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**Species & Management
Considerations
For Profitable Multi-functional
Riparian Buffers**

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Species Selection

Land Considerations

- Soil characteristics
- Road and water access
- Regional and micro Climates

Client Considerations

- Experience and access to labor
- Preferred style of work
- Access to capital

“This is where you started, this is the context, these are the land considerations, and here is your design”



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Land Considerations



Suitability Maps



Environmental Factors

- | | |
|------------------------------------|--------------------------------|
| 1. Land Use | 6. Drainage Class |
| 2. Slope Percentage | 7. Hydric Rating |
| 3. Susceptibility to Frost Heaving | 8. Surface Soil Texture |
| 4. USDA Hardiness Zone | 9. Depth to Water Table |
| 5. Precipitation | 10. pH |
| | 11. Depth to Restrictive Layer |
| | 12. Flooding Frequency |

Chinese Chestnut Suitability

pH	Rating (0-5)
0 - 4	Disqualified
4 - 5	1/5
5 - 6.5	5/5 - Most Suitable
6.5 - 7.5	1/5
7.5 - 10	Disqualified

Parameters

pH
Soil Texture
Depth to Water Table
Depth to RL
Growing Zone
Drainage



Ground-truthing

Software



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GPS



Soil Testing

- Soil Probe
- Penetrometer

Other

- Drone
- Shovel

The simple yet powerful way
to access and use soil data.





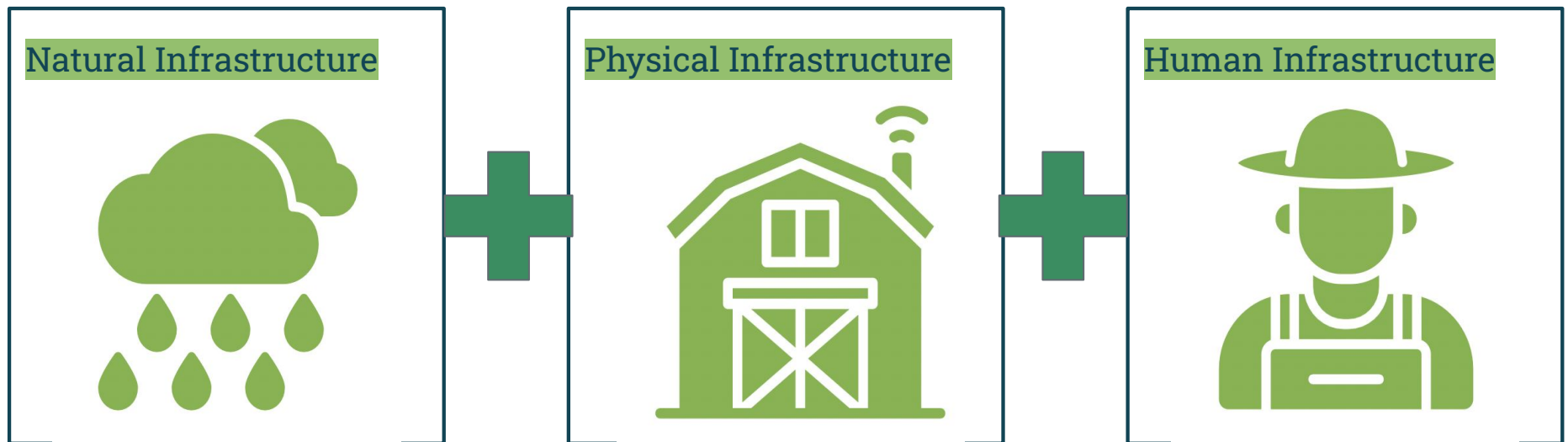
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Farm-level Considerations



Holistic Context



“The power of nature is the power of a life in association”

-Terry Tempest Williams



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“Tell me about a perfect day on the farm . . .”

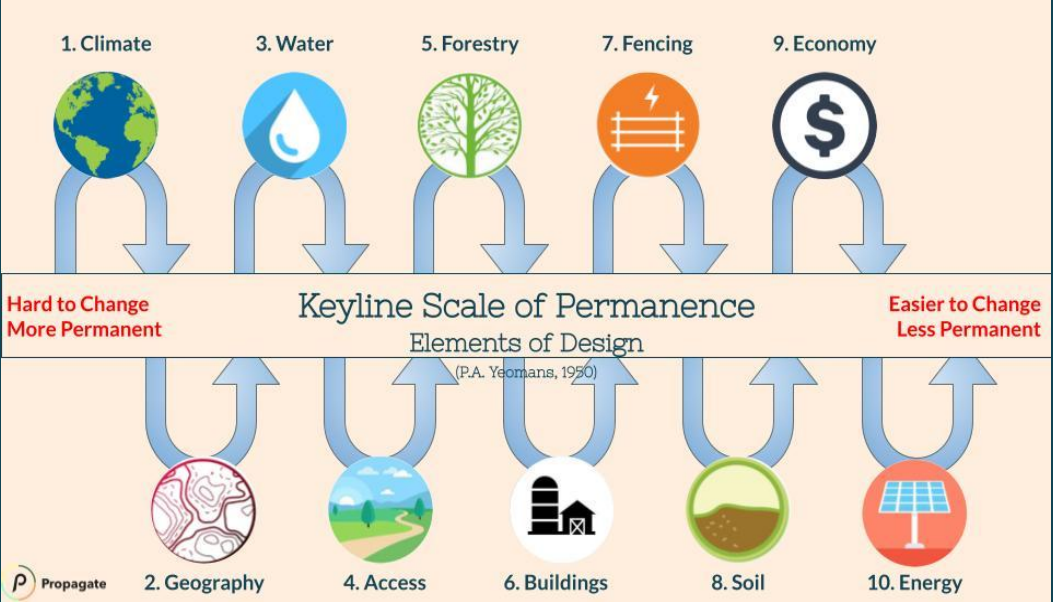
Why Holistic Context?





