

Mechanization and Tractor Training

Linking Mechanization to Farm Business Planning

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Where I am Coming From...

- Educator and researcher at the Center for Integrated Agricultural Systems, UW-Madison
- Grower, Stone Circle Farm



- 2 acres in production
- Mostly wholesale markets
- Garlic, carrots, hot peppers
- Year-round sales



Where I am Coming From...

- Coordinator, Beginning Grower Training Programs
 - 2 to 3 Day Intensive Workshops
 - Market Growers
 - Cut Flowers
 - Apples
- Research and Outreach Foci:
 - **Scale** and Economics
 - Planning and Record Keeping
 - Tools and Equipment
 - Labor Efficiency and Management
 - Market options



Grower to grower: Creating a livelihood on a fresh market vegetable farm

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A Matter of Scale

“To me, the whole thing comes down to this: what is the right scale for my operation? The challenge is to find a size that represents a good ‘fit’ for a grower’s management skills.”

Land base

Quality of life goals

Income needs

Crop diversity

Market diversity

Labor / Mechanization



Today's Goals

- Better understand the impact of effective planning for farm mechanization
- Be better able to help new farmers assess their readiness and need for mechanization
- Be better able to help new farmers set mechanization priorities
- Better understand the cost of farm mechanization (especially on diversified vegetable farms)
- Understand “alternatives” to mechanization and capitalization



Mechanization in Context

- Especially in the early years of a farm's development, mechanization is often linked to **expansion** (acreage, herd size, markets, enterprises).
- Many farms have limited capitalization funds and many are adverse to debt and risk.
- Land costs often consume most of a beginning grower's financial resources...placing them on long slow process of mechanization over time.
- Mechanization is closely linked to **labor**
- Mechanization purchases are ***business investment decisions*** that have significant impact on a business's financial picture.
- It is depressingly common for investment decisions to be made with little financial analysis and this can lead to problems.



Mechanization Planning

Every farm business plan should include this section:

“Start-up Expenses and Capitalization”

- Estimate your needs and expenses accurately
 - Visit other farms
 - Attend conferences and trade shows
 - “Google it”
- Plan where you will get sufficient capital
 - Savings
 - Family
 - Loans
 - Reinvestments



Capitalization Planning Sheet

Start-up Expenses and Capitalization

Item	Cost High	Cost Low	Cost to Rent or Hire	Notes (Priority)

Capitalization Planning Sheet

TIP: Categories Help You Plan More Accurately and Systematically

Item	Cost High	Cost Low	Cost to Rent or Hire	Notes (Priority)
Power Source				
Tillage Tools				
Cultivation				
Post Harvest				
Delivery				

Capitalization Planning Sheet

Livestock Start-up Expenses and Capitalization

Item	Cost High	Cost Low	Cost to Rent or Hire	Notes (Priority)
Manure Handling				
Hay-making Equipment				
Animal Transport				

Capitalization Budgets

What do you think it costs on a per acre basis to capitalize a **5 to 15 acre vegetable farm** in terms of equipment (not buildings)?

- A. \$2,500
- B. \$5,000
- C. \$10,000
- D. \$20,000
- E. \$50,000

Getting Started: What will it cost?

Fresh Market Vegetable Farm

- \$10,000 to \$20,000 per acre rule of thumb for capitalization
- Facility needs for market farm:
 - Greenhouse: 200-300 square feet PER ACRE
 - Pack House: 100 to 150 square feet PER ACRE
 - Cooler: 150-250 cubic feet PER ACRE
- Priority Equipment needs:
 - 25-55 hp tractor
 - Variety of implements (rotovator, mower, field cultivator, chisel plow, disk, etc.)
 - Irrigation equipment
 - Hand tools (seeding and weed cultivation)
 - Harvest totes / Harvest cart or wagon / Scale / Wash tank
 - Delivery vehicle / Market tent
 - Computer / phone / email / website

Getting Started: What will it cost?

What does it cost to capitalize a grass-fed beef or lamb operation? How about a pastured poultry business?

How about an orchard? Or a goat dairy?

Mechanization Planning

Start-up Expenses and Capitalization

- A new business often costs more than anticipated. Always include a “**contingencies**” line item to account for unforeseen capital expenses.
- Experienced growers may offer advice on an appropriate amount for contingencies but as a general rule contingencies should equal at least 20 percent of the total of all other start-up expenses.
- A farm is never “done” capitalizing.

It is never too late to write a business plan and get serious about a capitalization strategy!

Capitalization Research

When visiting other farms or talking to other farmers, ***ask lots of questions and try to get lots of data:***

- Acres in production / herd or flock size
- Cropping / market mix
- Equipment list and prices
- Facilities (buildings, usage, cost, square footage, etc.)
- Labor situation

Use this data to get valuable information for your own planning and projections:

- Herd or flock size per acre of pasture
- Cubic feet of cold storage per acre of vegetables
- Greenhouse square footage per acre
- FTE per acre

Scaling Up Realities and Issues

- You can never be too small as a beginning farmer...but you can definitely be too big.
- Slow growth is generally less painful than rapid growth.
- It is really easy to plant more...what comes after is not so easy.
- For organic vegetables, expand only as your capacity to stay on top of weeds allows.

