

SUPPLEMENTAL FEEDSTUFF COST AND VALUE CALCULATOR

BEEF CATTLE VERSION 2.0: Supporting information

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OVERVIEW

This decision-making tool is intended to be used to compare the cost and value of different supplemental feedstuffs for beef cattle. In order to make these comparisons, the workbook automatically calculates nutrient cost for up to 5 different supplemental feedstuff options after unique information has been entered for each feedstuff option. This information includes purchase price, unit of purchase and storage, costs associated with transportation or delivery, storage, and feeding, as well as feeding frequency and shrink losses associated with storage, handling, and feeding. After entering supplementation information, which includes the number of head to supplement, amount of supplemental protein and/or energy to provide, and duration of the supplementation period, the workbook calculates the total expected cost of supplementation in order to meet those criteria. Additionally, this workbook allows the user to select whether a feedstuff option is self-limiting and define the expected daily intake of that feedstuff in order to determine if a self-limiting feedstuff option may be a viable option based upon the user-defined supplementation criteria.

Useful abbreviations and symbols that appear throughout the decision-making tool include the following:

AF = as-fed	cwt. = hundredweight, or 100 lbs
DM = dry matter	kg(s) = kilogram(s)
CP = crude protein	lb(s) = pound(s)
TDN = total digestible nutrients	Mcal = megacalorie(s)
NE _m = net energy for maintenance	no. = number
NE _g = net energy for gain	/ = per
	\$ = U.S. dollars

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**Note* - Only enter information in the tan-colored cells. All other cells will either be automatically populated or calculated based upon entry of information in other cells. The workbook will not allow the user to enter information in other cells. "MISSING INPUT" indicates that information has not been selected in one or more cells that are required for a respective calculation. Clicking on a tan-colored cell, as well as some other cells, will prompt an information box to appear. Simply hit the escape key in order to make the box disappear. Similarly, hit the escape key to close a drop-down menu.*

Navigating the workbook

This workbook contains four sheets. The purpose for each of these sheets is outlined below.

- ▶ The *Instructions* sheet serves a similar purpose as this publication in that it provides all of the information necessary to successfully utilize this decision-making tool.
- ▶ The *Feedstuff nutrient composition* sheet contains Table 1, which is where the name and corresponding tabular or expected nutrient content information of 57 pre-populated supplemental feedstuffs can be found. Nutrient content information can be modified with user-specific information when available. This sheet also provides the opportunity to enter the name and nutrient content information of up to five custom supplemental feedstuffs.
- ▶ The *Feedstuff cost and value* sheet contains Tables 2 through 9, which is where the majority of criteria will be defined and automatic calculations are made. These are broken into topic-specific areas below:
 - Users can select up to five supplemental feedstuffs for comparison in Table 2. Tables 2 and 3 are where the majority of information pertaining to the purchase, transportation or delivery, storage, and feeding of previously selected supplemental feedstuffs is entered. Information pertaining to a specific supplementation program is entered in Table 4. This information includes

the number of cattle to supplement and the duration of the supplementation period, as well as the daily amount of CP, TDN, and/or NE_m to be supplemented. If necessary, work with your nutritionist to identify the amount of protein and energy that should be supplemented. This often requires forage analyses, which can help to provide the information necessary to design the most appropriate supplementation program.

- Table 5 estimates the amount of each supplemental feedstuff that is required to be consumed in order to meet the supplementation criteria that was defined in Table 4, expressed in lbs as consumed per head per day. Table 6 uses that information to estimate the total amount required to be consumed, lost to shrink, and required to be purchased throughout the entire duration of supplementation.
 - Table 7 estimates the feedstuff and nutrient cost of each supplemental feedstuff. Table 8 estimates the realized cost of supplementation based upon the user-defined criteria, and expresses it in various metrics, while Table 9 estimates the proportion of supplementation costs that can be attributed to feedstuff purchase, transportation or delivery, storage, and feeding.
- The *Nutrient unit-basis conversions* sheet contains Table 10, which can be used to convert nutrient content to the appropriate unit or basis that is required for entry into Table 1 on the *Feedstuff nutrient composition* sheet.

Upon opening the workbook, the user begins at the “Instructions” sheet. From there, you can navigate to each of the other sheets by either clicking on their respective tabs, or by clicking on the blue buttons that are found at the bottom of each sheet.

