APPENDIX C.
FORAGE RATIONS AND FEED PLANNING

This appendix converts the forage work described in Chapter 7 into quantities that can be checked before winter. It is a planning aid, not a prescribed hippopotamus ration. Common hippopotamuses are non-ruminating foregut fermenters, and cattle feed tables cannot establish the requirements of lactating females, growing animals, or an individual with altered health. Base the working allowance on recorded feed consumption, body condition, veterinary assessment, and analyses of the forage actually offered. Keep measured values separate from assumptions made for the purpose of an example.

This appendix is available for download at:

https://greybarnfarm.com/publishing/hippo-dairy

Dry matter first

Forage is purchased, moved, and stored at its fresh or as-fed weight; the animal receives the nutrients in its dry matter. Dry matter (DM) is as-fed mass multiplied by the measured DM fraction. Conversely, the as-fed quantity required for a specified amount of DM is DM divided by that fraction. A 300 kg hay bale at 85% DM contains 255 kg DM; a 300 kg wrapped bale at 60% DM contains only 180 kg DM. Neither bale weight nor the number of bales is therefore a satisfactory inventory on its own.

Forage lot (illustrative)	As-fed mass	Measured DM	Dry matter
Dry grass hay	300 kg	85%	255 kg
Wrapped grass forage	300 kg	60%	180 kg
Fresh pasture cut for weighing	100 kg	22%	22 kg

Treat 85% DM as a typical dry-hay reference, not as a result guaranteed by appearance; wrapped forages and fresh grass vary considerably. Take representative samples from identified lots and record the laboratory method and date. Keep records in kilograms or tonnes of DM consistently, and do not confuse a tonne of standing fresh grass with a tonne of usable dry forage.

Using a forage-quality report

Laboratory results may report crude protein (CP), fibre fractions, ash, and minerals per kilogram of DM. Multiplying a concentration by the actual DM supplied gives a nutrient amount; it does not establish that the amount meets the animal's needs. For example, a sample mixture providing 6 kg DM of hay at 100 g CP/kg DM and 4 kg DM of wrapped forage at 140 g CP/kg DM contains (6 × 100) + (4 × 140) = 1,160 g CP in 10 kg DM, or 116 g CP/kg DM. The corresponding as-fed weights are 6 ÷ 0.85 = 7.06 kg hay and 4 ÷ 0.60 = 6.67 kg wrapped forage.

These numbers demonstrate calculation only; neither the ten-kilogram issue nor its protein concentration is a feeding recommendation. Energy systems and intake targets developed for cattle must not be assumed to predict hippopotamus performance. Record palatability, refusal, manure changes, weight or body-condition trends, and any forage substitution. The primary ration decision remains one for species-experienced veterinary and nutritional supervision, especially during lactation or growth.

Example winter requirement worksheet

The following hypothetical holding has five mature animals and two younger animals. Its recorded or deliberately provisional planning allowances are 12 and 5 kg DM per animal per day, respectively. They are not universal intake rates. Suppose usable pasture will be unreliable for 180 days; replace that duration and every allowance with values supported by the actual holding.

Group	Head	DM/head/day	Daily group DM	180-day DM
Adults (example only)	5	12 kg	60 kg	10,800 kg
Young animals (example only)	2	5 kg	10 kg	1,800 kg
Total	7	—	70 kg	12,600 kg

Allowing an illustrative 12% combined storage and feeding loss, required stored DM is 12,600 ÷ 0.88 = 14,318 kg. Adding a separate 15% contingency to the intended consumed amount gives (12,600 × 1.15) ÷ 0.88 = 16,466 kg DM to have in store at the beginning of the period. Apply loss factors once, in the correct sequence: stored feed, minus loss, equals feed available to consume. Reserve is additional demand, not another name for the same loss.

Field production, carryover, and bale allowance

Yield must be stated at a known moisture content. In the example below, the two cut fields are weighed after preservation. The quantities and field yields are assumed to show how a farm account is prepared; they do not describe the productive capacity of the Camargue, Marais poitevin, or Gascony.