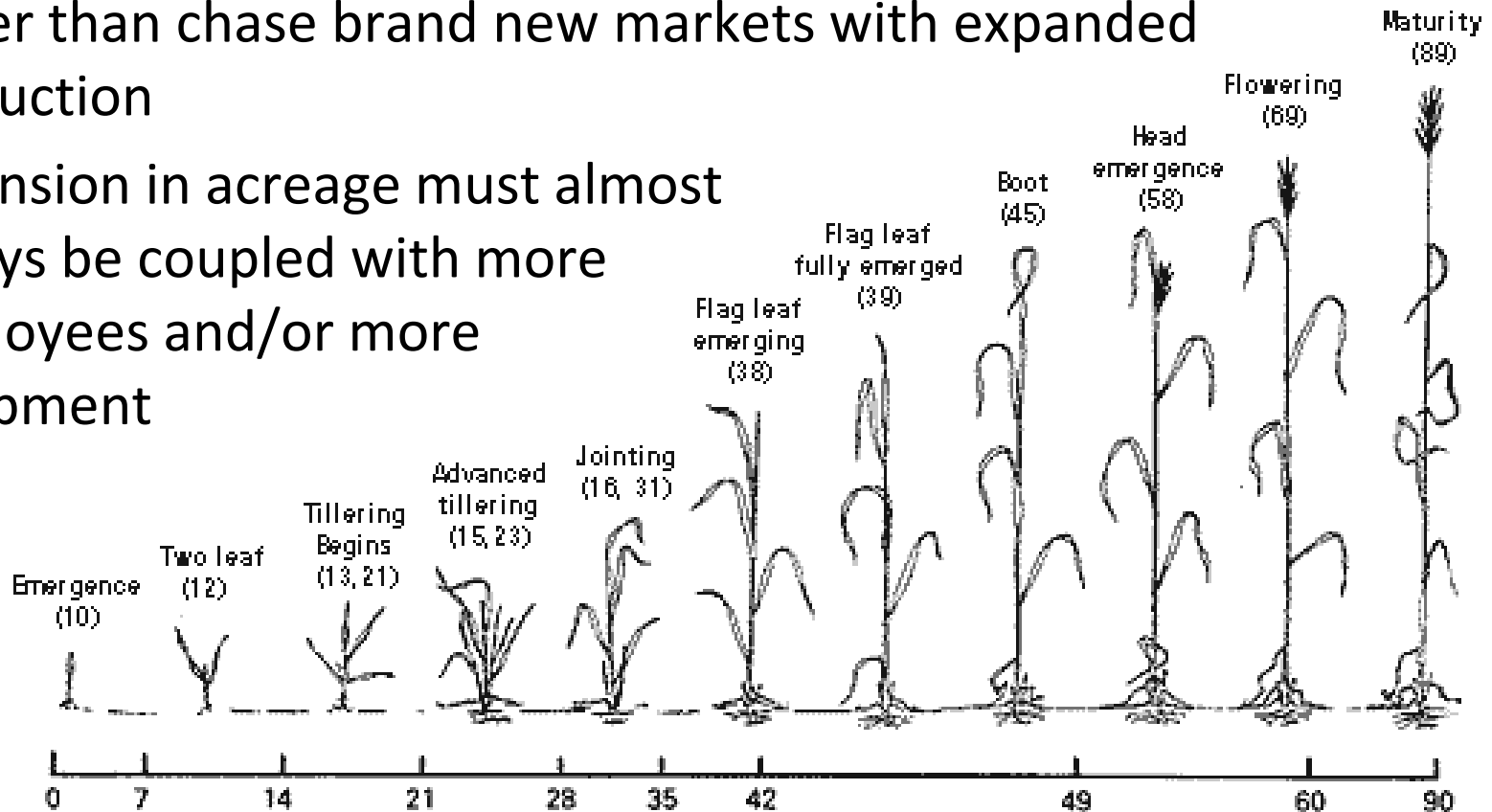


Scaling Up Realities and Issues



Those Critical Growth Steps

- Expand in reasonable, steady steps
- When expanding in acreage, do not take on significant or complex new enterprises at the same time
- If possible, “follow the lead” of existing customers/markets rather than chase brand new markets with expanded production
- Expansion in acreage must almost always be coupled with more employees and/or more equipment



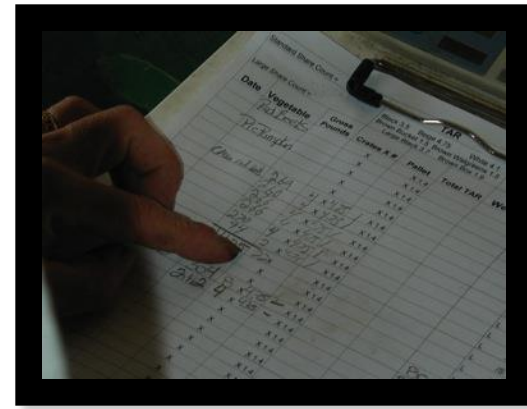
Keys to Settling the Scale Issue

- Record-keeping
- Appropriate Mechanization
- Finding Your Market Niche
- Solving the Labor Puzzle



Record Keeping

The part of running a farm business that most growers do not like!



- Track sales for all products in all markets
- Track expenses (production and marketing)
- Track your labor
- Evaluate crops and enterprises thoroughly and honestly
 - Compare expense and labor inputs to value of crop (gross, net, and “other”)



Veggie Compass

A Tool for Whole Farm Profit Management



Mechanization: Vegetables

- For vegetables, it is possible to get started with little more than “a shovel, a rake, and a hoe”
- Ultimately, a wide range of tools and facilities are needed to grow and market effectively, profitably, and sustainably



Mechanization: Livestock

- Unlike vegetables—where you really can grow a considerable quantity **without** a tractor or other expensive equipment—there is a fundamental need for mechanization for most livestock enterprises.
 - Manure handling
 - Pasture maintenance / renovation
 - Feed production and harvesting



Mechanization: Livestock

- Unlike vegetables, it is generally easier and more common to find alternatives to buying equipment.
 - Rent instead of buy
 - Custom hire



General Mechanization Advice

- Combat Wishy-Washiness and “Paralysis by Analysis”
- Do not get stuck being afraid to spend money in order to effectively capitalize your business.
- When you are sure farming is right for you and you have established some markets and relationships with customers...it is time to get serious and invest in your farm in terms of tools and facilities.
- Most vegetable producers report that equipment pays for itself relatively quickly.
- If it doesn't work, sell it!



