



**THE BULLVINE**

PRACTICAL FIELD GUIDE / FORAGE & MARGIN / EDITION 1

# From Forage Test to Feed Margin.

**The Bullvine Practical Guide to  
Turning Lab Results into Ration Decisions.**

A practical decision guide for turning forage lab results  
into milk, ration, and margin action.

**“The lab report is not the decision.  
It's the starting gun.”**

— THE BULLVINE

**GET STARTED**

**Run your forage numbers:**

<https://thebullvine.com/tools/BullvineForageQualityValueCalculator.html>

Link is clickable. Tap to open in browser.

## WHAT'S INSIDE

# A field-ready playbook for forage decisions.

This guide takes a forage lab result and a Bullvine Forage Quality Value Calculator output and turns them into ration, group, and margin decisions. It is built to live on the kitchen table beside the lab report — not in a folder.

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**How to use this guide.** This is a decision-support tool, not a ration model. Final ration changes belong with your nutritionist and a current model run (NASEM 2021 or equivalent).<sup>6</sup> Milk-response numbers from any calculator — including The Bullvine's — must be validated against your farm's ration balance, cow group, forage inventory, and price assumptions before action. This guide does not give medical or animal-health advice beyond general nutrition management.

## 01

THE BRIDGE

## Article &gt; Calculator &gt; Decision

Most forage "insights" die at the lab report. You get a paper, a PDF, a few highlighted values, and then... nothing changes in the bunk. That gap is what this guide closes.

## 1

ARTICLE

### Understand why forage quality moves margin

The 2026 nutrition shift: NASEM 2021 dynamic models, NDFd30, uNDF240, and feed efficiency — not just NDF and CP.<sup>1,6</sup>

Open &gt;

## 2

CALCULATOR

### Quantify cost, milk response, margin

Plug in lab values, milk price, DMI and inclusion. Get score, shrink-adjusted cost, net margin, break-even, bottleneck.<sup>2</sup>

Open &gt;

## 3

THIS GUIDE

### Decide what to do next

Map the result to a cow group, fix the bottleneck, change what you buy or grow next, and document the call.

**“Cheap forage gets expensive fast when it drags milk, intake, or margin.”**

## WHY 2026 LOOKS DIFFERENT

## From static tables to dynamic models

Dairy nutrition has moved away from static NRC 2001-style ration tables toward NASEM 2021 dynamic intake and nutrient-response modeling.<sup>1,6</sup> That means forage kinetics — how fast and how completely fiber digests in the rumen — now drives more of the ration decision than NDF on its own. Two forages with the same NDF and CP can differ materially in DMI and milk if NDFd is different.<sup>4</sup>

**Sources on this page:** <sup>1</sup> Bullvine 2026 nutrition pillar <sup>2</sup> Bullvine Forage Quality Value Calculator <sup>4</sup> University of Wisconsin — NDF digestibility <sup>6</sup> NASEM 2021. Full URLs in the Sources list on the final pages.

## 02

## READING THE CALCULATOR

## Your output in 60 seconds

Six numbers tell you almost everything you need to know about a forage. Read them in this order — then go to the decision tree.

#	OUTPUT	WHAT IT TELLS YOU	ACTION TRIGGER
1	Forage Quality Score (0-100)	Composite of digestibility, fill, energy, protein, cost. Weighted: 30/20/20/10/20.	>=75 push it; 55-74 use strategically; <55 limit or reformulate.
2	Cost per ton DM	Strips out moisture so you compare on actual nutrient mass.	Always cite DM cost. As-fed price hides water.
3	Shrink-adjusted DM cost	DM cost / (1 – shrink %). Real cost of what reaches the cow.	If shrink is 20% the real cost is roughly 25% higher than DM cost.
4	Net margin / cow / day	Milk response value + replacement-feed offset – forage cost.	Positive and stable > keep. Negative > fix or reroute.
5	Annual herd impact	Net margin x herd size x 365.	Anchors the conversation in dollars per year, not cents per cow.
6	Break-even milk response	(Adj. feed cost – replacement cost) / (milk \$/cwt / 100).	If expected response is below break-even, the forage isn't earning.

