A Household Economics View of Small Farm & Forest Ownerships

For readers who are following the Wilhelm Farm Factsheets, you have read snapshots about agroforestry technologies and financial evaluation of these systems. This purpose of this Factsheet is to encourage a holistic perspective in decision making. Looking at your farm as-a-whole, allows effective integration of goals like *Natural Resources Stewardship*, *Family and Community Values* and *Financial Perspectives*.

All values cannot be collapsed into dollars or present net worth estimates. A critical idea is that making tradeoffs explicit between dollars and other values is essential for small farm and forest ownerships. Research by Dr. Brett Butler and his team at Amherst MA (2016) on family forest ownerships reveals an array of values sought by families:

- Amenity values are the dominant reasons for owning 10 acres or more:
  - Beauty, wildlife, nature, legacy, privacy and water are cited by 50% or more of owners as important or very important
  - Family, hunting and recreation are important to very important for 40 to 50% pf the respondents.
  - Long-term Investment is an important purpose for to 40% or more of the owners and even more so for those who own 50% of the forested acreage. Timber, firewood, and non-timber forest products – utilitarian values – are far less important.

- Butler, *et al* (2016, p. 646) observes, *Owners tend to be active on their land, but most are not engaged in traditional forestry programs. Program effectiveness will likely increase with more explicit incorporation of amenity-oriented ownership objectives, increased emphasis on intergenerational transfer of land, and a focus on traditionally overlooked owners, such as females.*

- Owners are relatively old (nationally, 43% of the owners that own 48% of the family forest area in 10 acre or larger blocks are 65 or older). It is likely that new owners and decision makers will assume ownership soon, often with further fragmentation and development.

Consequently, integration of goals is a desirable step to help family forest owners make more sophisticated and socially responsive decisions. While the literature with regards to small farm owners is less rich, we observe considerable evidence that similar values hold.[1, 2]

[1] The 10-acre lower size reflects the structure of the nation's forest inventory. Identifying and sampling smaller ownership is quite expensive, but analysis of the 1 to 9-acre ownership classes has been done for Connecticut with

Two critical economic concepts inform the integrated view of small farm and forest economics that we use on Wilhelm Farm: marginal change and tradeoffs.

> ***Marginal increments*** – marginal analysis drives much of modern economic analysis, especially concepts useful to managers. A simple example is the impact of an additional inch of water per acre on vegetable yields per acre. These are not average figures, but the increment of yield (say pounds of produce per acre) for each additional increment of water.
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> The most important analytical results are estimates of the increment in revenue (marginal revenue) from an increment in cost (marginal cost). This information tells managers if the next cost increment produces ***at least*** an equal amount of revenue. When the increments are large – for example, incremental additions of an acre foot of water and incremental yields of pounds of vegetables per acre – the results form a benefit/cost assessment.
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> ***Tradeoffs*** are a similar concept, but our focus is on what we must give up for an increment of what is desired. If we want a 1,000 more board feet of timber production, how much forage do we give up by shifting pasture to woods? If we add goats to our daily routine, how much time must be taken from other enterprises? If we want more family time together, what must be given up? The tradeoff concept becomes especially useful as we move toward a holistic perspective of our family farm and forest.

In a household context, like a family-owned farm or forest, choices are made using a broader value framework than net dollars or present net worth. Tradeoffs also involve balancing among social, environmental and financial goals. For example, how much net dollar value is given up satisfying a family value? Or an environmental value like soil health? Tradeoffs among various uses of time are especially important because they often reflect a rationality regarding what alternative uses of time can produce.

The framework we use is a normative model—it acknowledges non-monetary values rather than ignoring them. This helps families plan and manage their farm and forestlands in an integrative manner. Silvopasture and other agroforestry regimes often are selected because they increase social and environmental values, sometimes at the expense of financial measures.

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funding from the Forest Service, Yale School of Forestry and other sources. See Mary Tyrell. 2015. *Understanding Connecticut Woodland Owners: A Report on the Attitudes, Values and Challenges of Connecticut's Family Woodland Owners*. Yale School of Forestry & Environmental Studies. 131 p.

[2] Our perspective is influenced and reinforced by course work with the Holistic Management Institute, an organization dedicated to helping farm and ranch families think broadly about their lands and opportunities. See https://holisticmanagement.org. for more information

Stewardship of Natural Resources

A farm is a living ecosystem that is manipulated to produce more of what is desired (e.g., grain, vegetables, forage, wildlife habitat, timber, species diversity) and less of what is not wanted (e.g., weeds, invasive species, soil erosion). For the farm system to be sustainable, the limitation on shifting toward desired outputs, however, is the basic ecosystem resiliency, most particularly soils. Soils are themselves dynamic ecosystems of organic material, roots, insects, fungi, etc. that create the environment for living plants and any livestock or wildlife dependent on the system. Sustainability as a goal or value requires not undermining the essential soil and ecosystem resource.