Instructions for evaluating supplemental feedstuff cost and value

STEP 1: MODIFY FEEDSTUFF NUTRIENT COMPOSITION OR ADD FEEDSTUFFS

Step 1a: Click on the “MODIFY FEEDSTUFF NUTRIENT COMPOSITION OR ADD FEEDSTUFFS” button or click on the “Feedstuff nutrient composition” tab at the bottom of the spreadsheet in order to modify feedstuff nutrient composition and add or modify custom feedstuffs. This workbook comes pre-loaded with many common supplemental feedstuffs. Where available, NASEM (2016) values for nutrient composition were entered. Otherwise, generic formulations were developed to provide representative examples of the nutrient

composition of various commercial feeds. However, the user has the option to replace the nutrient composition of the pre-loaded feedstuffs and to add up to 5 additional custom entries. It is always recommended to replace the pre-loaded nutrient composition with actual analysis or expected nutrient composition results where applicable. Follow step 1b in order to update the pre-loaded nutrient composition with these values. Similarly, additional feedstuffs that do not appear in the list (cells B9–B65) that users wish to compare should be added as custom entries in cells B66–B70. Users may add up to 5 custom entries. Follow step 1c in order to add custom entries.

Step 1b: To replace the pre-loaded nutrient composition with actual analysis results or expected nutrient values, simply type the number into the cell and hit the enter key. This is only an option for dry matter (DM), crude protein (CP), and total digestible nutrients (TDN). Please notice that dry matter (DM) is expressed on a % as-fed basis, while crude protein (CP) and total digestible nutrients (TDN) are expressed on a % of DM basis. It is critical that the values be entered in these units and on the correct basis for the workbook to correctly perform the calculations. If the available values are expressed in different units or on a different basis, then click on the “PERFORM FEEDSTUFF NUTRIENT UNIT OR BASIS CONVERSIONS” button or the “Nutrient unit-basis conversions” tab for assistance with the conversions. Feedstuff nutrient composition information obtained from a feed tag or product label is typically expressed on an as-fed basis, unless otherwise specified, and generally does not contain an energy value. Expected energy values can often be obtained by contacting either a technical support person for the product or your nutritionist. Net energy for maintenance (NE_m) and net energy for gain (NE_g) values for each of the pre-populated feedstuffs and custom entries can be altered by changing the TDN values as necessary and are expressed on a Mcal per hundredweight (Mcal/cwt.) of DM basis.

Step 1c: To add additional feedstuffs as custom entries, simply type the names of the desired supplemental feedstuffs in cells B66–B70, DM content in cells C66–C70, CP content in cells D66–D70, and TDN content in cells E66–E70, where DM is expressed on a % as-fed basis, while CP and TDN are expressed on a % of DM basis. Net energy values (NE_m and NE_g , expressed on a Mcal/cwt. of DM basis) can be modified by altering the TDN values that are entered in cells E66–E70. The same unit and basis conversion concepts that were discussed in step 1b also apply to entering nutrient content information for custom feedstuff entries. After typing each entry, hit the enter key in order for the workbook to recognize the entry.

After steps 1a–1c are complete, this information will automatically be updated and apply to the workbook, and users should move on to step 2.

STEP 2: ENTER FEEDSTUFF COST AND SUPPLEMENTATION INFORMATION

Step 2a: Click on the “ENTER FEEDSTUFF COST INFORMATION AND EVALUATE FEEDSTUFF VALUE” button or click on the “Feedstuff cost and value” tab at the bottom of this sheet in order to enter or modify feedstuff cost information.

Step 2b: Complete the required entries (tan-colored cells) for table 2. Begin by selecting up to 5 supplemental feedstuffs to compare by making the appropriate selection from the drop-down menus located in cells B10–B14. This will automatically pull in the necessary nutrient composition information for each of the selected options. If the option of interest is unavailable through the drop-down menu, it can be added on the “Feedstuff nutrient composition” sheet by following the instructions previously outlined in step 1c. Next, enter the retail cost for each respective feedstuff (expressed in \$ per unit of purchase) in cells C10–C14, as well as the unit of purchase (expressed in lbs as-received) in cells D10–D14. Then, enter the delivery or transportation cost in cells E10–E14, expressed in \$ per unit of purchase. These cells can be left blank if no delivery or transportation costs will be assigned to a respective feedstuff. Next, select or enter the appropriate unit of storage to which storage costs will be defined in cells F10–F14, expressed in lbs as-stored. Next, enter any storage facility and labor costs in cells G10–G14, expressed in \$ per unit of storage. Finally, enter the estimated storage shrink for each respective feedstuff in cells H10–H14, expressed in % as-stored, before moving on to step 2c. Storage shrink is the % of purchased feedstuff that will either disappear or spoil during storage, and therefore be unfeedable.