## CLASSIFICATION BANDS

**Green push, Yellow use strategically, Red limit or reformulate**

**[+][+] GREEN — PUSH**

**Build your high-group ration around it.**

**CRITERIA**  
 Score  $\geq 75$  AND shrink-adjusted cost  $\leq$  replacement cost.

**DECISION**  
 Allocate to high pen first. Lock supply if seasonal.

**[o][o] YELLOW — STRATEGIC**

**Belongs in mid group, dilution, or with offsets.**

**CRITERIA**  
 Score 55-74, OR  $\geq 75$  with a cost premium.

**DECISION**  
 Pair with high-digestibility forage; recheck after price moves.

**[-][-] RED — LIMIT / FIX**

**Heifers, dry cows, sell, or fix shrink.**

**CRITERIA**  
 Score  $< 55$ , shrink  $> 20\%$ , OR cost  $>$  replacement and break-even unrealistic.

**DECISION**  
 Don't feed to high group. Address shrink, or reprice.

**Accessibility note:** shape and text labels are paired with color. Green = upward triangles, Yellow = circles, Red = squares.

## REFERENCE TARGETS

## Forage quality targets cited by the calculator

Use these as a starting point, not law. Targets are pulled from The Bullvine pillar article and the calculator's elite-band logic.<sup>1,2</sup> NDF digestibility cannot be compared across incubation windows — a 30-hour value is not directly comparable to a 48-hour value.<sup>4</sup>

METRIC	ELITE / TARGET	WATCH-OUT	WHAT IT DRIVES
NDFd30 (corn silage)	>55-58%	<50% drags intake	Digestible fiber, DMI, milk
uNDF240 (% DM)	<10% DM	>11-12% = fill limit	Rumen fill, intake ceiling
IVSD (in-vitro starch digestibility)	>75%	<65% = poor starch use	Energy capture, milk
Starch (% DM, corn silage)	30-35% typical	Highly variable — test	Energy density
Crude protein (% DM, haylage)	18-22%	Big swings season to season	RUP/RDP balance
DM (silage, as-fed)	32-38% typical	Test before/during harvest + 2x/week feedout	Ration consistency
Shrink (DM loss)	<10% ideal	20% DM loss can look like 2.8% as-fed shrink	Real cost / ton

## THE MATH IN PLAIN ENGLISH

## What the calculator is actually doing

<b>DM cost / ton</b>	= as-fed cost / DM %
<b>Shrink-adjusted DM cost</b>	= DM cost / (1 - shrink %)
<b>Daily forage DM intake</b>	= total DMI x forage inclusion %
<b>Feed cost / cow / day</b>	= (daily forage DM lb / 2,000) x shrink-adjusted DM cost
<b>Milk response value</b>	= expected milk response lb x milk value \$/cwt / 100
<b>Net margin / cow / day</b>	= milk response value + replacement-feed offset
<b>Annual herd impact</b>	= net margin x herd size x 365
<b>Break-even milk response</b>	= max(0, shrink-adj. feed cost - replacement cost) / (milk value / 100)
<b>Score</b>	= 0.30*Digestibility + 0.20*Fill + 0.20*Energy + 0.10*Protein + 0.20*Cost

DM-basis pricing is the only valid way to compare two forages — rations are formulated on DM but fed as-fed, so as-fed prices hide moisture.<sup>3</sup> Shrink, as Wisconsin extension notes, is a deceptive term: 20% DM loss can show up as ~2.8% as-fed shrink in some scenarios.<sup>5</sup>

**03**

## THE FRAMEWORK

**5 questions before any forage decision****01****Is this forage biologically strong enough for high cows?**

Score  $\geq 75$ , NDFd30  $> 55\%$ , uNDF240  $< 10\%$ , IVSD  $> 75\%$ . If two of those fail, it's not a high-group forage.

**02****Is the shrink-adjusted cost still defensible?**

Compare shrink-adjusted DM cost to your replacement feed cost. If higher, the discount is gone.

**03****Does expected milk response beat break-even?**

Be honest about the lb response. If it can't credibly clear the break-even line, you're farming hope.

**04****What ration group should get first access?**

Green = high group. Yellow = mid / dilution. Red = heifers, dry, or out the door.

**05****What changes before the next crop or purchase?**

Document one thing — harvest timing, processing, hybrid choice, storage face, contract spec — to fix next round.