Keyline Scale of Permanence

Farm-Level Factors



Element	Points Possible	Score	%	Key	
History and Climate	25	25	100.00%	80-100%	Green
Geography	10	10	100.00%	60-79%	Yellow
Water	20	20	100.00%	<60%	Red
Access	15	15	100.00%		Black
Forestry	10	10	100.00%		Black
Buildings	15	15	100.00%		Black
Fencing	15	15	100.00%		Black
Soils	25	25	100.00%		Black
Economy	15	15	100.00%		Black
Energy	10	10	100.00%		Black
Total	160	160	100.00%		



Holistic Context

Initial Design



Final Design





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Let's Take a Look



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Financial Considerations



Design Complexity

Multi-functional riparian buffers blend traditional riparian design with economically productive crop patterns.

Permaculture
Homestead-Scale

"The Sweet Spot"

Monoculture
Conventional Ag

Ecological Complexity

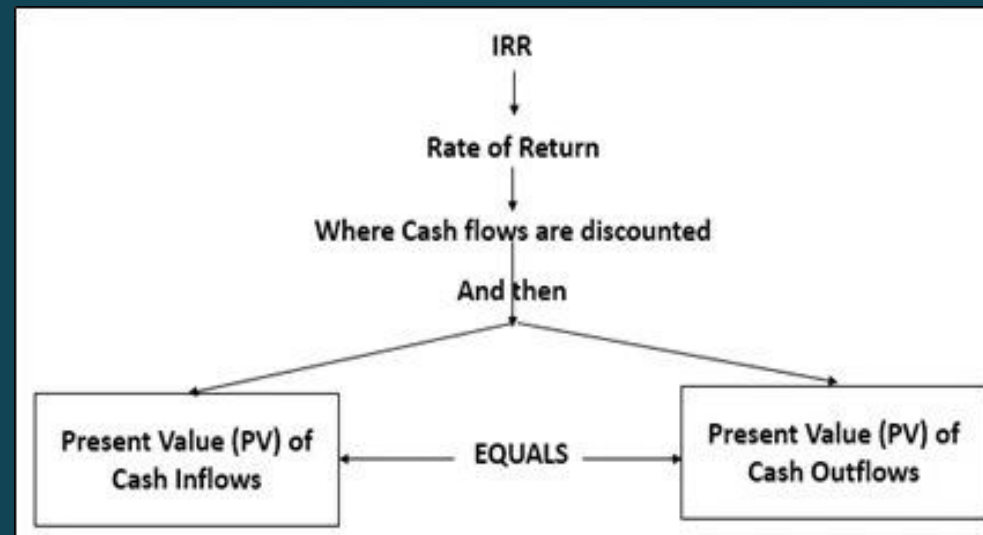
Rate of Return



Internal Rate of Return

$$NPV = \sum_{t=0}^N \frac{CF_t}{(1+r)^t}$$

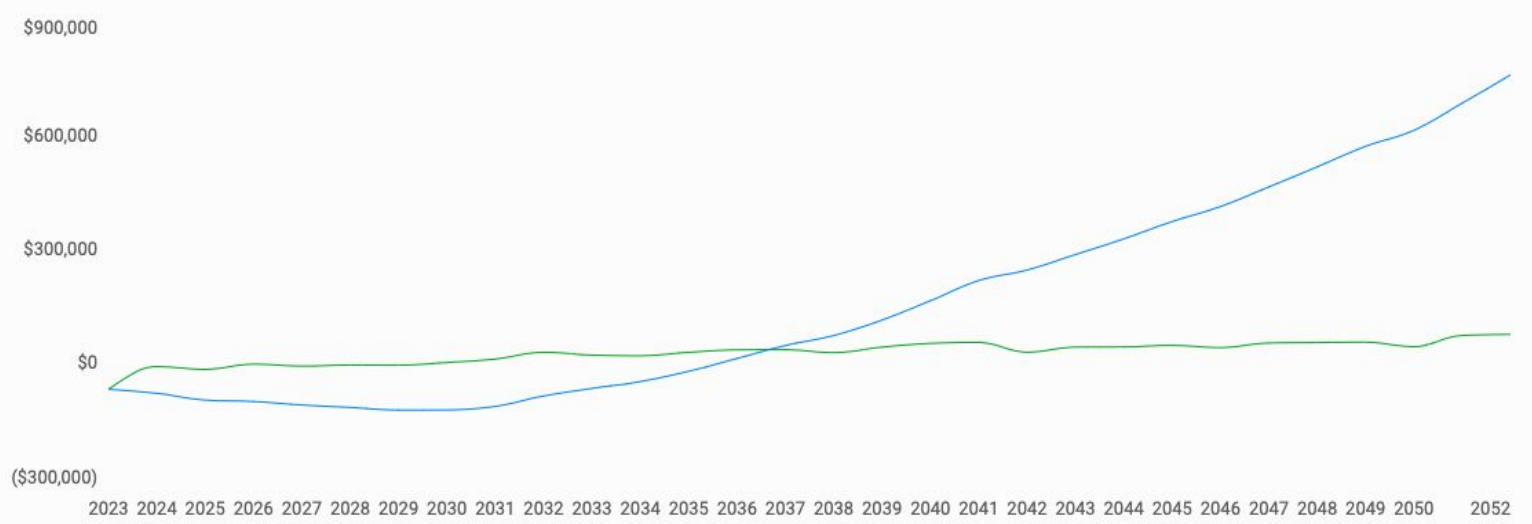
A guideline for deciding whether to proceed with a project or investment.





Internal Rate of Return

Gross Income	<input checked="" type="checkbox"/>
\$25,278 (Avg/yr)	
Cumulative Profit	<input checked="" type="checkbox"/>
\$758,341	
Revenue	<input type="checkbox"/>
\$43,923 (Avg/yr)	