The Commission on Science for Sustainable Forestry described sustainable development as: *The suite of plans, policies and practices that seek to sustain a specified array of forest benefits at a particular location*.[3] The literature on sustainable development usually refers to attainment of balance – balance between society's increasing demands for products and benefits, and the preservation of ecosystem health and diversity. We must consider the future in making our decisions about the present.[4]

Most operating definitions of sustainability include basic stewardship as an essential. Another way of looking at stewardship is a definition of conservation offered by Ciaracy-Wantrup (1952). Rather than defining conservation as a measurable goal, Wantrup defined conservation in terms of positive change over time – and defined depletion as the opposite. In this perspective, improving soil productivity or any of the many metrics for soil health from year to year is conservation. The direction of change is measurable, where the ultimate levels possible often are not known. This is a practical way of thinking about sustainability. Are we moving in the right direction? For examples: Are soil characteristics getting better? Is our family better off? Or our Community? We do not know what possible ultimate levels of sustainability are, but we generally can measure if we are moving in the right or wrong direction.[5]

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[3] This 2004 definition was provided by Thomas Worthley, University of Connecticut Extension Forester. He would add, *…for a specified period of time*.

[4] The global dialogue on sustainable development began with the Brundtland Report's definition: ***sustainable development*** [is] ***development that meets the needs of the present without compromising the ability of future generations to meet their own needs***. *Our Common Future* is available at www.un-documents.net/**our-common-future**.pdf

[5] See WF Factsheet No. 4, *Biophysical Metrics for Agroforestry*, for discussion of Ciriacy-Wantrup's dynamic definition of sustainability. Factsheet No. 4 presents a variety of simple but useful metrics for small ownerships to consider when contemplating adding an agroforestry practice or related technology. From the stewardship perspective, the most important metrics are ones that measure direction of change. Changes in soil tilth, soil organic percentage, and soil pH are excellent indicators of movement toward sustainability or depletion.

Family and Community Values

Recent research on family forestry[6] illustrates several family values as the goals of ownership of farm and forestland – e.g., beauty, wildlife, nature, legacy, privacy. These reasons drive the owner's management decisions. Making such values explicit aids tradeoff decisions; for example, do we remove all the brush in this area and plant pasture grass or do we retain some of the area as coverts[7] for song birds that we enjoy watching?

Where values held by different family member seem in conflict, tradeoff analysis can make the conflict in values explicit at some level of precision. Depending on how the family reaches decisions, consideration of tradeoffs make choices among values or value mixes explicit.

Landowners often are active members of their communities. In some cases, community leadership roles become a family value that guides decisions. Wilhelm Farm, for example, has provided tours, information, and other forms of leadership for the Granby community for over 80 years. Continuing this role and expanding it to state-level outreach, illustrated by our NRCS Conservation Innovation Grant, is a family value important to us.

In another dimension, stewardship leads owners to consider the environmental service their lands provide to the local community. Water quality, wildlife habitat, or insect and disease protection are examples of environmental services that influence our family's decisions. In other words, being a good steward is itself a family value, and we add community leadership and outreach by our examples.

[6] See Tyrel (2015), Butler, et al (2016) and Butler (2017).

[7] Coverts is a term for ground cover that protects small birds and mammals (e.g., neotropical song birds, New England cottontail) from predators like hawks. Brush, even the invasive multiflora rose, and thickets of willow or birch are examples of effective coverts.

Time and Dollars— Key Tradeoffs

A brief case study of the Wilhelm Farm farmstand 1990–2012 illustrates how one can view the tradeoffs between time and money.

Ann and Bill were married in late 1990, Russell was born in 1992 and Ricky in 1995. During the 22 years of market garden and farmstand operation, we benefitted from:

- Daycare – a significant expense for dual career couples and often not as good an early life experience as being around mother and other family -- $200 per week per child was our savings – or over $18,000 per year

- Food – the fresh vegetables replaced grocery expenses with more and higher quality nutrition; much was frozen each season for winter use; surplus berries were processed into jams and jellies for sale at the stand. A conservative estimate is a savings of over $1,500 per year, plus increased income.

- Commuting – Ann's current costs per year are about $10,800 for mileage and parking.

- The net cash from the operations allowed us to invest the maximum amount each year ($5,000/year for each child) in the boys 529 college funds

- The garden and stand operations provided real work experiences for our boys, even as young children, and they worked part-time through high school with the understanding that they would save 50% of their earning in their 529 plans, give 25% to charity and retain another 25% for spending money.

- Hay & pastures used jointly over time with local dairy farmer, saving us the cost and time of managing harvesting hay and fertilizing these fields – at least $1,000/year.