Goals, Priorities, and Decisions

- Set goals for yourself and your business and use them to guide priorities and decisions
- Visit other farms and talk to other growers
- Ask for references from dealers in order to talk to someone who has bought what you are planning to buy and has used it more than one season.
- Do you need to own it?
 - Ownership versus rental
 - Hire custom work
 - Lease with option to buy
 - Trade / Barter

Cost of Ownership

To accurately determine whether it makes more sense to own versus rent or custom hire, consider the true costs of ownership:

- Depreciation
- Interest
- Repairs
- Maintenance
- Insurance
- Labor
- Fuel and oil
- Taxes (property taxes for land or buildings)

Estimate and total all the costs of ownership on an annual basis

Cost of Ownership

Next, the total annual cost should be divided into whatever increment makes the most sense for a comparison with renting or custom hire.

- Buildings: monthly basis
- Tractor: hourly basis
- Field equipment: per acre

Be honest about the costs of ownership!

It is then equally important to consider whether renting or custom hire are *practical and economically feasible* options.

Goals, Priorities, and Decisions

Consider carefully the purchase of all equipment, tools, and implements:

- Does it fit within the context of my over-all farm plan?
- Does it fit my scale? Does it fit the scale I want to reach?
- What does it cost? What does it cost to operate?
What is its resale value?
- Is it durable? Can I repair it myself?
- Is it easy to use? Is it enjoyable to use? Can others use it?
- Is it sustainable?
- Do I *need* it, or *want* it?

Be honest and thoughtful: are you truly investing in a “weak link” or are you defaulting to the “buy something cure?”

Situation: new grower, 1 acre in vegetables, funds are limited!

Where should I prioritize my capitalization efforts?

- A. Greenhouse (for growing transplants)
- B. Tractor (to prepare ground and more...)
- C. Cold storage unit (to cool and hold produce)
- D. Delivery vehicle (to get produce to market)

Target Areas of Mechanization

- Mechanize those areas of the farm that demand the most labor and are the most physically demanding.



- For vegetable growers, emphasize the “back end” of your farm.

The “Front End” of the Market Farm

- Transplant Production (Greenhouse)
- Power/Traction/Horsepower
- Primary tillage tools
- Direct seeding



The “Middle” of the Market Farm

- Irrigation
- Weed Management
- Insect and Disease Management
- Fertility and Cover Crop Management



The “Back End” of the Market Farm

- Harvest Aides
- Post Harvest Handling
- Storage
- Marketing/Sales
- Delivery



Avoid the “Picnic Table Approach” to Washing and Packing



Better: covered area with washable tables and sinks



Even Better: enclosed, wash lines



A Livestock Perspective:

WI grass-fed, organic beef farmer

- If you examine the cost structure of any animal protein operation and the outstanding cost item is feed.
- If you look at the cost of feed the cost is driven by cost of land, cost of fertility, and the cost of equipment (operating and owning) to plant, harvest, and handle feed.
- Income per acre is very low compared to vegetables so land is a huge factor.
- As these operations expand the pinch points are decisions about land and equipment - both have the potential of being huge capital hogs.
- On land – “I recommend putting in place long-term rental agreements on land owned by others.”



A Livestock Perspective:

WI grass-fed, organic beef farmer

- On equipment – “if you have custom operators in your area, use them...thus using their cost of operating and owning and getting the dividend of not using your time to do these things yourself.”
- A full cost analysis of the custom operator approach versus owning and doing things yourself almost always shows that paying for the custom operator is the way to go.
- “If I were doing it all over, I'd end up with one skid steer, one used 50hp tractor, a manure spreader and a brush hog.”



The Labor Puzzle

- Absolutely your biggest expense
- For many crops, this is likely the factor where you can have the biggest impact on profitability
- Labor management often impacts your quality of life
- Focus on maximizing the impact of labor and improving efficiency



The Labor Puzzle

On a vegetable farm, what percent of gross income goes to labor (payroll)?

- A. 10-20%
- B. 20-40%
- C. 50- 60%

Maximizing the Impact of Hired Labor

- Develop efficient systems and get organized BEFORE hiring workers
- Be careful about who you hire. Be clear about the realities of farm work AND expectations
- Spend time training your employees
- Set standards and target times for tasks
- Weed management
- Invest in facilities and tools to make harvest and post-harvest handling more efficient
- Fit labor to you and your farm



Maximizing the Impact of Hired Labor

- Offer incentives or bonuses.
- Make it worthwhile for workers to return for a second, third, or fourth season.
- Get and stay organized!