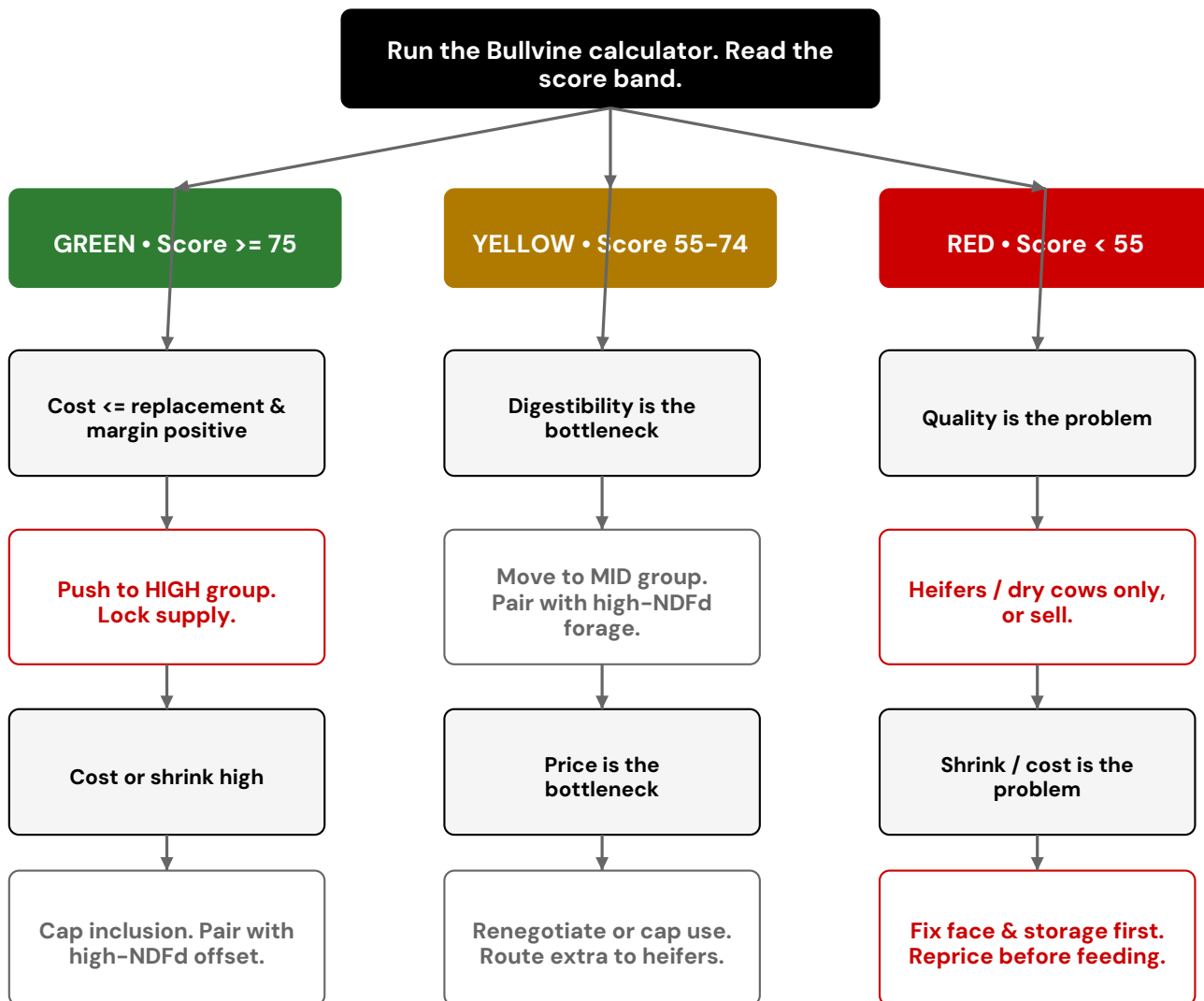
**“The ration doesn't care what the crop cost to grow. It cares what the cow can turn into milk.”**

# 04

ONE-PAGE DECISION TREE

## From calculator output to next action

Start at the top with your calculator's score band. Walk down the matching path to a specific action.



**If advanced lab values (NDFd30 / uNDF240 / IVSD) are MISSING: don't push the forage. Re-test before any high-group decision.**

**Legend.** Black box = decision input. Red action = priority next step. Grey = verify with nutritionist before changing the ration.

# 05

WHERE THIS FORAGE FITS

## Ration group guidance matrix

The fastest gain from a lab result is matching the right forage to the right pen. This matrix is the starting point — your nutritionist owns the final call.

