Introduction

This checksheet is designed to stimulate critical thinking in planning a farm on which a primary enterprise is milk production. This relates to all dairy species: cattle, goats, and sheep. The sustainability of a farm relates to many factors revolving around farm management, use of resources, and quality of life. The series of questions is intended to stimulate awareness rather than serve as a rating of management practices. Carefully think about how decisions made in one area impact the results in other areas of your farm. Use this guide to define areas in your farm management that might be enhanced, and to identify areas of strength as well.

Suggestions on how to use the checksheet

The checksheet is quite lengthy and can be rather intimidating, to both educator and producer. Having evaluated the use of the checksheet on several farms, the authors make the following suggestions to the educator:

• Send the checksheet to the producer prior to the first meeting.
• Be flexible. The producer and the educator should be comfortable in working through the process. Remember that the checksheet is a guide to assess the operation.
• Review the questions beforehand. Then, when going through them with the producer, don’t just read the questions but address them in your own words. If a question has been addressed in general conversation, or if a question doesn’t need to be answered because of the way a previous question was answered, move on to the next question. If the producer doesn’t have a problem in a certain area, then the subset of questions pertaining to that problem need not be addressed.
• There are no right or wrong answers. The producer should not be able to answer all questions and may need more information in order to answer some questions.
• Having aerial photos, soil maps and topographic maps on hand during the assessment has proven useful.
• Since the time needed to completely work through the checksheet may be longer than is available for a single farm visit, two or more visits may be in order. The checksheet is most useful in making the producer aware of management alternatives. Therefore, defining the items for which he or she needs more information is most important. The producer should use the sections that apply.
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INVENTORY OF FARM RESOURCES AND MANAGEMENT

Size of farm (owned) ___________________________  Acreage rented ____________________________

Acres of:  Pasture  Woods  Crops

Number of:  Milking animals  Replacements  Dry animals

Other types of animal and farm enterprises _______________________________________________________

Breeds ____________________________  Weight of mature animals ____________________________

Number of:  pastures on farm  ponds  other water sources

Do you have city water? ______  Developed wells? ______  Flowing water? ______

Market for milk __________________________________________________________

Months you calve (kid, lamb) in __________________  Milk in__________________________

How many acres of the following do you have?  What is grown?

- predominantly cool season perennial grasses
- predominantly warm season perennial grasses
- mixture of warm and cool season grasses
- pastures with legumes
- cool season annuals
- warm season annuals
- pastures that can be stockpiled for late fall/winter grazing
- crops for silage
- for grain
- alfalfa

Do you use crop aftermath? ____________________

Which practices are part of your grazing system?  short duration, slow rotation, continuous grazing

Do you feed TMR? ________________

What kind of housing facilities do you use? ___________________________________________________

What is your nutrient management system? ___________________________________________________

Give major soil types and productivity indexes for the farm ________________________________________

When and with what do you fertilize? ____________________________________________________________

What are the top five strengths of your operation? ________________________________________________

What are the top five problems? ________________________________________________________________
Instructions: In the margin for each question, place a checkmark if it needs further thought. Leaving the item blank indicates that the area covered in that question is not a problem or an issue in the management program. Keep in mind that some questions are repeated to show interrelationships.

SUSTAINABILITY

____ Does having a greater gross income translate into more net income? _____________________
____ Are you doing things to improve the quality of life for you and your family?_____________
____ Do you have a plan to graze more and feed less?_____________________________________
____ Do you have a plan that will allow you to use off-farm inputs in your operation?___________
____ Are you improving your soil or just maintaining a level of fertility?______________________
____ Do you recognize the interactions occurring on your farm, i.e. how one decision affects another? (give an example)____________________________________________________

I. FARM PLANNING AND GOALS

Farm planning is an on-going process that requires farm families to know where they want to go and how to get there. In determining goals, most farmers have a general idea but lack specifics. Putting goals on paper can provide a framework for making management decisions. Once you have written down your goals, other decisions are easier. You can plan for farm expenditures rather than buying what seems to be needed at the time.