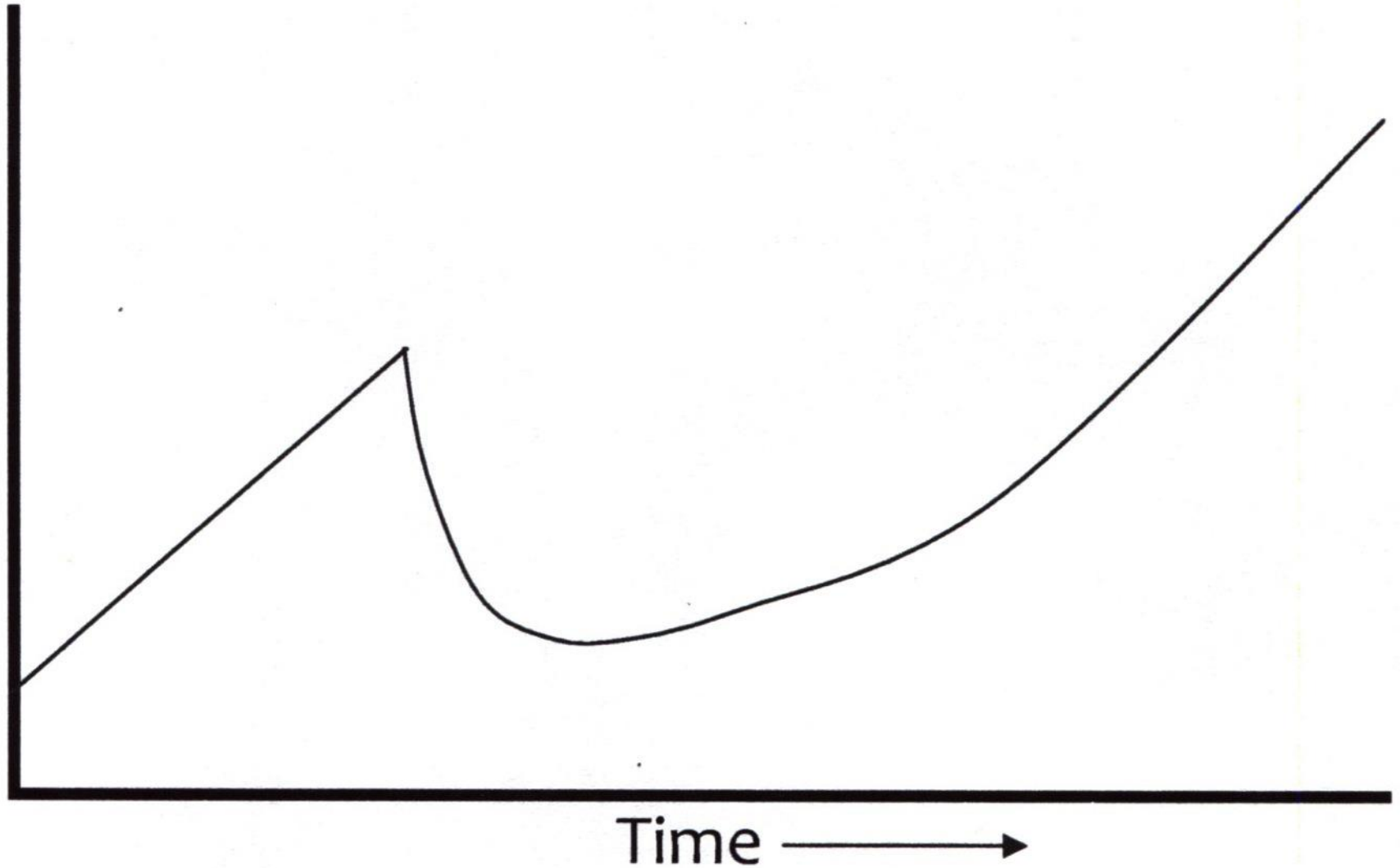


How to Find the Right Scale

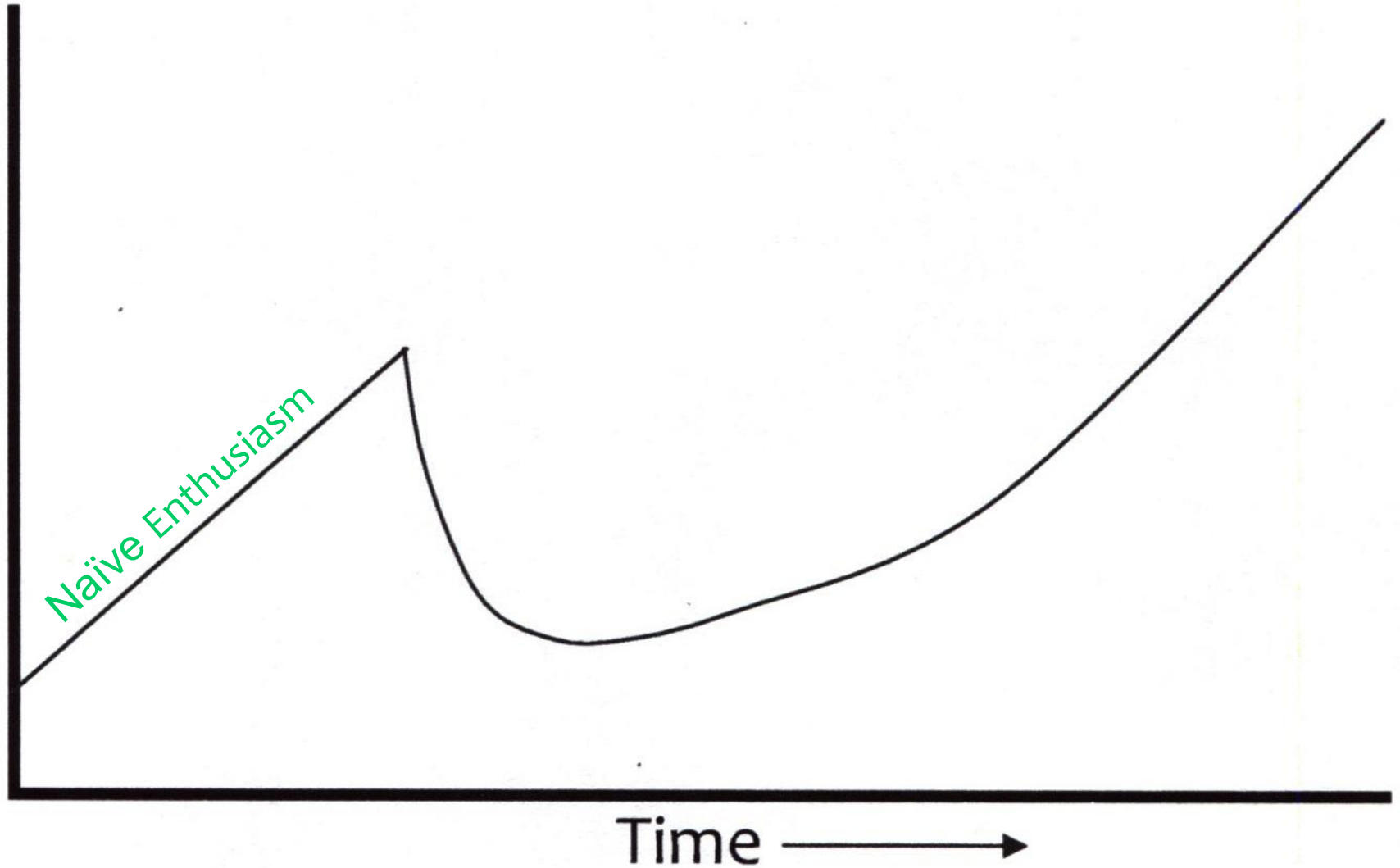
- Visit and talk with other growers
- Set goals: \$ and quality of life
- **Keep records**
- *Use* your records to evaluate your farm and make informed decisions
- Do not be afraid to invest in your farm
- Do not be afraid to make changes...even radical changes to your farm
- Finding the right size for you is a dynamic process:
Re-evaluate goals, challenges, and strategies every year.