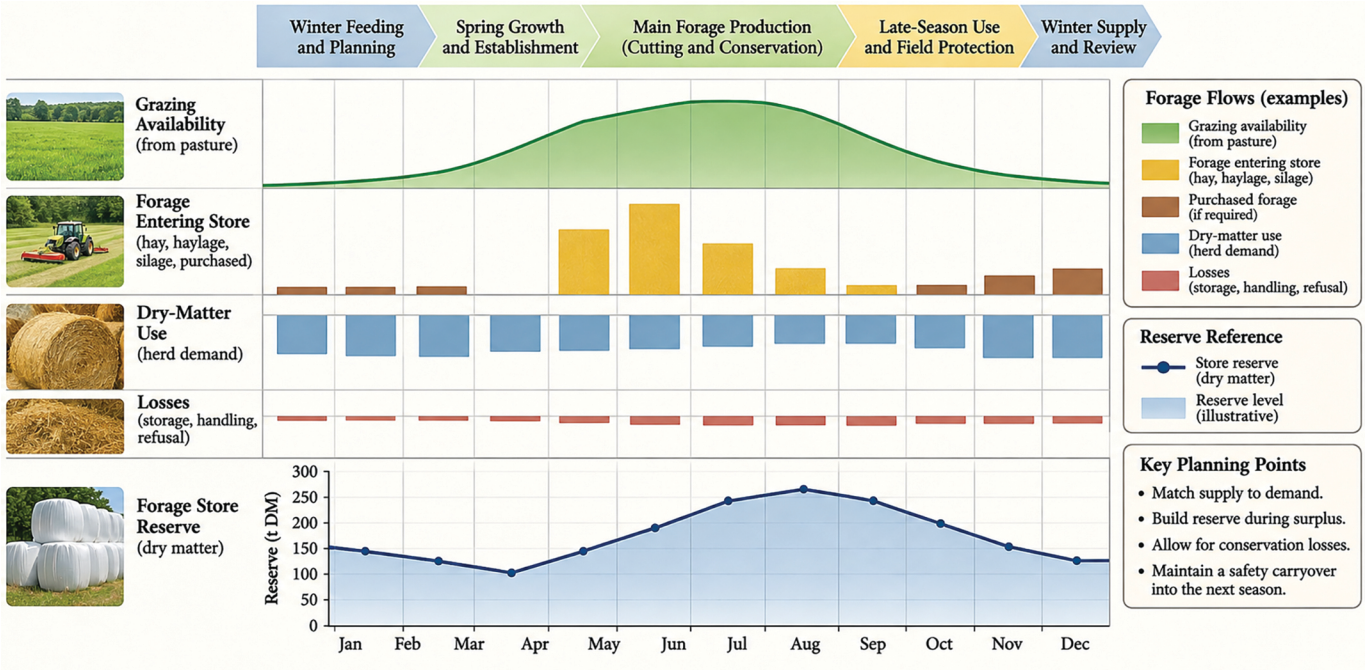
Source	Area × as-fed yield	DM fraction	Recorded DM
Field A: baled hay	3 ha × 5 t/ha	85%	12.75 t
Field B: wrapped forage	2 ha × 4 t/ha	60%	4.80 t
Sound opening carryover	Recorded inventory	Already in DM	1.60 t
Total entering store	—	—	19.15 t

At the same assumed 12% storage and feeding loss, 19.15 × 0.88 = 16.852 t DM remains available to consume. Against the base 12.60 t winter need and 15% contingency (14.49 t combined), this leaves 2.362 t DM available beyond the planned reserve. This comparison uses the same loss convention as the preceding worksheet; the 16.466 t stored-DM requirement is therefore directly comparable with 19.15 t in store. Any lot found spoiled or inaccessible must be subtracted before declaring the reserve adequate.

For a hay-only equivalent, one 300 kg bale at 85% DM provides 255 kg DM before storage and feeding losses. The required initial inventory of 16,466 kg DM would amount to 16,466 ÷ 255 = 64.6, rounded up to 65 such bales. This is an equivalence, not an additional requirement if wrapped forage supplies part of the stock. The barn needs extra space for access, lot separation, inspection, and safe handling; bale count alone cannot establish the floor area or permissible stacking arrangement.

Seasonal supply and shortage checks

Make a monthly ledger: opening usable stock; expected grazing contribution; cut forage actually carried into storage; permitted purchases or transfers; feed issued; measured waste; and closing stock. A spring surplus does not cancel a winter deficit unless it can be conserved. Likewise, a field that looks green in October is not safely available to a heavy animal if grazing would destroy the soil. Schedule the stock review before the first extended wet or freezing period, not after the barn is already short of forage.



Annual forage supply-and-demand planning diagram showing monthly grazing availability, harvested and purchased forage entering store, recorded dry-matter use, losses, and carryover reserve. Seasonal bands are illustrative and do not establish feeding rates or fixed French growing-season dates.

Seasonal feeding plan — example decisions

The following checks belong in the monthly ledger. Seasons overlap differently in each region; they are reminders to reassess forage availability rather than dates for changing a ration automatically.

Period	Primary check	Practical response when forage is short
Spring	Actual sward recovery and firm pasture access	Maintain stored forage until grazing supply is measured.
Summer	Drought, heat and regrowth after cutting	Protect sparse pasture; draw down planned reserve or purchase suitable forage.
Autumn	Ground bearing capacity and inventory before rain	Close vulnerable paddocks; reconcile tested stocks and winter demand.
Winter	Feed refusals, moisture, losses and remaining reserve	Recalculate usable DM monthly; preserve contingency and avoid abrupt substitutions.

Blank working record — copy for each planning revision

Period / group	Opening DM	Added DM	Issued / lost DM	Closing DM
Month: _____	_____	_____	_____	_____
Group: _____	_____	_____	_____	_____
Lot / field: _____	_____	_____	_____	_____

The closing stock of one period becomes the opening stock of the next. Retain the source of every estimate: weighbridge ticket, sampled bale weight, laboratory DM report, field tally, or keeper intake log. Record the date on which a provisional figure was replaced by a measurement. A plan that consistently distinguishes the two is useful even in a poor harvest; a polished total built on unexamined guesses is not.

Chapter 7 explains how to grow and preserve the forage; Chapter 8 considers how it should be offered to the animals. This appendix connects them by accounting for what the land provides and what the animals actually use. A sensible farmer will revise these numbers as soon as the season gives him better ones.