Planning and Implementation Frameworks
Creating Long-term Adaptation and Mitigation Plans

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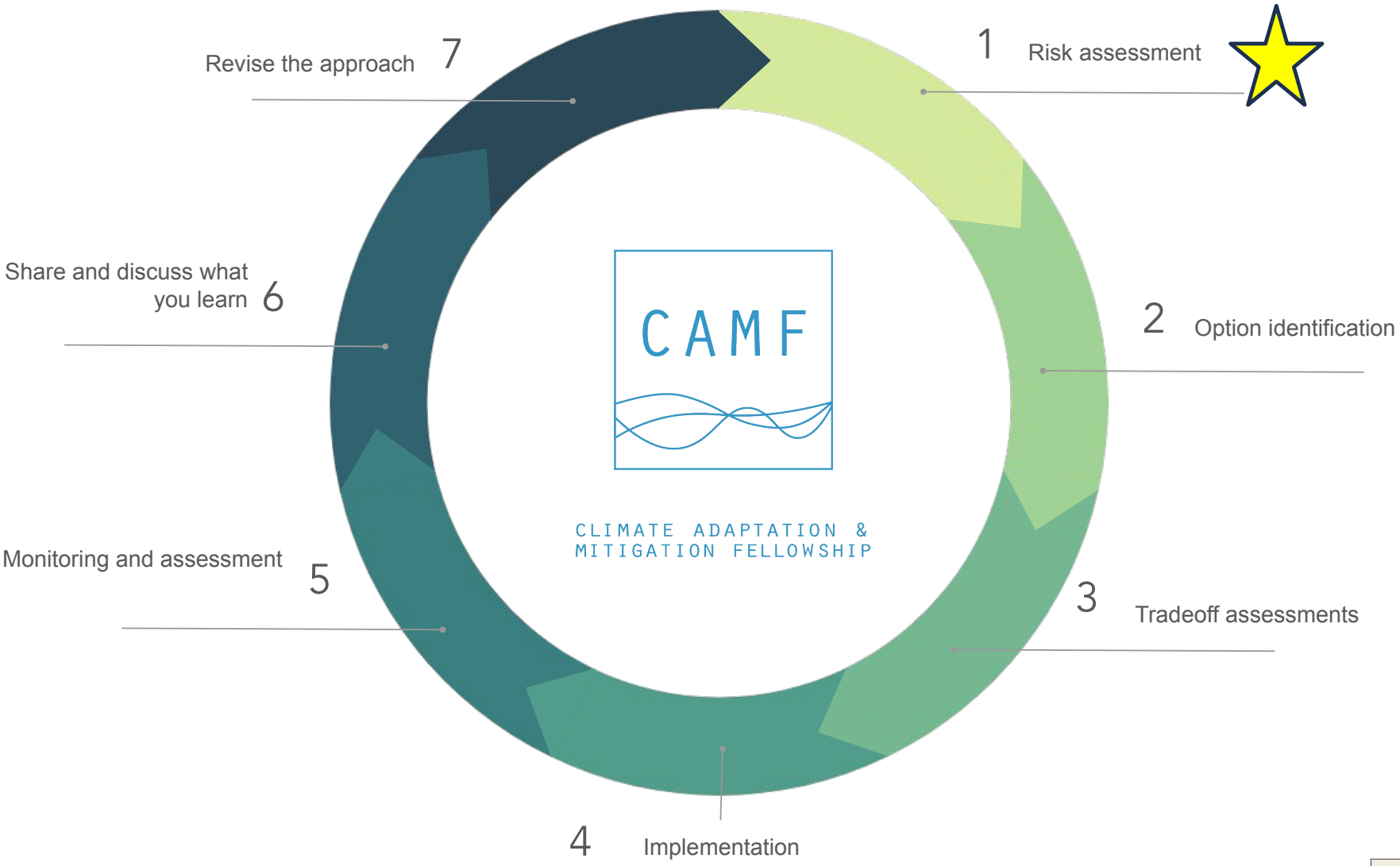
The Agroecology Lab

MAINE AGRICULTURAL AND FOREST EXPERIMENT STATION

What makes for an effective planning process?

Put your thoughts in the chat

Photo: Bumbleroot Farm (Schattman, 2021)



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Risks are well-known

In commodity crops, these risks are being used to inform projections in premium subsidy costs for federal crop insurance.