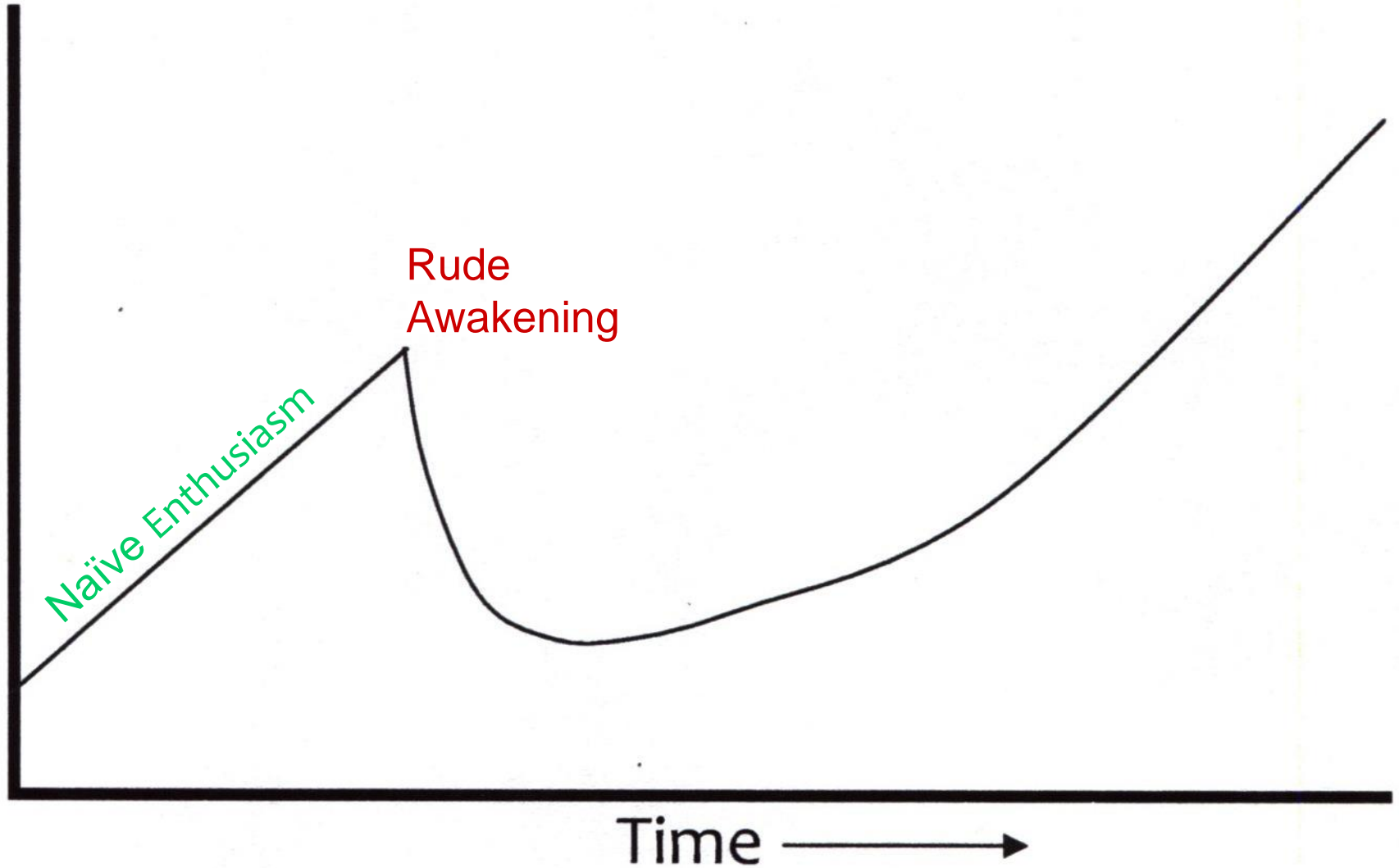
Reality Curve



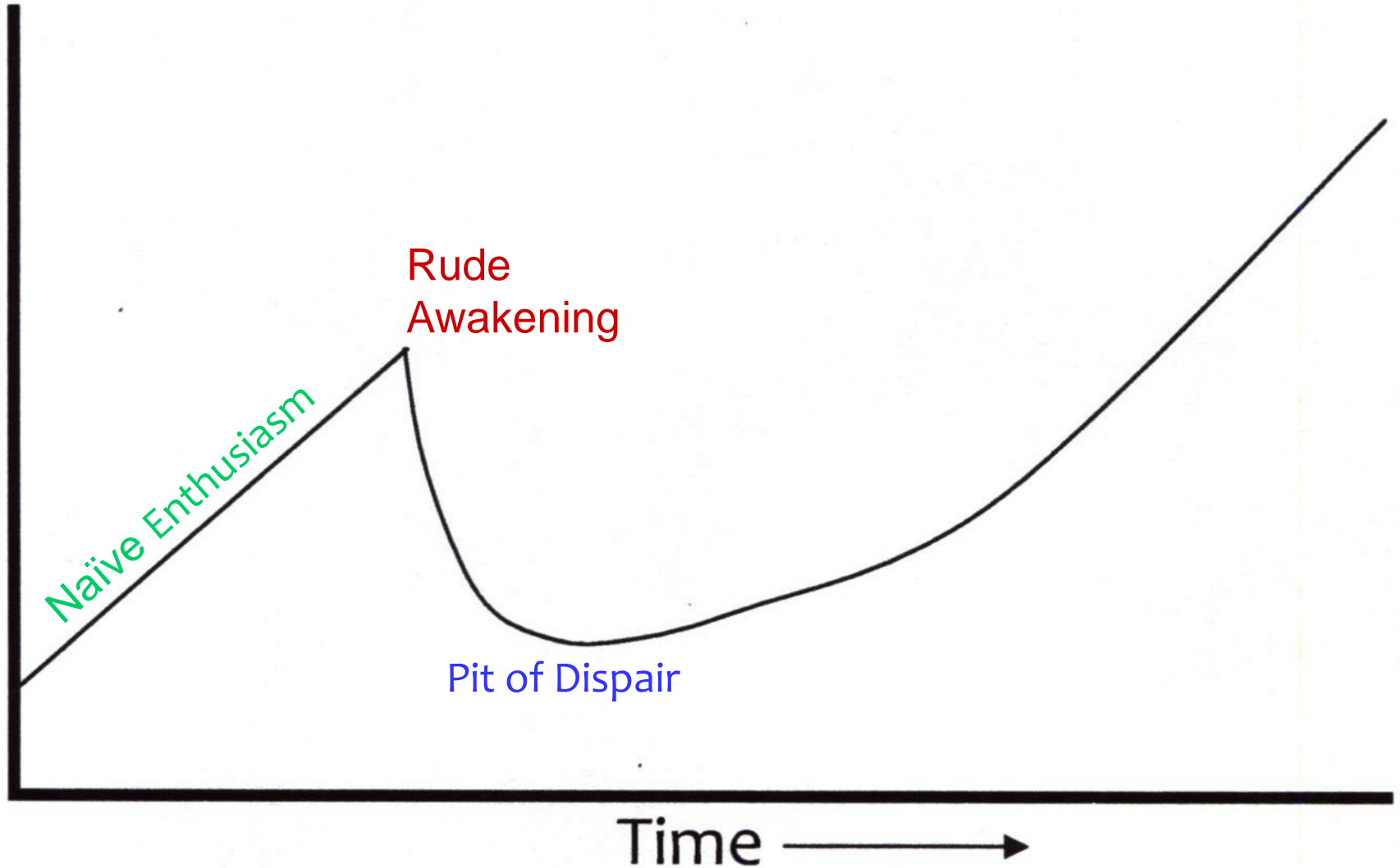
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