means a gradual decrease in income (area C) during the establishment period while a relatively constant cashflow (line A) will be maintained once harvesting begins. AEM analysis for the hypothetical farm described here shows that a planting and harvesting scheme of approximately 2.5 acres per year would be required to achieve the steady state on this operation. However, this scenario is not practical because 2.5 acres is too small to attract contract harvesting of the trees. AEM also shows, in this example, that the total farm livestock units decreased from a carrying capacity of 30 animal units for the pasture only scenario to 26 animal units with the implementation of the silvopasture system even though net income (I) was increased.

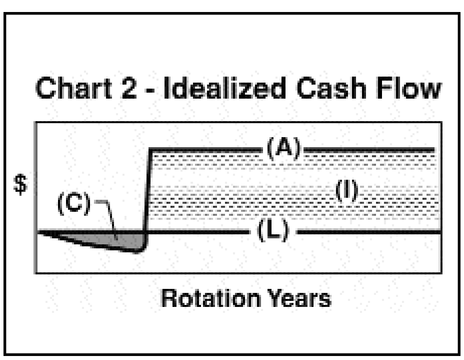

Chart 2: Cash flow that would be achieved under an ideal scenario.

Other analysis that AEM will display are:

- Wood production
- Labor requirements
- Allowable cut
- Forage production
- Planting acres by year
- Tables of all farm accounts and costs
- Net Present Values chosen discount rates.

Is silvopasture the most economical system for you? The Agroforestry Economic Model under development is a tool that will help landowners make the best informed decision possible. ARS, NRCS and Forest Service professionals are planning to deliver AEM training, for conservation professionals, beginning in June 1999. NAC

Upcoming Events

October 4-7, 1998
North American Conference on Enterprise Development Through Agroforestry: Farming the Forest & Agroforest for Specialty Products, Minneapolis, MN. Contact, Scott Josiah, 612-624-7418.

October 19-21, 1998
Exploring Agroforestry Opportunities in the South, Huntsville, AL. Contact Dr. George Brown, 256-858-4189.

June 12-16, 1999
Sixth Conference on Agroforestry in North America -- Sustainable Land-Use Management for the 21st Century, Hot Springs, AR. Contact, Dr. Catalino A. Blanche, 501-675-3834.

From the Editor

NAC has literature available to provide you with more information on agroforestry. And, we also have brochures, displays, and videos for you to use as tools to educate landowners. If you're interested in any of this material, e-mail Nancy at *nhammond/rmrs_lincoln@fs.fed.us*. Or, call her at the Center at 402-437-5178 Ext. 11. Visit our web site at *www.unl.edu/nac*.

Inside Agroforestry is published quarterly by the USDA National Agroforestry Center. Phone: 402-437-5178; Fax: 402-437-5712.
Greg Ruark, Center Director, ext. 27
Michele Schoeneberger, Research Program Leader and Soil Scientist, ext. 21
Jerry Bratton, FS Lead Agroforester, ext. 24
Bruce Wight, NRCS Lead Agroforester, ext. 36
Kim Isaacson, *IA* Editor, Technology Transfer Specialist, ext. 13
Clover Shelton, Technology Transfer Assistant, ext. 14
Jim Robinson, NRCS Agroforester located at Fort Worth, TX; phone: 817-509-3215
Gary Kuhn, NRCS Agroforester located at Seattle, WA; phone: 206-616-7166
Web Site: www.unl.edu/nac

Mission

The National Agroforestry Center (NAC) is a partnership of the USDA Forest Service, Rocky Mountain Research Station and State & Private Forestry and the USDA Natural Resources Conservation Service.The Center's purpose is to accelerate the development and application of agroforestry technologies to attain more economically, environmentally, and socially sustainable land-use systems. To accomplish its mission, the Center interacts with a national network of partners and cooperators to conduct research, develop technologies and tools, establish demonstrations, and provide useful information to natural resource professionals.

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Forest Service, Rocky Mountain Research Station
Natural Resources Conservation Service
National Agroforestry Center
East Campus-UNL
Lincoln, Nebraska 68583-0822