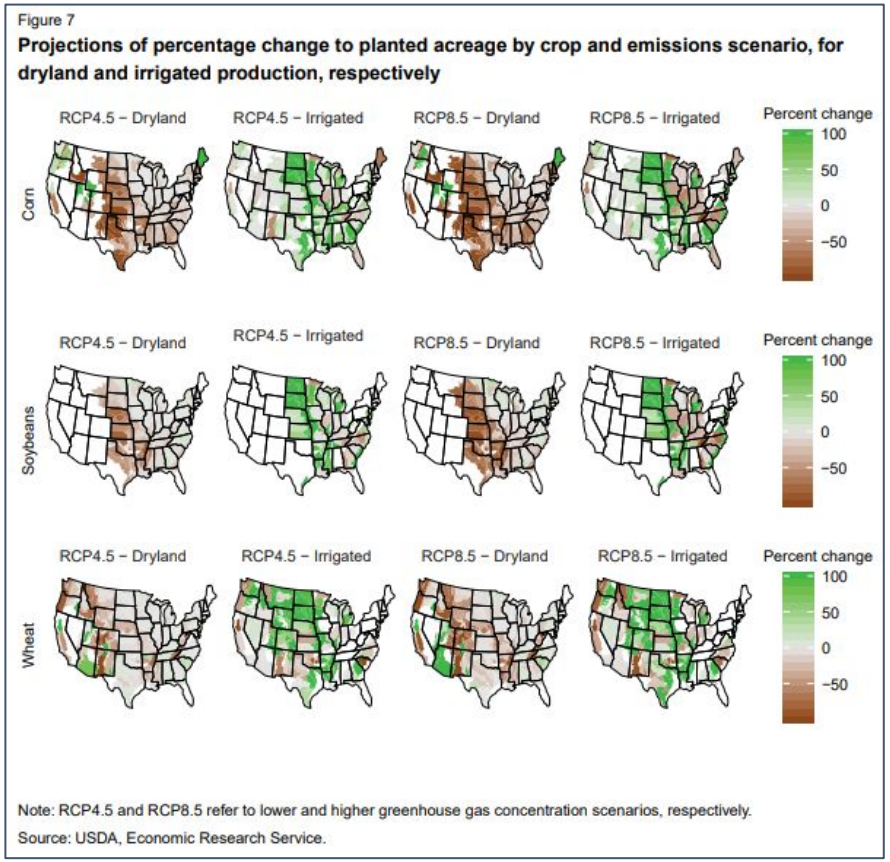
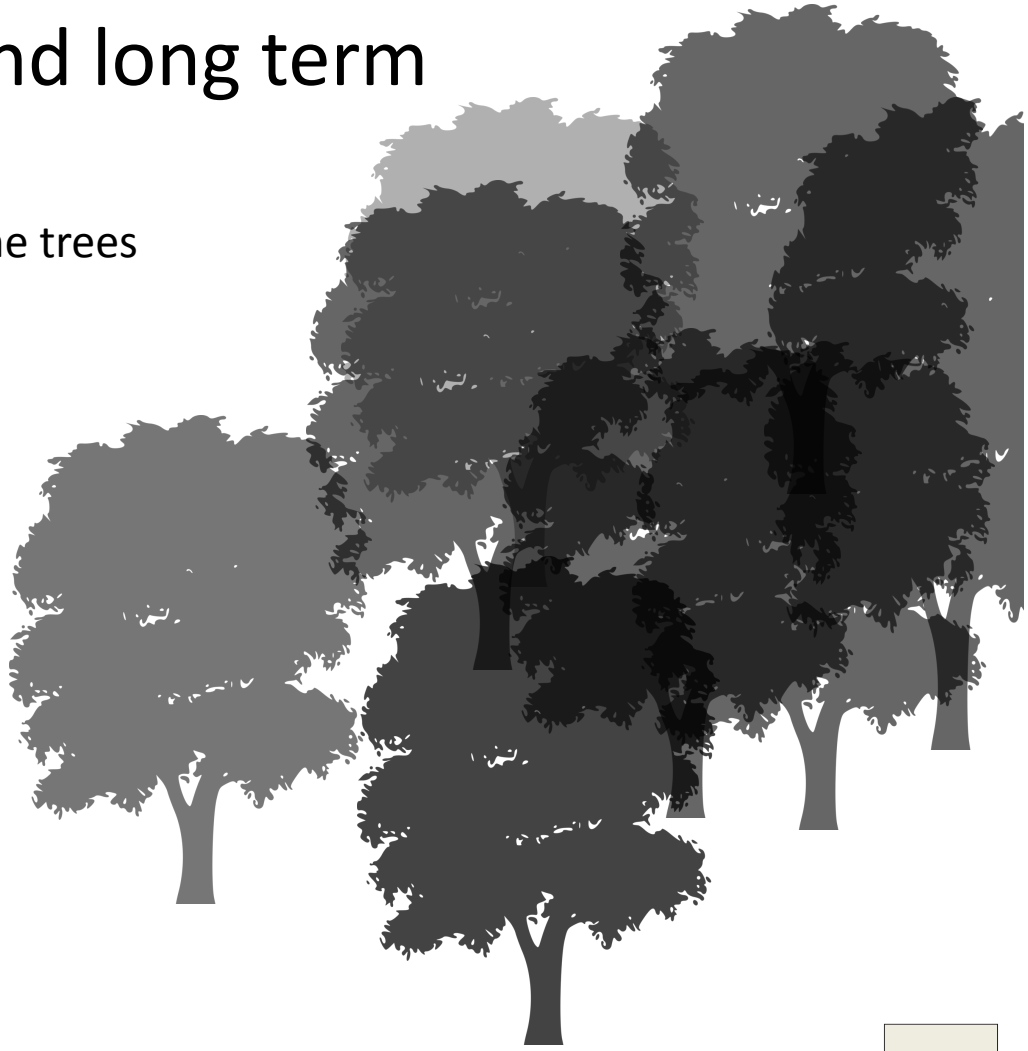


Figure source: Crane-Droesch et al. (2019). Climate Change and Agricultural Risk Management Into the 21st Century, ERR-266. USDA-ERS.

Localized risks - near and long term

It can be difficult to see the forests for the trees



Step 1. On-Farm Risk Assessment

last updated June 2024

Instructions: Start by considering the various climate change effects that could influence your farm. Choose climate risk factors from the "climate risk factor bank" in **row 12**, or add your own. Fill in **column B** with these risk factors. Use **column C** to consider the specific ways in which these risk factors will influence your operation or team. For example "winds from the southeast put high tunnels at risk on a regular basis." Use **column D** to brainstorm any *benefits* these changes may have. Use **column E** to note any resources you may have that can be used to address the risk. Finally, in **column F** rank these climate risk factors (**column B**) from the highest to lower risk to your farm.

Who is filling out this assessment:	
Farm name:	
Date:	
Climate risk factor bank	High temperatures, low temperatures, temperature swings, high precipitation, low precipitation, wind, extreme weather events, wildfire, flooding, pests and/or disease, supply chain disruptions, land prices, other climate risk factors that pertain to your farm

B	C	D	E	F
Climate Risk Factor	What concerns or problems does this create on the farm?	What benefits could we gain from this risk factor, if any?	What resources do we already have to address this risk?	Ranking of Risks (1 = highest risk; 7 = lowest risk). *Use each value only once, only list as many risks as you feel are important for your farm.*

On-Farm Risk Assessment:

Climate Adaptation Fellows 2021

Ben Crockett- The Morrison Center

Jason Lilley- UMaine Extension

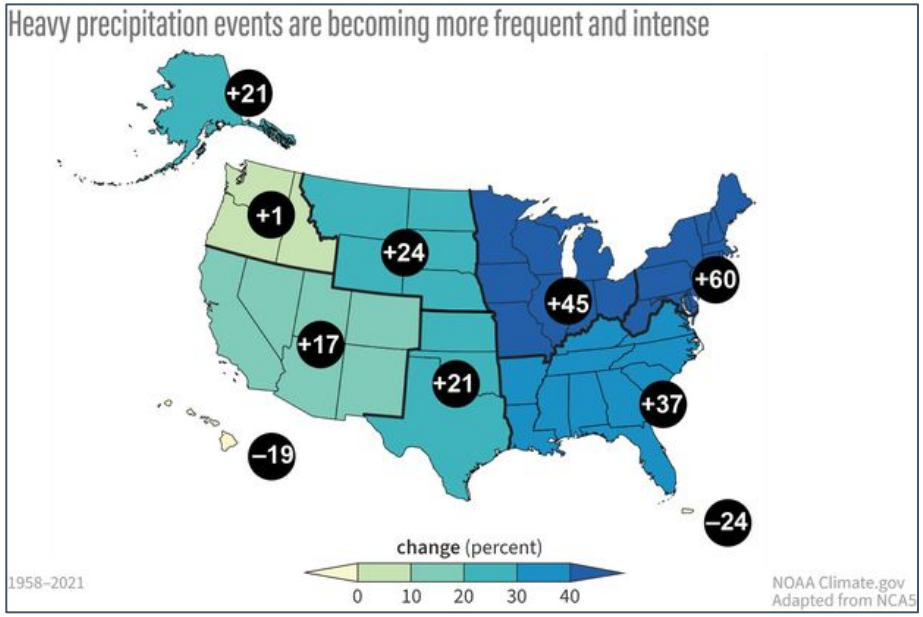
Assessment of Highest Climate Risks and Concerns