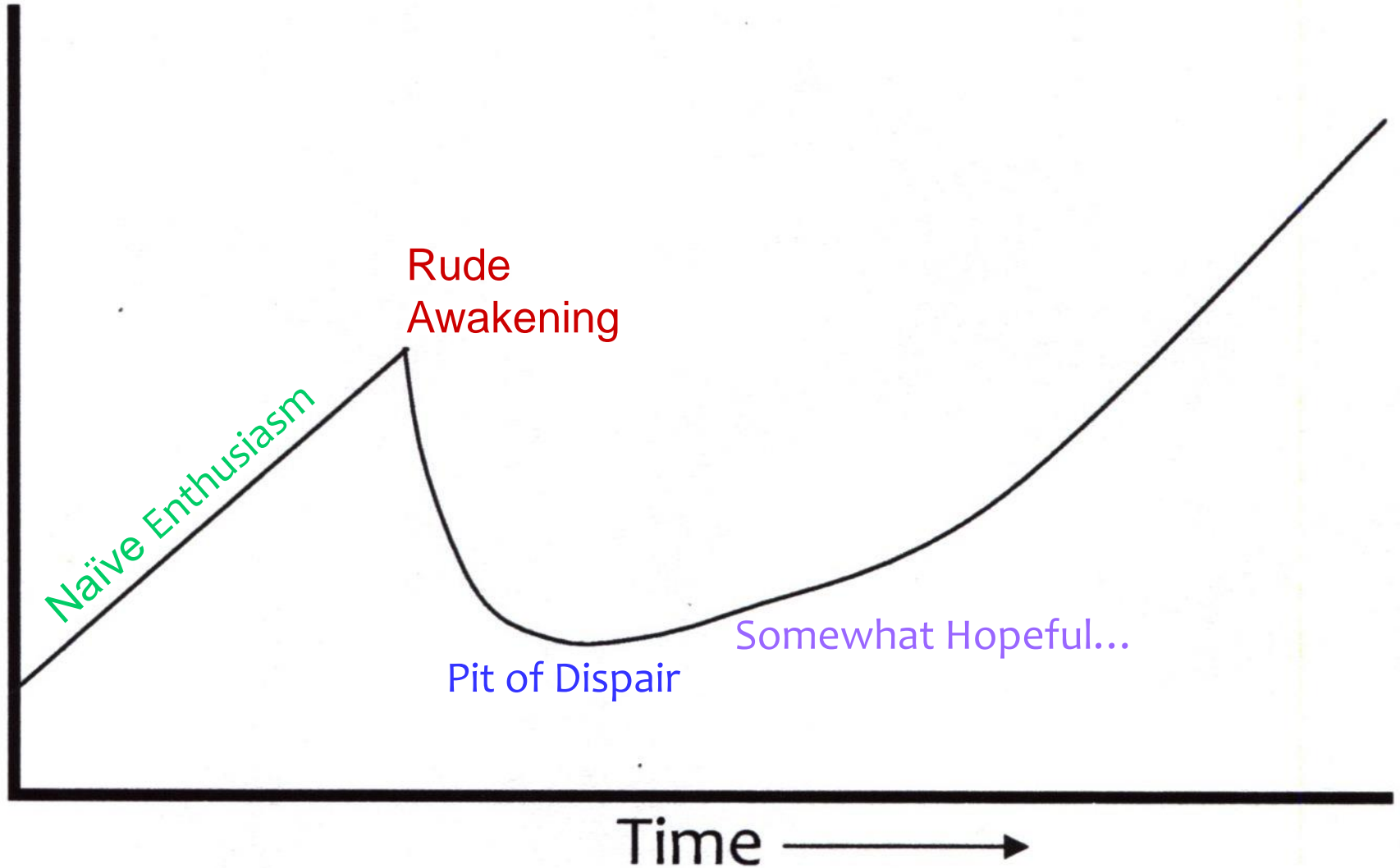
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