Capex	<input type="checkbox"/>
(\$34,469)	
Opex	<input type="checkbox"/>
(\$17,496) (Avg/yr)	



Returns	Income Statement				
Category	5 Years	10 Years	15 Years	20 Years	30 Years
IRR	N/A	(15%)	3%	8%	11%



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Let's Take a Look



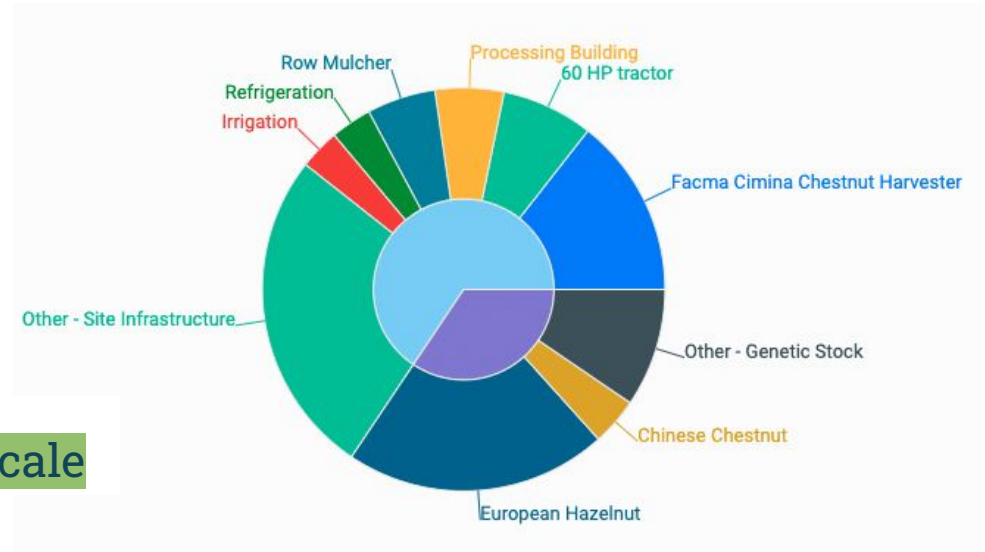
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Farm-Level Capital Investments: Maintenance & Post-Harvest Processing



Farm-level Capital Investments



Capital Risk Should Correlate With Scale

Small Scale

Low Investment
Low Risk
High Margin

Medium Scale

High Investment
High Risk
Low Margin

Large Scale

High Investment
High Risk
Moderate Margin



Pooling Resources



Route 9 Cooperative

Centralized cleaning and
sales for 90+ acres of
Chestnuts

River Hills Harvest

Centralized processing
and sales for Elderberries

Propagate Hubs

Strategically located
farms to spark further
regional development



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Thank You!

Questions?



This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the [Northeast SARE](#) program under sub-award number [ENE22-177](#), and managed by a partnership between [Berkshire Agricultural Ventures](#), [Propagate](#), and [Landscape Interactions](#)

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