Climate Risk Component	Positive/ Resiliency	Concern	Level of Risk and Need for Adaptation Strategy Ranking (high, mid, low Or whatever ranking systems makes the most sense)
Wind	Wind power?	High Winds from East/Southeast Direction	
		Crop Lodging	
		Excess drying from plants and soil	
		Wind erosion	
		Infrastructure damage	
Heat		Strain on labor	
		Reduced shelf-life/post-harvest quality	
		Increase demand on irrigation/water	

Risk Intensity

Heavy rain	= 1.2 - 2.8”/day
Very heavy rain	= 2.8 - 5.9”/day
Extremely heavy rain	≥ 5.9”/day

Rainfall intensity x soil infiltration rate x time = risk of saturation



How much “lost production” can an operation withstand?

Image credits: Left bottom, unknown; right bottom, Vern Grubinger; right top, NOAA Climate.gov, NCA5.

Risk Exposure

Reoccuring weather-related events that have negative effects on a specific operation either because of **WHERE** they are or **WHAT** they produce.

A farm that doesn't grow brassicas is likely not susceptible to black rot, which is made much worse by persistent rain.

A farm that isn't located in a floodplain probably doesn't need to worry about flooding.

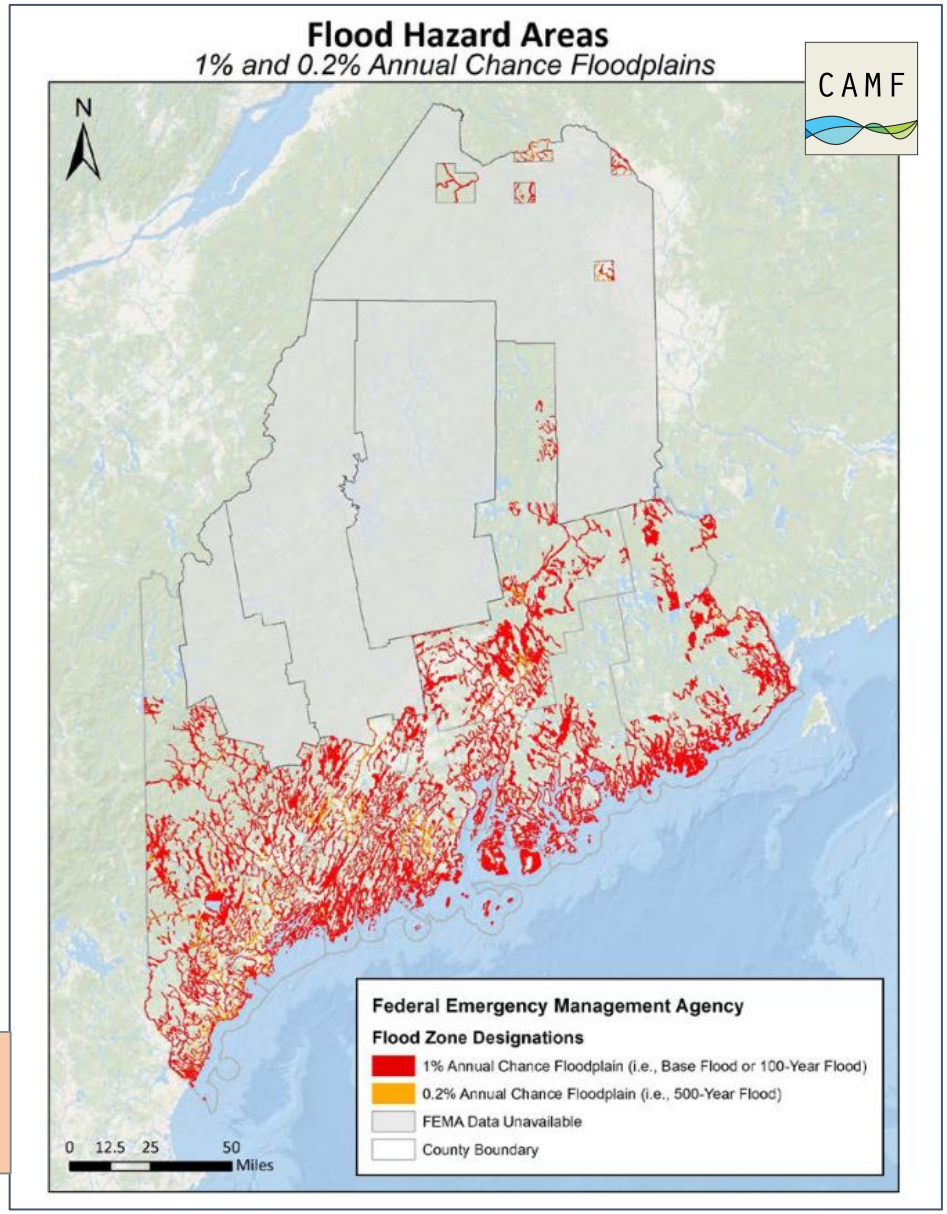
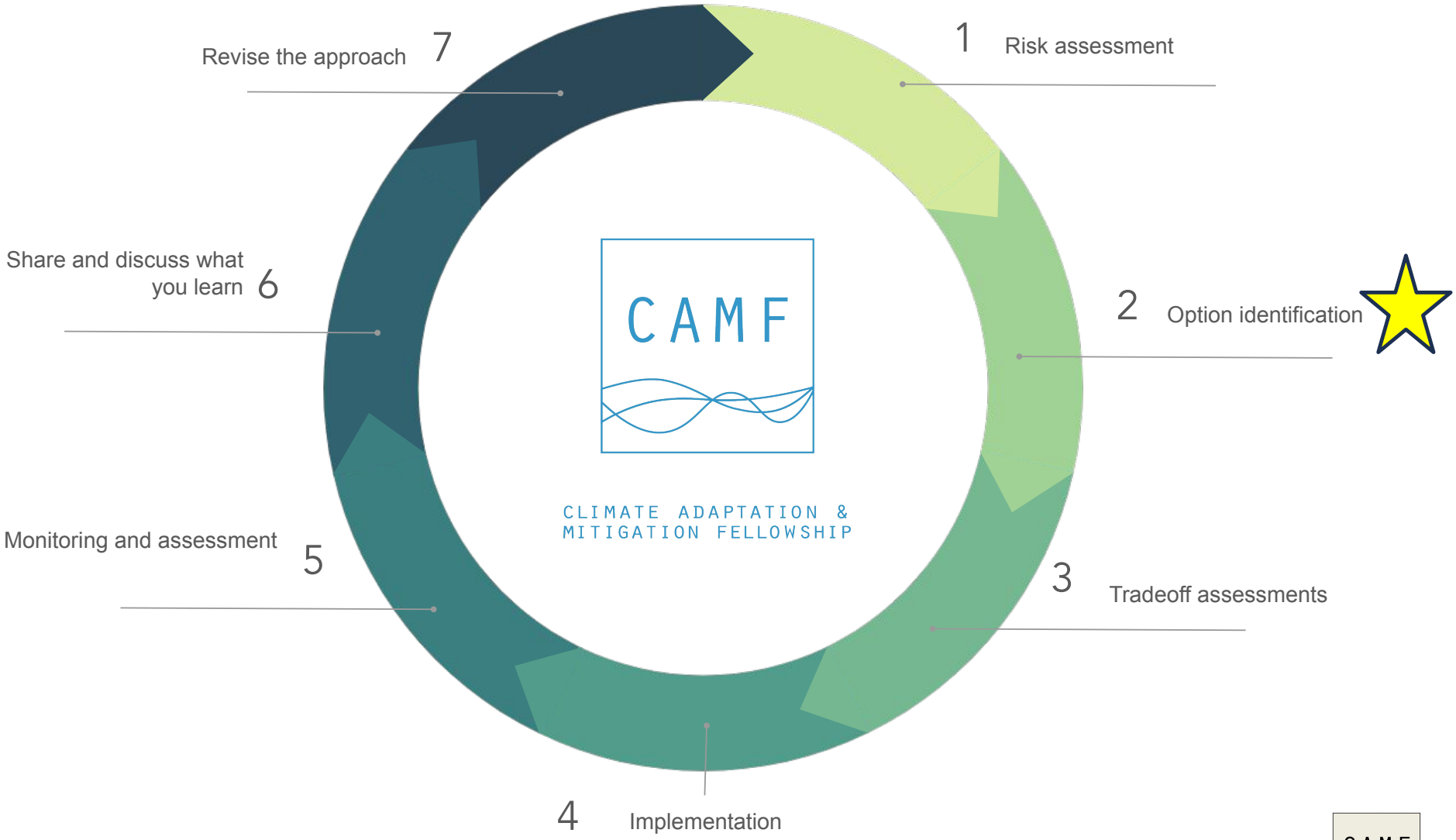