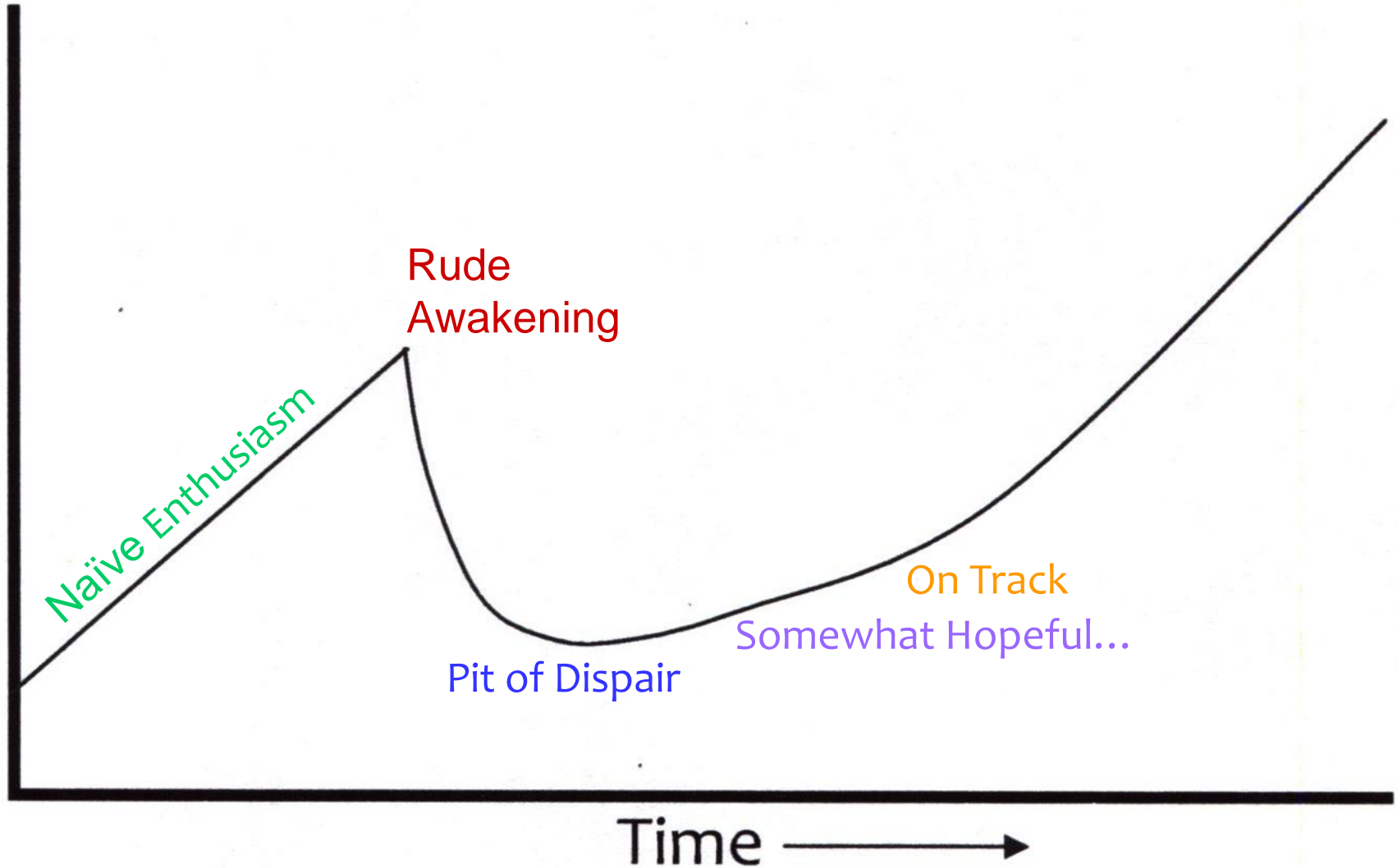
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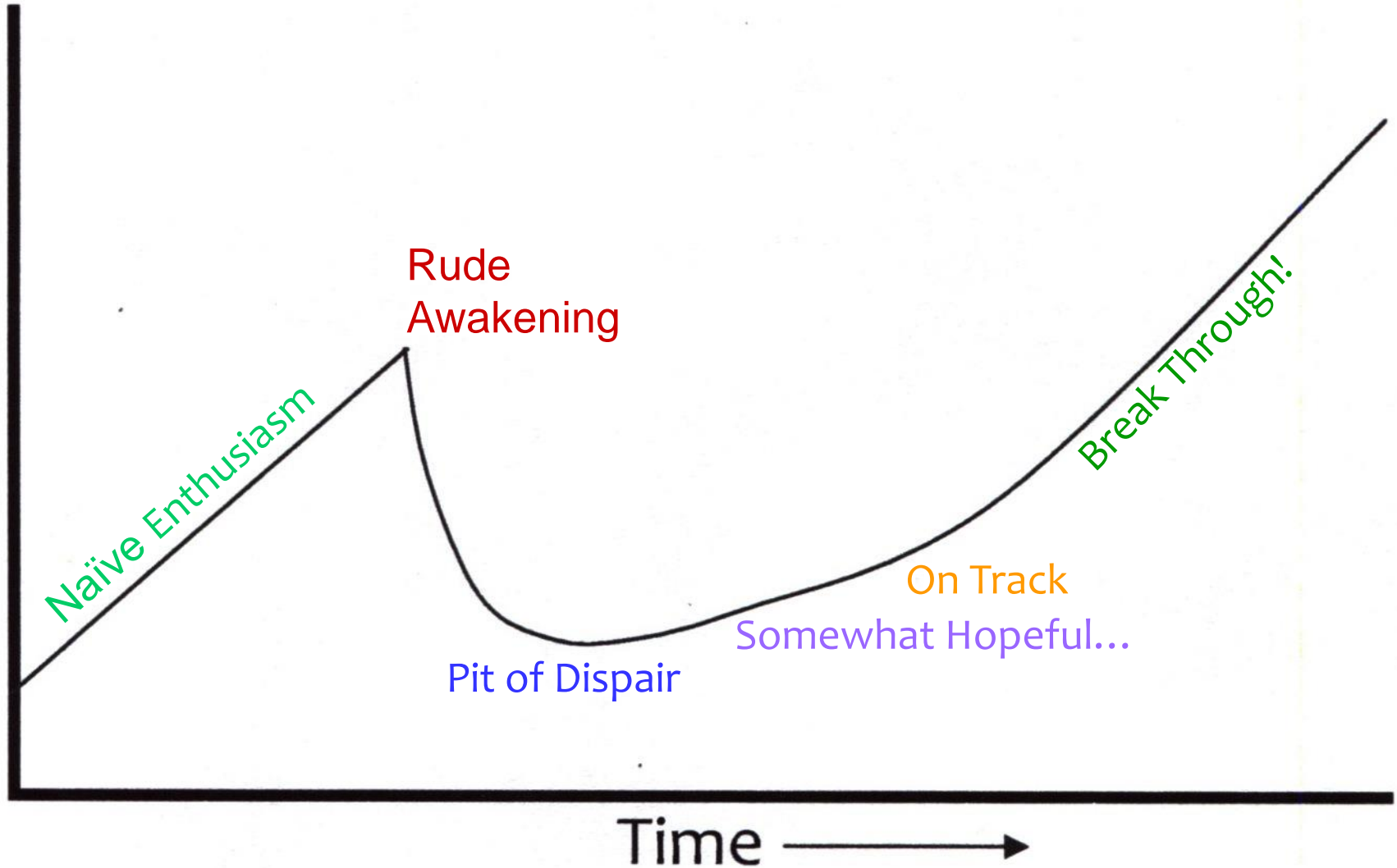
Reality Curve