GROUP	BEST-FIT FORAGE PROFILE	WATCH-OUTS	ASK NUTRITIONIST	BUSINESS IMPLICATION
<b>High group</b>	Score >=75, NDFd30 >55%, uNDF240 <10%, IVSD >75%, low shrink.	Don't substitute on price alone; protect inventory; consistency is more valuable than peak score.	How much can we lean on this without losing rumen function or stability?	Highest return on each lb of forage DM; protect supply and contract early.
<b>Mid group</b>	Score 55-74, decent digestibility, modest shrink, fair cost.	Watch for swings as the bunker face changes; recheck after price moves.	What pairing or offset gets us back toward high-group performance?	Workhorse pen — small ration tweaks earn meaningful dollars at scale.
<b>Low group / late lactation</b>	Lower-digestibility forage that still tests safe; ideally lower cost.	Don't drag mid-group production by mistake; intake matters here too.	Where is body-condition risk if energy density drops further?	Maintenance, not push. Margin from cost control, not milk.
<b>Heifers</b>	Lower-energy, palatable, lower-cost; storage-stable.	Don't overfeed energy; mineral balance still matters.	Are growth targets on track with current ration density?	Hidden cost line — efficiency here compounds over years.
<b>Dry cows / close-up</b>	Controlled energy, low-K options, clean fermentation.	Transition health risk; precision is non-negotiable.	Does this forage fit DCAD and starch limits for close-up?	A bad dry-cow forage costs you fresh-cow performance, not pennies.
<b>Limit / reroute</b>	Score <55, shrink >20%, cost > replacement.	Don't "use it up" on milking cows because it's already paid for.	Is the cost of feeding it higher than the cost of selling or replacing it?	Cut losses early. Sunk cost is sunk.

# 06

BOTTLENECK PLAYBOOKS

## Six fixes for the calculator's #1 problem

The calculator flags one key bottleneck. Use these one-page playbooks to fix it now and again next cycle.

<b>DIGESTIBILITY</b>	<b>NDFd30 / IVSD low.</b>
<b>WHAT IT USUALLY MEANS</b>	Means: fiber digests slowly or starch isn't being captured. Drags DMI and milk. <sup>4</sup>
<b>WHAT TO VERIFY</b>	Confirm incubation window matches your benchmark; rerun on a fresh sample; check processing score.
<b>ASK NUTRITIONIST</b>	Can we dilute with a higher-NDFd forage in the high pen and re-balance starch?
<b>ACTION NOW</b>	Move forage to mid/low group; pair with a higher-NDFd source; tighten high-group inclusion.
<b>CHANGE NEXT CROP / PURCHASE</b>	Harvest at correct stage of maturity; revisit hybrid for NDFd; review processing settings.

<b>DRY MATTER</b>	<b>DM off-target.</b>
<b>WHAT IT USUALLY MEANS</b>	Means: ration formulated on DM is fed as-fed — moisture errors propagate. <sup>3</sup>
<b>WHAT TO VERIFY</b>	Test DM before and during harvest, and twice per week during feedout. <sup>3</sup>
<b>ASK NUTRITIONIST</b>	How often are we re-checking DM and resetting the mixer accordingly?
<b>ACTION NOW</b>	Set up routine DM checks at feedout; recalibrate mixer; verify sampling protocol.
<b>CHANGE NEXT CROP / PURCHASE</b>	Standardize harvest moisture targets; train staff on sampling cadence.

<b>STARCH</b>		Starch level or IVSD off.
<b>WHAT IT USUALLY MEANS</b>	Means: energy capture is below potential. Either too low total starch or low digestibility.	
<b>WHAT TO VERIFY</b>	Verify processing score, kernel breakage, lab method, fermentation length.	
<b>ASK NUTRITIONIST</b>	Should we ferment longer or adjust kernel processing before next season?	
<b>ACTION NOW</b>	Adjust ration starch sources; consider ferment time / processing change at next opening.	
<b>CHANGE NEXT CROP / PURCHASE</b>	Hybrid review for kernel characteristics; processor calibration; longer ensiling time.	