Image credits: Brassica black rot from University of Madison Wisconsin Extension; map of riverine and coastal flood risk from Maine.gov.future



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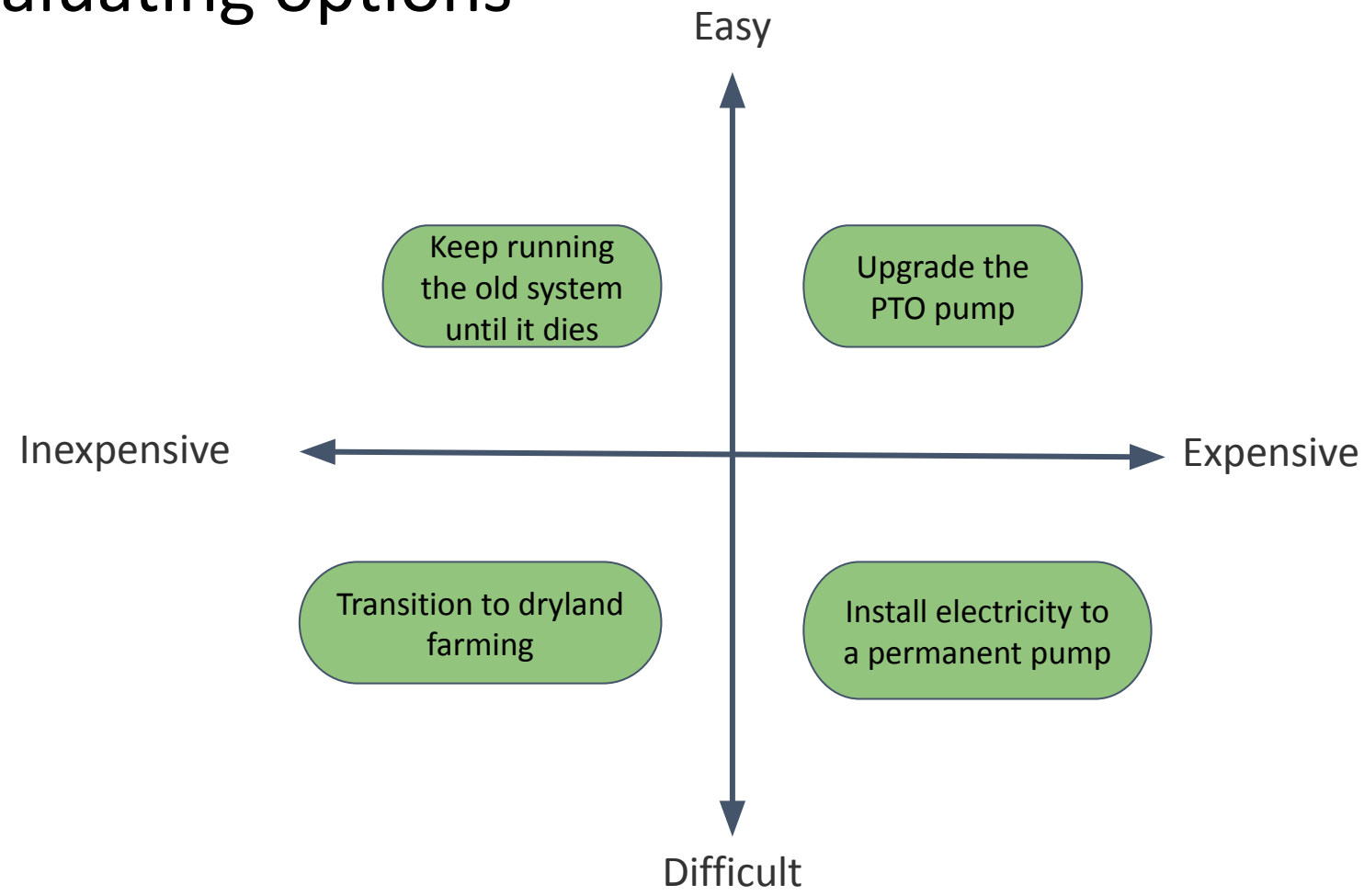
Step 2: Options should be aligned with the most pressing risks x each farms particular vulnerabilities