Step 2c: Complete the required entries (tan-colored cells) for Table 3. Begin by using the drop-down menus in cells C20–C24 to select if the respective feedstuff is a self-limiting supplement, by selecting either “Yes” or “No.” Examples of self-limiting supplemental feedstuffs include many tubs, blocks, liquid feeds, and some other commercial feeds where cattle are expected to consume less than they would of other non-limited feedstuffs, due to some aspect of the product that limits either the ability or desire of cattle to consume more when offered free choice. For self-limited supplements only, also enter the appropriate expected daily intake in cells D20–D24, expressed in lbs as-fed per head per day. For example, if the expected self-limited intake of the respective feedstuff is 1.5 lbs per head per day, enter 1.5. Next,

for all feedstuffs, enter the appropriate amount that will be fed (expressed in lbs as-fed per feeding event) in cells E20–E24, followed by the supplementation frequency (expressed in number of times per week) in cells F20–F24. Then, enter the appropriate feeding equipment and labor costs in cells G20–G24, expressed in total \$ per feeding event. Finally, select or enter the estimated handling and feeding shrink in cells H20–H24, expressed as a % as-fed. Handling and feeding shrink is the % of feedstuff that disappears during the handling and feeding process and is therefore not consumed by cattle. Successful completion of these entries will result in automatically calculated costs of each respective feedstuff that will then be automatically included in the proceeding supplemental feedstuff value calculations and supplementation cost estimations.

Step 2d: In order to evaluate nutrient cost as well as the cost of supplementation for a specific scenario, complete the required entries (tan-colored cells; C28–C32) in Table 4. Begin by selecting the appropriate number of head to be supplemented from the drop-down menu in cell C28. For example, if a total of 100 cows will be supplemented, select 100. Next, either directly enter or select the amount of CP, TDN, and/or NE_m to be supplemented from the drop-down menu in cells C29, C30, and C31, respectively, expressed on either a lb (for CP and TDN) or Mcal (for NE_m) per head per day basis. Then, either directly enter or select the total duration of the supplementation period from the drop-down menu in cell C32, expressed in days. For example, if this group of cattle will be supplemented for a total of 120 days, enter or select 120. If the necessary options are not listed in the drop-down menus, the appropriate numbers can be manually typed into any of these 5 cells. The information selected for or entered into these cells will then be used to calculate the amount of each feedstuff required to meet the defined protein and energy supplementation criteria (see previous explanation in the “Navigating the workbook” section), which will appear in cells F37–F41 of Table 5, expressed in lbs as-consumed per head per day.

STEP 3: EVALUATE SUPPLEMENTAL FEEDSTUFF VALUE AND COST OF SUPPLEMENTATION

Step 3a: Table 6 provides an estimate of the total calculated amounts of feedstuff that are required to be consumed, lost to storage shrink, lost to feeding shrink, and required to be purchased in cells C46–C50, D46–D50, E46–E50, and F46–F50, respectively. Self-limited feedstuffs that require an intake level greater than was declared as expected will return either “Required intake is greater than self-limited intake” or “OPTION NOT APPLICABLE” responses. This occurs when cattle are not expected to voluntarily consume enough of the

feedstuff to provide the daily amount of supplemental protein or energy that was defined in Table 4 and thus required in order to meet the criteria of the supplementation scenario.

Step 3b: Table 7 should be used to evaluate the realized nutrient cost of the supplemental feedstuffs that have been selected after considering the other information that has been provided. Use this information to identify the most economical option for the nutrient(s) of interest. The most economical option will be highlighted in green, and the least economical option will be highlighted in red. It is important to note that there may be other factors that influence the value of a supplemental feedstuff that can only be accounted for in the comparison if the economic value of those respective factors was incorporated through adjusting costs or cost savings accordingly. Some examples may be the added value or cost savings that could be attributed to the mineral and vitamin content of a supplemental feedstuff, or its ability to act as a vehicle of delivery for a feed additive, drug, or growth promoting technology. Consult with your nutritionist to determine the economic value of those factors.

Step 3c: Table 8 provides estimates of the realized total cost of supplementation, expressed in \$/head/period (cells E64–E68), \$/day/group (cells D64–D68), \$/head/day (cells C64–C68), and total \$ throughout the duration of the supplementation period (cells F64–F68). Self-limited feedstuffs that require an intake level greater than was declared as expected will return a “NOT APPLICABLE” response. Similar to nutrient cost, the most economical option will be highlighted in green, and least economical option highlighted in red.

Step 3d: Table 9 provides estimates of the proportioned costs of supplementation, with feedstuff purchase cost, transportation or delivery cost, storage cost, and feeding cost each expressed as a % of the total cost for each feedstuff, in cells C73–C77, D73–D77, E73–E77, and F73–F77, respectively.

With questions, or for more information on the topic, contact Dr. Jason Smith at Jason.Smith@ag.tamu.edu.