<b>PROTEIN</b>		CP or RUP off-target.
<b>WHAT IT USUALLY MEANS</b>	Means: protein fractions don't fit the ration model's needs.	
<b>WHAT TO VERIFY</b>	Verify CP, soluble protein, NDICP/ADICP; cross-check with NDFd interpretation. <sup>7</sup>	
<b>ASK NUTRITIONIST</b>	Where is the cheapest dollar of CP/RUP coming from in this ration?	
<b>ACTION NOW</b>	Re-balance with concentrate protein; avoid solving with the priciest by-product first.	
<b>CHANGE NEXT CROP / PURCHASE</b>	Cutting timing on haylage; species mix; storage covering to limit protein loss.	

BOTTLENECK PLAYBOOKS (CONT.)

# Shrink and Price — the silent margin killers

<b>SHRINK</b>	<b>DM loss / shrink high.</b>
<b>WHAT IT USUALLY MEANS</b>	Means: feed value is leaving the system before it reaches the cow. <sup>5,8,9</sup>
<b>WHAT TO VERIFY</b>	Audit face management, removal rate, oxygen exposure, spoilage, and silo seal.
<b>ASK NUTRITIONIST</b>	What is our face-loss number, and what's the cost per ton of fixing it?
<b>ACTION NOW</b>	Tighten face management; remove only what gets fed; improve seal and density.
<b>CHANGE NEXT CROP / PURCHASE</b>	Storage system upgrades; harvest density targets; staff training on face.

<b>PRICE</b>	<b>Cost per ton DM &gt; replacement.</b>
<b>WHAT IT USUALLY MEANS</b>	Means: this forage's discount is gone — once shrink is added, it's not earning.
<b>WHAT TO VERIFY</b>	Recalculate DM cost and shrink-adjusted cost; quote replacement feed.
<b>ASK NUTRITIONIST</b>	What price/lb of nutrient gets us back to neutral vs. replacement?
<b>ACTION NOW</b>	Limit inclusion; renegotiate; route lower-margin loads to heifers or sell.
<b>CHANGE NEXT CROP / PURCHASE</b>	Buy on DM and tested nutrients, not as-fed price; lock multi-load contracts.

**“Shrink isn't a line item. It's a quiet exit door for margin.”**

A 20% dry-matter loss in storage can present as only a few percent of as-fed shrink — the feed weighed the same, but the nutrients didn't make it.<sup>5</sup> Feedout begins eroding value the moment silage is exposed to oxygen; remove no more than will be fed.<sup>9</sup> Storage losses of 15% or more are common in poorly managed bunkers and piles.<sup>8</sup>

# 07

## BUYING & CONTRACTING

# Don't get sold water and shrink

### QUESTIONS BEFORE BUYING

- [-] What is the DM, and when was it tested?
- [-] What lab numbers will you share — NDFd30, uNDF240, starch, IVSD, CP?
- [-] As-fed price, freight, storage, expected shrink — itemize each.
- [-] Variety, hybrid, cut number, harvest date, processing score?
- [-] How was it stored? When was it opened? Face management?
- [-] What's the load-to-load consistency look like?

### LAB NUMBERS TO ALWAYS REQUEST

DM %, NDF, NDFd30, uNDF240, starch %, IVSD, CP, soluble protein, ash, fermentation profile.<sup>7</sup>

### WHY AS-FED PRICE MISLEADS

You're paying for water, fiber, and storage variance, not just nutrients. Convert every offer to DM cost / ton and then to shrink-adjusted DM cost. The cheapest as-fed bid often loses on a DM basis.<sup>3</sup>

### COMPARE OFFERS LIKE THIS

- [-] DM cost / ton (not as-fed)
- [-] Shrink-adjusted DM cost
- [-] Freight per actual ton DM delivered
- [-] Storage and face losses you'll inherit
- [-] Consistency across loads (sample variability)

### RED FLAGS

- [o] "Test is on the way" — no lab available.
- [o] Only NDF and CP shared, no NDFd or starch digestibility.
- [o] DM swings >5 points across pulls from the same load.
- [o] Seller resists splitting freight from forage price.
- [o] Stored open-faced, weeks of oxygen exposure.
- [o] Quote priced as-fed only; refuses DM-basis comparison.