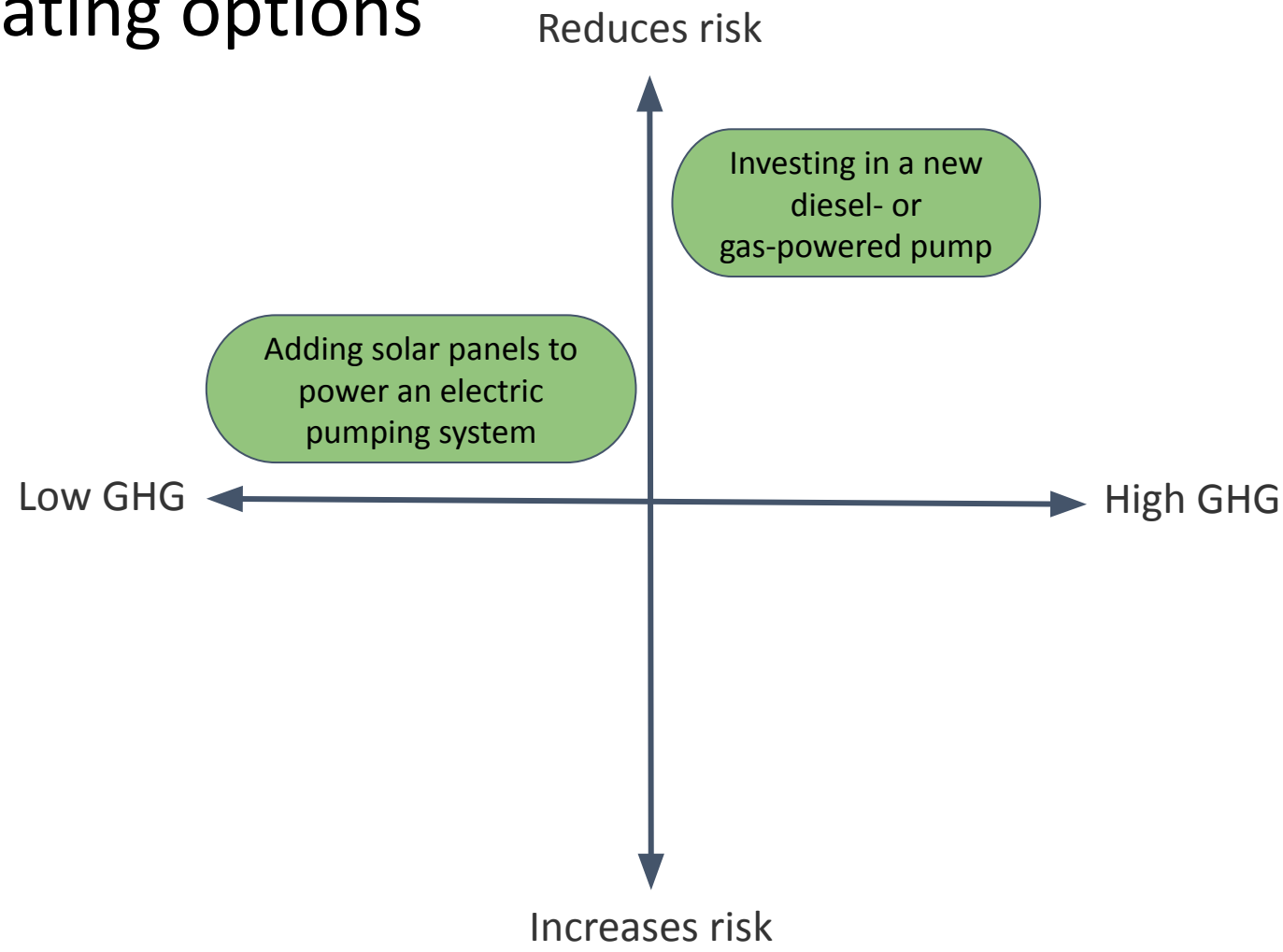
Consider:

- Different farm locations / microclimates
- Different crop or livestock requirements
- The time period in which you are vulnerable
- The tools you have available to either (a) reduce or (b) recover from the risk