- Intangibles – We valued the time for close parenting that the arrangement provided, including close relationships with the boys' grandparents. And Ann loved this work!

In summary, operating the market garden and farm stand netted at least $31,000 a year in savings and other benefits. Salary opportunities in this period for Ann were about $45,000 gross, adjusted to $35,000 after taxes.[8] Given the choice made, the implication is that Ann and her family attributed about $4,000 annually to intangibles. The family values stated are congruent with this conclusion (see last section of the matrix below).

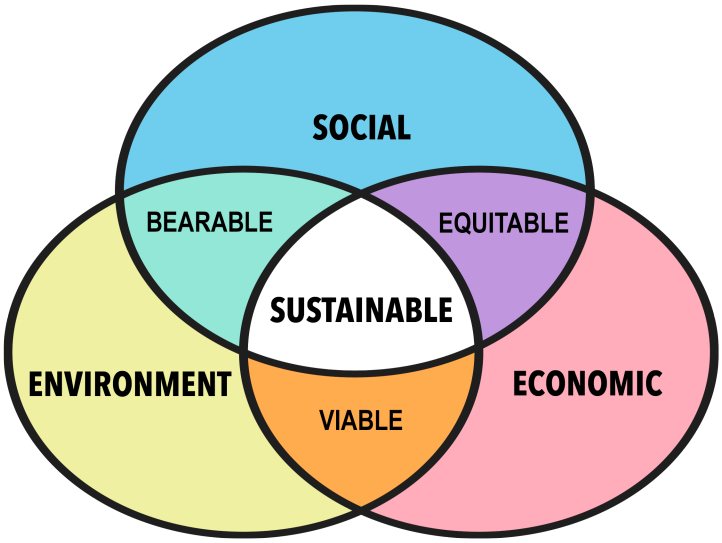
[8] Gross salary is adjusted by least 20% less for federal and state income taxes.

Qualitative Example – Decisions Among Alternative Silvicultural & Agroforestry Regimes

Wilhelm Farm is 45.6 acres roughly allocated into 35 acres of woods, 9 acres of pasture & Hay fields, and 2 acres for house and outbuildings. We made some land use reallocations of wet pasture, brushy and low-value hardwoods, and marginal pine stands to create a silvopasture unit of about 5 acres. It will complement the more productive pastures and provide a more useful landscape for future livestock enterprises. We are open to yet more complex future allocations of the pasture land, hayfields, low-grade (wet) pastures, market garden and farm stand.

This analysis focuses on the woods and adjacent pastures. The alternatives span current land management practices and some silvopasture alternatives (mixes of grass and trees). We can evaluate the choices qualitatively at this point. More quantitative information is available and will be integrated into to a holistic plan over the coming years. Also, within enterprise choices can be evaluated at the margin in terms of holistic goals. A ***no-management*** alternative provides a baseline for evaluating the alternative management regimes.

Three core values drive much thought on sustainable resource use and development.[9]



Our criteria or values are:

Social
- *Relationships with children, family.*
- *Relationships with community.*
- *Relationships with professional colleagues*

Environment
- *Soils*
- *Ecology*
- *Song Birds*

Economic
- *Cash Flow*
- *Present Net Worth*

[9] Many current graphic representations show the environment as a large circle, with the social as a smaller circle, entirely within it and the economic circle smaller yet, within the social one. From a broad policy perspective, this makes sense. This Factsheet, however, is focused on family decisions, which almost always are a search for a balance among the three values represented in this Venn diagram.

Summary of the Household Perspective

The household economic view encourages integration of our social, environmental and financial criteria or family values. Consideration of family values, along with "bottom line" measures like profit or present net value, makes our choices more explicit and more balanced, rather than allowing conditions and lack of action shape our choices. Rather than setting quantitative end-point goals, the household perspective encourages sustainable models that measure progress by consistent incremental positive change. This is a path to lasting stewardship that makes tasks more manageable and at a scale that will not overwhelm a family ownership.

References

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WILHELM FARM
FACTSHEET

Household Economic Presentation of Wilhelm Farm Case Study

Root Cause: [10] *The ecological succession on this landscape, both wooded and pasture, is toward brush followed by low-value hardwoods with a few pines or high-value hardwoods*