### BUYER CHECKLIST

## Before you sign anything

- |   |   |
|---|---|
| <p><input type="checkbox"/> Recent lab report including NDFd30, uNDF240, starch, IVSD, CP</p> | <p><input type="checkbox"/> As-fed price, freight, storage cost, and shrink assumption itemized</p> |
| <p><input type="checkbox"/> DM-basis cost calculated and compared to replacement feed</p>     | <p><input type="checkbox"/> Shrink-adjusted DM cost calculated and inside acceptable range</p>      |
| <p><input type="checkbox"/> Run through The Bullvine Forage Quality Value Calculator</p>      | <p><input type="checkbox"/> Score, key bottleneck, and ration group identified</p>                  |
| <p><input type="checkbox"/> Margin per cow / day and annual herd impact estimated</p>         | <p><input type="checkbox"/> Discussed with nutritionist using worksheet on page 14</p>              |
| <p><input type="checkbox"/> Inclusion limit, group assignment, and pairing forage agreed</p>  | <p><input type="checkbox"/> Documented one change for next purchase or crop cycle</p>               |

# 08 NUTRITIONIST WORKSHEET **Bring this to the next ration meeting**

Print this page. Fill it in before you call. You will get more out of fifteen minutes than out of an hour without it.

<b>Date</b> _____	<b>Starch (% DM)</b> _____
<b>Herd size (head)</b> _____	<b>Starch digestibility / IVSD (%)</b> _____
<b>Milk / cow / day (lb)</b> _____	<b>Crude protein (% DM)</b> _____
<b>Avg DMI (lb)</b> _____	<b>As-fed cost (\$/ton)</b> _____
<b>Forage inclusion (%)</b> _____	<b>Estimated shrink (%)</b> _____
<b>Forage type</b> _____	<b>Replacement-feed cost (\$/ton DM)</b> _____
<b>Lot / cutting / hybrid</b> _____	<b>Calculator score (0-100)</b> _____
<b>DM (%)</b> _____	<b>Net margin (\$/cow/day)</b> _____
<b>NDF (% DM)</b> _____	<b>Annual herd impact (\$)</b> _____
<b>NDFd30 (%)</b> _____	<b>Key bottleneck</b> _____
<b>uNDF240 (% DM)</b> _____	<b>Proposed ration group</b> _____

**THREE QUESTIONS TO DISCUSS**

1. Given this score and key bottleneck, what is the highest-return ration change this month?
2. What inclusion limit makes sense for this forage in the high group?  
.
3. What should change in next year's crop, contract, or storage to avoid this bottleneck?  
.

# 09 MARGIN WORKSHEET **Current vs. replacement forage — side by side**

Fill both columns. The forage that produces the higher net margin per cow per day, given a realistic milk response, wins.

LINE ITEM	CURRENT FORAGE	REPLACEMENT FORAGE
Forage type / lot	_____	_____
DM %	_____	_____
As-fed cost (\$/ton)	_____	_____
Cost / ton DM	_____	_____
Estimated shrink (%)	_____	_____
Shrink-adjusted DM cost (\$/ton)	_____	_____
Forage inclusion (%) at planned use	_____	_____
Feed cost / cow / day (\$)	_____	_____
Expected milk response (lb)	_____	_____
Milk value (\$/cwt)	_____	_____
Milk response value (\$/cow/day)	_____	_____
Break-even milk response (lb)	_____	_____
Net margin / cow / day (\$)	_____	_____
Annual herd impact (\$)	_____	_____
Decision (push / strategic / limit)	_____	_____

**Reminder.** Expected milk response is the most-abused input. Validate it against farm conditions, ration balance, cow group, forage inventory, and price assumptions before committing to a change. The break-even line is the floor, not the target.

## 10

## COMMON MISTAKES

## Eight ways forage value gets quietly destroyed

**01 Looking at as-fed price only**  
Hides water and shrink. Always convert to DM and shrink-adjusted DM cost.<sup>3</sup>

**02 Ignoring shrink**  
20% DM loss can look like ~3% shrink. Real cost is much higher than the invoice.<sup>5</sup>

**03 Treating NDF as enough**  
Two forages with identical NDF can differ materially in DMI and milk if NDFd differs.<sup>4</sup>

**04 Overvaluing cheap forage**  
If it drags intake, milk, or efficiency, the savings disappear at the bulk tank.

**05 Under-testing purchased forage**  
One lab on the first load isn't a contract. Sample by load or by month.

**06 Feeding wrong forage to wrong group**  
Best forage to heifers, average forage to high group — money on the floor.

**07 Forgetting to update when milk price moves**  
Break-even changes with milk price. Recheck the calculator when CME moves.