Evaluating options



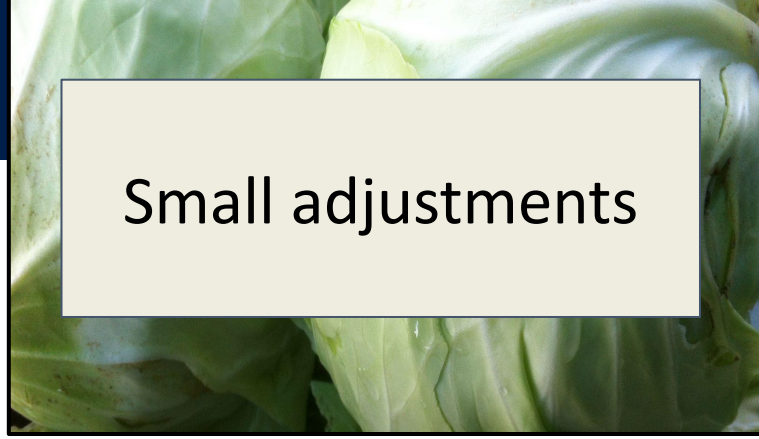
Evaluating options

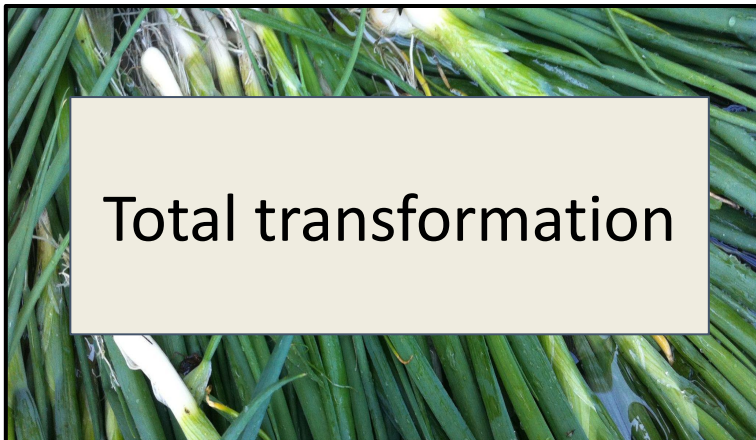


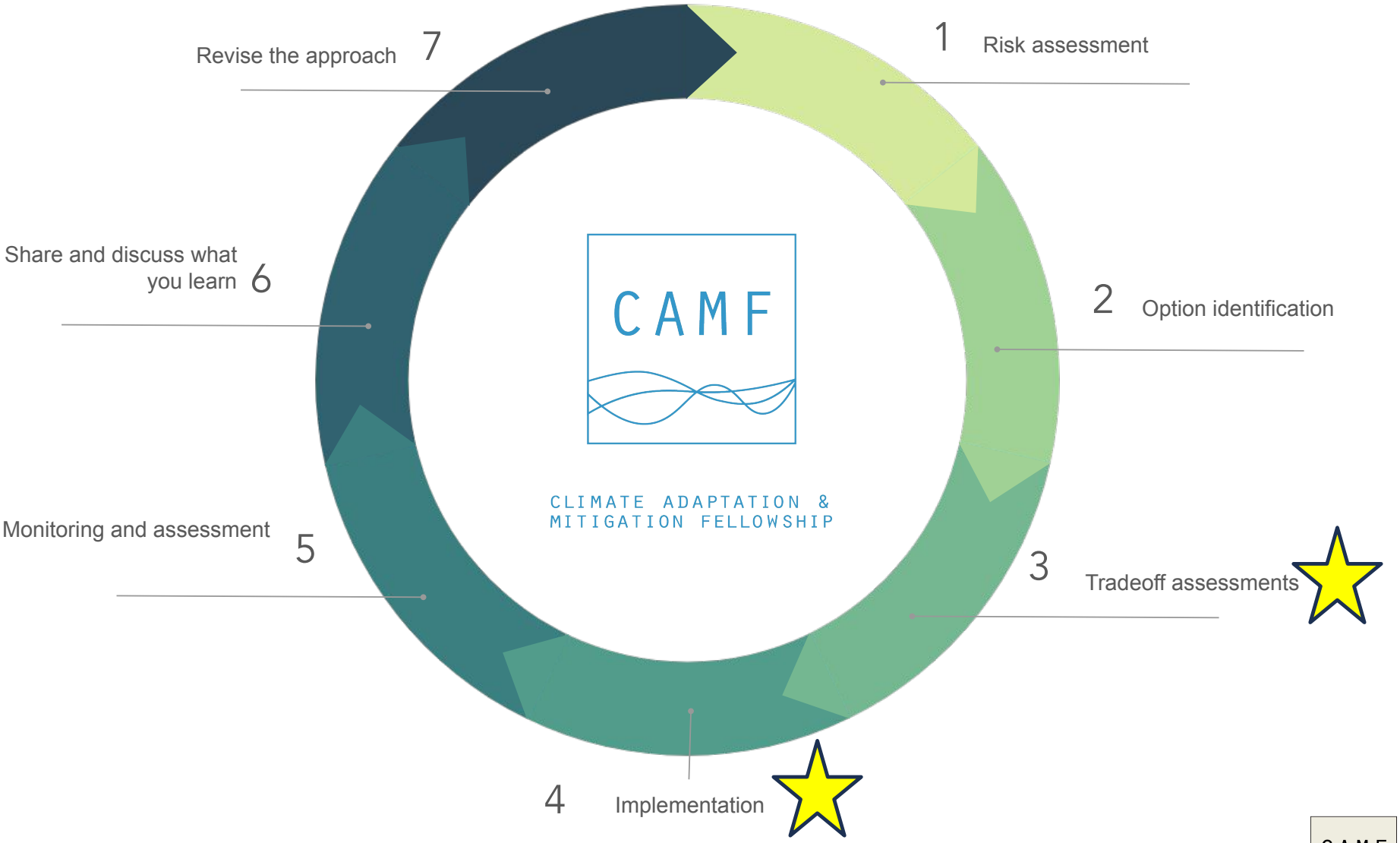
Are all options on the table?

Options can be small or dramatic, depending on your need and current situation.

What options are you not considering?







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Understanding tradeoffs requires… *DATA* (including financial data)

Adaptation or mitigation strategy #1:

Increase in income			
Item	Units	Unit income	Extended income
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total increase in income			**$ -**

Increase in cost			
Item	Units	Unit cost	Extended cost
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total increase in cost			**$ -**

Decrease in income			
Item	Units	Unit income	Extended income
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total decrease in income			**$ -**

Decrease in cost			
Item	Units	Unit cost	Extended cost
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
			$ -
Total decrease in cost			**$ -**

Change in income
$ -

Change in cost
$ -

Change in net income
$ -

An example of a partial budget that shows net (financial) benefits associated with switching to grafted greenhouse tomatoes

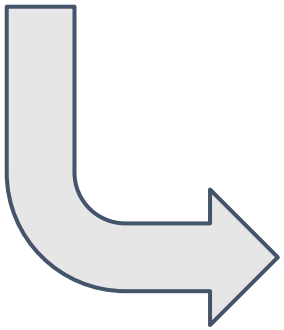
Increase in Income		Increase in Cost	
Additional 1500# of tomatoes/year @ $2/#	$3,000	Geronimo and Maxifort seeds ($2/plant)	$180
		Grafting domes	$50
		Mister	$10
		Grafting clips	$20
		Additional labor, 25 hrs. @15/hr.	$375
		Extra greenhouse propane - 4 weeks of heat	$600
Total increase in income	**$3,000**	**Total increase in cost**	**$1,235**
Decrease in Income		**Decrease in Cost**	
None		No purchase of Early Girl seeds ($0.25/plant)	$23
Total decrease in income	**$0**	**Total decrease in cost**	**$23**
Change in income		**Change in Cost**	
$3,000		$1,212	

Change in Net Income
$1,788

Image credit: Wikimedia commons

Non-monetary trade-offs also factor into our decisions

	Adaptation / mitigation strategy	Change in net income for each strategy (from **Step 3a)**	How many concerns or problems (from **Step 1** Risk assessment, column B) does this practice address?	Non- monetary benefits		Non- monetary costs	
				Ecological benefits of this strategy	Social or community benefits of this strategy	Ecological costs of this strategy	Social or community costs of this strategy
1		*$0.00*					
2		*$0.00*					
3		*$0.00*					
4		*$0.00*					



Non- monetary benefits		Non- monetary costs	
Ecological benefits of this strategy	Social or community benefits of this strategy	Ecological costs of this strategy	Social or community costs of this strategy

What about implementation?