Reality Curve



Reality Curve



Perspectives on Scale & Mechanization

- “I believe that profitable farms operate at 60-80% of the capacity of their invested resources (equipment package, hired labor, and land). More than this range does not allow for flexibility and will lead to break downs—of equipment, people, and land—less than this range and the operation will get buried in overhead.” —*Post to Market-Farming Listserv*
- “One farmer is only capable of managing 2.5 acres of intensive vegetables” —*Eliot Coleman*
- “Expand your farm because it **is** profitable, not to **make** it profitable.” —*Bart Hall, ATTRA*
- When you have reached the limits of a particular scale, do not expand, raise your prices. —*attributed to Eliot Coleman*

Resources

- Tractor Primer for the Beginning Market Farmer, Wisconsin School for Beginning Market Growers
- Market Farm Capitalization Budget Planning Guide, Wisconsin School for Beginning Market Growers
- Veggie Compass, University of Wisconsin
- Post Harvest Handling Decision Tool, Iowa State University
- Making Your Small Farm Profitable, Ron Macher
- The Organic Farmer's Business Handbook, Richard Wiswall
- Fearless Farm Finances, Midwest Organic and Sustainable Education Service (MOSES)
- Vern Grubinger, University of Vermont
 - Sustainable Vegetable Production: From Start-up to Market
 - Video series, especially Farmers and their Weed Control Machines
 - On-line resources

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