____ Do you have written goals for your farm and family? If so, list them below.
___________________________________________________________________________
___________________________________________________________________________
____ What are your short-term production goals?  _____________________________________
____ What are your long-term production goals?________________________________________
____ What do you want your operation to be in five years? ______________________________
  10 years?
  20 years?
____ Do you recognize the interactions occurring on your farm, i.e. how one decision affects another? (give an example)____________________________________________________

As you consider the goals of your farming operation, are you

____ examining your dairy production program to make it more cost effective?
____ assessing the soil, plant, and water resources?
____ analyzing your marketing program and the potential to change it?
____ evaluating your quality of life from a family and community perspective?
____ How do you see your quality of life changing within 5 years? 10 years? 20 years?
How do you decide your priorities for expenditures on the farm with a given amount of money?

- equipment
- feed
- pasture—establishment or renovation
- fertilizer
- fencing
- animals
- labor
- quality of life

Do you know your return on investment for those expenditures?

Do they increase your quality of life?

Is the farm income distributed over the year? Are there things you can do to spread out income?

Can you continue to do what you are currently doing for five years?

II. FARM MANAGEMENT

A. Records

The decision-making process needs to include a standard analysis of farm records to evaluate production and to determine if and how production might be increased economically. Many times decisions are based on recommendations to increase the biological efficiency of an operation, e.g., increasing milk production, without any thought given to the economic efficiency. Actual costs of production should be calculated for each farm, as cost averages from other operations may be quite different from your own farm’s costs.

What are your farm management goals?

- Do you make good use of a record-keeping system?
- Are you on DHI or other testing program? If so, which one?
- Do you know your actual cost of production per acre? per animal?
- Do you evaluate production based on per acre or per animal costs when making decisions?
- How many pounds of milk do you sell per acre? per animal? per worker?

Hay and silage are major expenses for many livestock operations. Usually grass is considered cheap, but harvesting costs are quite variable, depending on land values, fertility costs, labor, and availability of equipment. Before a producer makes decisions related to producing or buying hay, using more pasture (annuals) or feeding hay a longer period, these costs should be calculated.

- Do you know what it costs to produce, harvest, and feed a ton of harvested feedstuffs? graze an acre of pasture? graze one cow for one day?
- Can you purchase harvested feedstuffs cheaper than you can produce them?
- Would purchasing free up more pasture for grazing and cut your costs of production?
- If contracting your harvesting, what if the harvesting is not done on time?
B. Farm planning

_____ Would diversification with other animal species add some benefit or add extra income?

_____ Would adding other species to your grazing program better utilize the forage?

_____ If so, what are the considerations? (e.g., labor, predation, fencing, market, hunting)

Fertilization of pastures can be a great expense for cattle producers. A rotational grazing program helps to minimize these costs, as well as waste management costs, by having the manure from the grazing animals distributed back on pastures rather than in isolated areas, such as around shade trees, water tanks, etc. An important but often overlooked component of a good pasture fertility program is level of organic matter, which influences the microbial activity of the soil. Using dairy waste is an opportunity to increase organic matter and nutrient content of soils that would most benefit.

_____ Are you testing soils in each pasture or field at least every three years?

_____ Are you making effective use of your fertilizer expenditures?

_____ Are you using the additional forage you produce with purchased inputs?

_____ Could you decrease N fertilizer through more effective use of legumes?

_____ Would using lime allow a decrease in fertilizer expenditures?

Equipment expenditures on a farm can be very costly, yet also be part of the tax consideration, which has an impact on purchasing decisions. Proper sizing of equipment to the job and minimizing equipment maintenance and operational costs are also important. In some cases, hay can be purchased or custom baling used to decrease farm costs. Some producers make equipment purchases for non-economic reasons and have equipment that cannot be justified based on economic return to the farm.