**08 Forgetting storage and face losses**  
Feedout losses begin the moment silage hits air; remove only what gets fed.<sup>9</sup>

## 11

## ACTION CHECKLIST

## Do these eight things this week

01

**Run the calculator**

Open the Bullvine Forage Quality Value Calculator and enter your latest forage. [Open tool](#)

02

**Pull or confirm lab results**

Verify DM, NDF, NDFd30, uNDF240, starch, IVSD, CP. Re-test if any are stale.

03

**Compare shrink-adjusted DM costs**

Calculate for current and any replacement forage you're considering.

04

**Identify the key bottleneck**

Note the single bottleneck the calculator flags — digestibility, DM, starch, protein, shrink, or price.

05

**Assign forage to cow group**

Use the matrix on p. 9. Don't feed best forage to the lowest-return pen.

06

**Ask nutritionist three specific questions**

Use the worksheet on p. 14. Bring numbers, not vibes.

07

**Recheck margin assumptions**

Update milk price and replacement-feed cost; rerun. Break-even moves with CME.

08

**Document one next-cycle change**

Harvest, processing, hybrid, storage, contract spec. One change, written down, owned.

## 12

## RUN YOUR NUMBERS

## Three next steps. Tonight.

01

**Run your numbers in the Bullvine Forage Quality Value Calculator**<https://thebullvine.com/tools/BullvineForageQualityValueCalculator.html>

02

**Read the full forage-quality and feed-efficiency pillar article**<https://www.thebullvine.com/dairy-cow-nutrition-2026-ration-formulation-forage-quality-feed-efficiency/>

03

**Talk with your nutritionist using the worksheet on page 14**

Bring numbers. Bring the score. Bring the bottleneck. Leave with a written change.

**“The ration doesn't care what the crop cost to grow. It cares what the cow can turn into milk.”**

**About this guide.** Edition 1. Published by The Bullvine. Written for working dairy producers and their advisors. This is a decision-support guide, not a ration-balancing replacement and not a substitute for a professional nutritionist or ration model. It does not give medical or animal-health advice beyond general nutrition management. Expected milk response should always be validated against farm conditions, ration balance, cow group, forage inventory, and economics.

## SOURCES

## Citations used in this guide

Numbered superscripts throughout this guide refer to the sources below. All URLs are clickable.

- 1** The Bullvine — Feed Efficiency and Residual Feed Intake: Dairy cow nutrition in 2026  
<https://www.thebullvine.com/dairy-cow-nutrition-2026-ration-formulation-forage-quality-feed-efficiency/>

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- 2** The Bullvine — Forage Quality Value Calculator  
<https://thebullvine.com/tools/BullvineForageQualityValueCalculator.html>

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- 3** Penn State Extension — Determining Forage Dry Matter  
<https://extension.psu.edu/determining-forage-dry-matter/>

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- 4** University of Wisconsin — Understanding NDF Digestibility of Forages  
<https://fyi.extension.wisc.edu/forage/understanding-ndf-digestibility-of-forages/>

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- 5** University of Wisconsin — Shrink is a Deceptive Term  
<https://fyi.extension.wisc.edu/forage/shrink-is-a-deceptive-term/>

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- 6** National Academies — Nutrient Requirements of Dairy Cattle, 8th Rev. Ed. (NASEM 2021)  
<https://www.nationalacademies.org/projects/DELS-BANR-13-02/publication/25806>

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- 7** University of Wisconsin — Understanding and Using Forage Test Results (PDF)  
<https://fyi.extension.wisc.edu/forage/files/2016/09/10.1.1.414.6455.pdf>

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- 8** South Dakota State Extension — Silage: Minimizing Losses and Maximizing Value  
<https://extension.sdstate.edu/silage-minimizing-losses-and-maximizing-value>

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- 9** University of Wisconsin — Feedout Losses from Forage Storage Systems  
<https://fyi.extension.wisc.edu/forage/feedout-losses-from-forage-storage-systems/>

**Source notes.** Targets and band thresholds are drawn from The Bullvine 2026 nutrition pillar article and the embedded logic of the Bullvine Forage Quality Value Calculator. NASEM 2021 is cited as the current consensus reference for dairy nutrient requirements. NDF digestibility interpretation cautions reflect University of Wisconsin extension guidance, and the lab-method context reflects the Wisconsin “Understanding and Using Forage Test Results” primer. Shrink and storage-loss framing reflects University of Wisconsin and South Dakota State extension materials. Penn State extension is cited for dry-matter testing cadence.