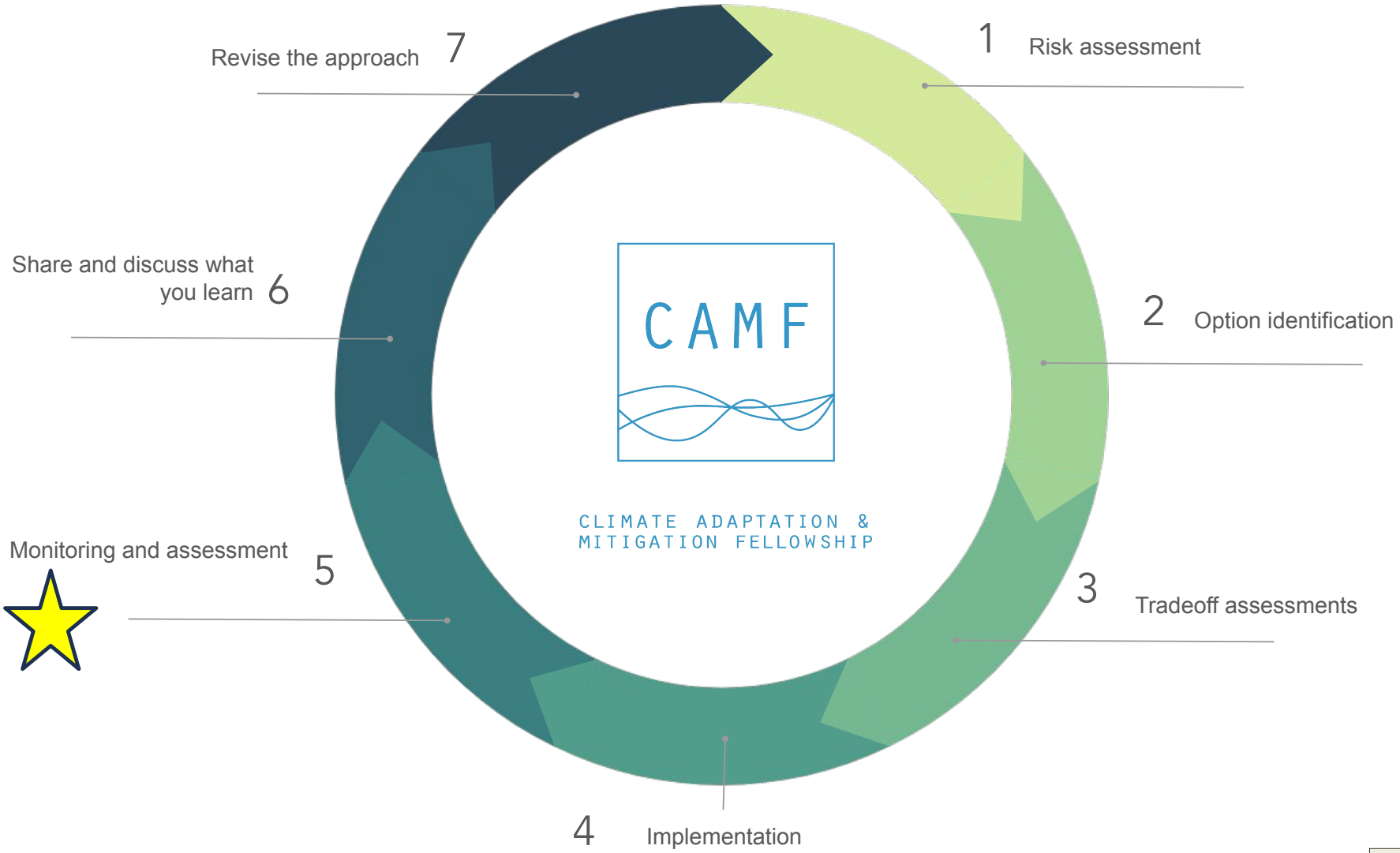
Implementation looks different depending on the practice, the time frame, and the farm.

Implement however it makes sense to you, given your particular circumstances.

A particular practice may help you address more than one vulnerability or risk.

If you are unsure of how to proceed, put together a “team” or develop relationships with those who have already tried something.

Photo credits: Becky Maden (top); Alex Scearce (middle); Rachel Schattman (bottom)



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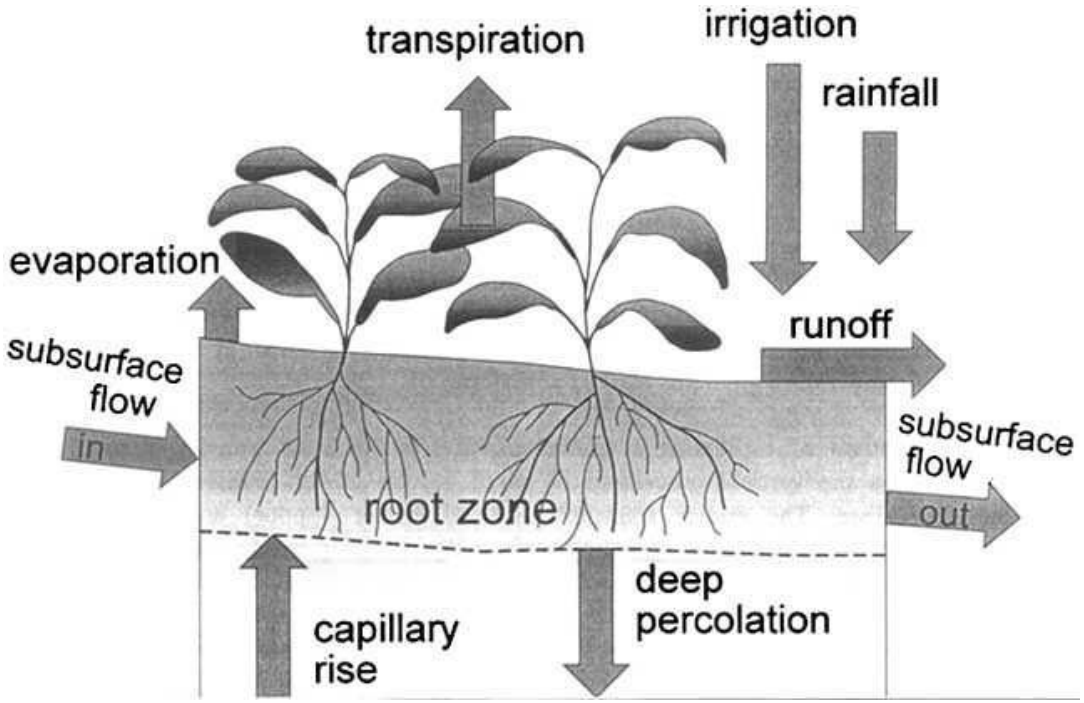
Step 5: Monitoring and Assessment

- How do you know you're making progress?
- What information do you need?
- How are you going to get it?