Alternatives → / **Criteria** ↓	Hardwoods (focus on Red Oak & Sugar Maple)	White Pine with some oak, maple, birch and hemlock	Mixed conifer & hardwoods (streamside & eskers)	Silvopasture with hardwoods & pine	Silvopasture with hybrid polar & black birch	No manage-ment strategy, periodic harvest of mature trees
The first three are forest enterprises and exclude domestic animals but favor bird and other wildlife. The second three only make sense with domestic animals (herbivores) in sequences. Animals can be introduced with a *no-management* regime but will reinforce the unsustainable results expected from this alternative.						
Species mix	+	++	+	+	+	_
Biological yield	+	++	+	+	+	_
Financial value	+	++	+	+	+	_
Social: *Are there any people whose support we need that will be troubled by this Action?*						
Relationships w/ children, family.	No	No	No	**Need more outreach to community & professionals**		**Would be criticized by community, professional colleagues**
W/community.	No	No	No			
W/professional colleagues	No	No	No			
Biological: *Does this Action address the weakest point in the life cycle of this organism?*						
The issue is not just one organism, but the collection of organisms that form the core of 3-5 distinct ecosystems found on Wilhelm Farm						
Soils	Favors soils formed from granitic parent material	Favors deeper, sandy well-drained soils	Not well-developed or highly produc-tive soils	Often sandy soils that favor pine over other tree species or grass	Trees help dry wet, acidic site through evapotranspiration	The mix will change over time in part because of the soils

[10] A root case is an understanding of one or more major symptoms that guide land management. In this case, the root cause reflects understanding tested hypotheses about the dynamics over time of our farm landscape.

Alternatives	Hardwoods (focus on Red Oak & Sugar Maple)	White Pine with some oak, maple, birch and hemlock	Mixed conifer & hardwoods (streamside & eskers)	Silvopasture with hardwoods & pine	Silvopasture with hybrid polar & black birch	No manage-ment, periodic harvest of mature trees
Ecology	A straight-forward manipulation that favors more of what we want	Pine grows well on our site—high productivity –85 feet at 50 years. But requires manipulation to favor pine seedlings	A straight-forward manipulation that favors more of what we want but understanding that mix will not be high value.	Easy be-because trees are on the site (mainly birch & red maple); manipulation required to shift toward oak & sugar maple	Easier than converting trees to grass by far; may add other wet pasture to this component of silvopasture	The unman-aged stands will evolve b/c of the relative competitive advantage of each species and history
Birds	+ Diversity of age, height & species	++ Diversity of age, height & species	0 Little light on ground and low diversity	+ Diversity of age, species; open areas	+ Diversity of height; open areas	-? Little light on ground and low diversity
Financial: *In this Enterprise will this Action address the area of greatest need to generate maximum asset value?*						
Cash flow	No upfront costs; harvests – every 15-25 years	Upfront costs if regeneration failure & need to plant pines	No upfront costs; infrequent harvests	Upfront costs to convert and reduce brush competition	Upfront costs to plant trees & control grass competition	No upfront costs; harvests – every 15-25 years
Present Net Worth[11]	Medium	Highest	Low	Unknown?	Unknown?	Lowest

[11] Formal estimates of present net worth are in ***Forest investments – Connecticut examples***, Wilhelm Farm Factsheet No 7.

Gut: ***How does this alternative play in terms of our vision?***						
Alternatives 	Hardwoods (focus on Red Oak & Sugar Maple)	White Pine with some oak, maple, birch and hemlock	Mixed conifer & hardwoods (streamside & eskers)	Silvopasture with hardwoods & pine	Silvopasture with hybrid polar & black birch	No manage-ment, periodic harvest of mature trees
Progressive Christian principles of love, compassion, justice, and charity guide all our actions. All our landscape feeds our feelings and principles, and we share them through food gifts and tours for community and professionals.						
Moving toward our vision of Wilhelm Farm enriches our marriage and relationship. Without question, thinking and talking about these alternatives (and other farm ideas) have enriched our marriage.						
Work and reflective time on the farm are important means of rejuvenating us. The woods are a spiritual experience for us and both solo and group time in our woods provides quiet spaces for reflection.						
Our role as stewards of the land are guided by our recognition of the beauty and intricacies of nature. Both of us are scientists and both have strong bases in ecological principles and this is coupled with our appreciation of the aesthetic and spiritual properties of our woods.						
Our vision of Wilhelm Farm will enhance our relationships with our children, extended family, community, and professional colleagues, and they, in turn, will broaden and deepen our vision over time.						
These alternatives will be appreciated by family, community and professional peers.						***No management*** strategy is not acceptable to many
While not all our assets are tied to the farm, the farm assets are concrete, and they provide us with sustenance and surplus in many forms, from food to collegial ties to community, local and writ large.						
All the forest management and silvopasture alternatives add value in present net worth terms; the alternatives can be refined by soil types and stocking levels by age to find optimal mixes.						
All the forest management and silvopasture alternatives will contribute to our ties to our communities; the silvopasture alternatives add food production to the Wilhelm Farm total.						
The *Do Nothing (except exploit)* alternative is the poorest in financial terms and adds nothing to our food ties or relationship to our local and peer communities.						