Image description: CAMF Leadership Team member, Joshua Faulkner, installs a Netafim water meter on an irrigation system in S. Burlington, VT. **Photo credit:** Rachel Schattman

Example: Soil water content as an indicator of soil health and/or crop performance potential



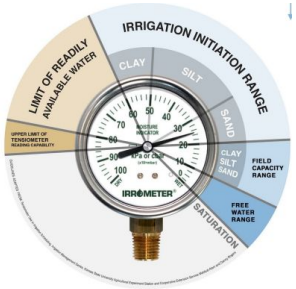
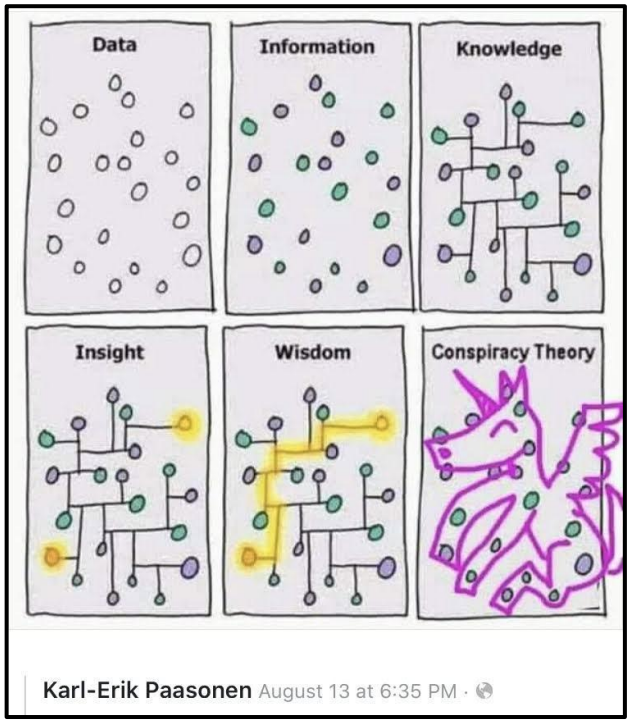


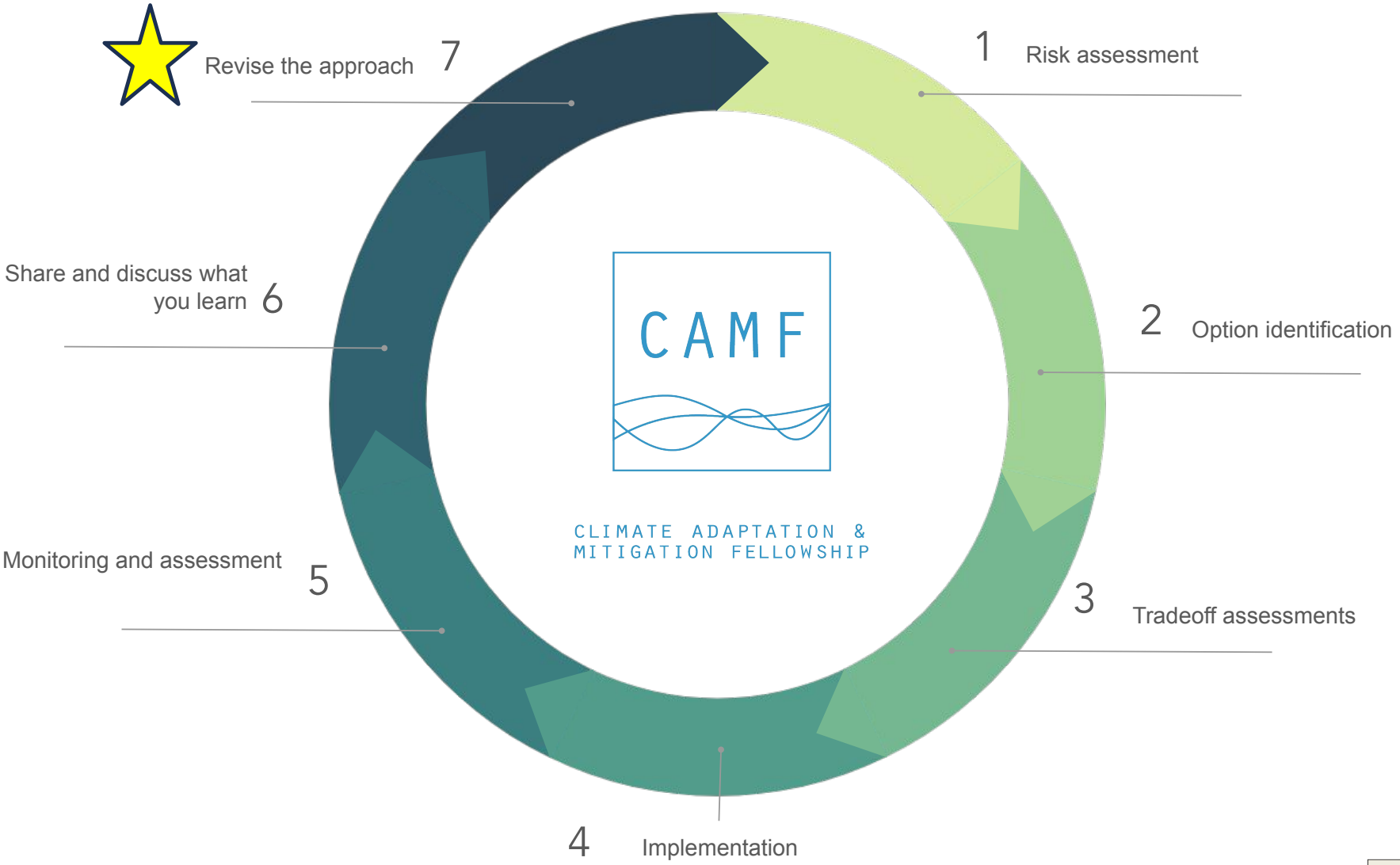
Image credits: Water movement through soil and cropping systems (FAO); tensiometer, watermark sensor, and pressure dial (Irrometer)

Tracking conditions over time helps you understand whether things are improving… or not.

Image: Travis Dillard makes notes on a large wild blueberry transplant effort in Old Town Maine (Kylie Holt)

Build in time to reflect and assess





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Food for thought:

- What are the characteristics of a good planning process?
- What does “success” look like in a planning process?
- Are you ever “done” planning? If not, what are the major milestones you look for?
- Should climate adaptation/mitigation planning stand alone? Or should it be integrated into other planning activities?

Thank you!

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