_____ Do you own more equipment than you need?

_____ Could you decrease the equipment you need if you relied more on grazing?

_____ Do you buy equipment for tax reasons, even though you don’t need the equipment?

_____ Does that equipment expenditure for tax reasons really increase your net income?

Feed expenses are usually considered the primary costs of a dairy. Having to purchase supplemental feeds and using harvested forages can increase the expenses of a dairy operation. As referenced earlier, good grazing management can decrease those out-of-pocket expenses. Conversely, there are times when supplements can be used very effectively and buying harvested feedstuffs might be more economical than producing them on the farm.

_____ What are your primary purchased feed expenditures? protein, energy, minerals, forages

_____ Could you decrease these by

_____ using by-product feeds?

_____ harvesting better quality feedstuffs?

_____ improving fertility of your pastures?

_____ better grazing management to be more efficient in pasture utilization?

_____ having better or more diverse forage species to extend the grazing season?

_____ changing the time of year when nutrition requirements of animals are highest?

_____ How do you know which of the purchased feeds you actually need?
III. FACILITIES

A. Livestock housing

___ Are you satisfied with your livestock housing facilities? _______________________________
___ If not, what are the problems? _______________________________
___ How many animals will your barns hold? ______ How many do you have in them? __________
___ Could you move animals out of barn? ________________________________________
___ Do you have windbreaks in pastures? ________________________________________
___ Do you have shade? _____________________________________________________
___ Is there water available? _______________________________________________
___ Do you have adequate loafing areas? ________________________________________
___ Are the animals comfortable while in these areas? _______________________________
___ Do you have respiratory problems in your animals? _______________________________
___ How are your barns ventilated? ______________________________________________
___ What percentage of cows use their free stalls properly? __________________________
___ Do your cows lay down and chew their cud? ______ Where do they rest? __________
___ Is the bedding dry? _________________________________________________________
___ Do cows appear stressed during weather extremes? ______________________________
___ Where do your cows drink? _________________________________________________
___ Do you have enough water for all of them to drink? ______________________________
___ Is the location of your barn such that runoff creates an environmental problem? __________

B. Milking parlor

___ Are you satisfied with your milking facilities? _______________________________
___ How calm are your cows while being milked? _______________________________
___ How long are they in the milking parlor? ______________________________________
___ Do you feed in the milking parlor? __________________________________________
___ Do you have problems with stray voltage? _____________________________________
___ Is your equipment adequately grounded? _____________________________________
___ Do you have your milking equipment tested regularly? __________________________

C. Calf raising

___ Do you raise your own replacement heifers? _______________________________
___ How do you raise them? ____________________________________________________
___ What is your disease incidence? _________________________________
___ What do you feed them? ____________________________________________________

D. Other

___ Do you have separate storage area for chemicals? _______________________________
___ Do you have feed storage facilities available? ________________________________
___ Are they adequate for commodities or for good buys? ___________________________
IV. LIVESTOCK and FORAGE PROGRAM
A. Herd health and reproductive management

Well-nourished, stress-free animals are the foundation of a sustainable livestock program. This means animals are healthy and perform better, are easier to manage and care for, and can more easily handle adverse conditions. While seemingly a simple question, this is intended to stimulate quick evaluation of any stress the animals may have. Simply walk into your herd and take a look at your animals.

___ What is the overall appearance of your animals?______________________________________
___ Do your animals appear to be thrifty, contented, and performing to your satisfaction?_______
___ What is your animals’ comfort level? ______________________________________________

If your animals are housed in a barn,
___ what kind of bedding do you use? _________________________________________________
___ Is it dry?____________________________________________________________
___ How often are stalls cleaned?______________________________________________
___ Do cows stand for more than four hours at a time? ________________________________
___ Are feeders and waterers clean? __________________________________________________

A good health and reproductive management program will allow a producer to avoid problems. Most reproductive management problems involve poor nutrition. The forage management plan, by ensuring an adequate supply of high quality forage throughout the year, will reduce the incidence of health and reproductive problems in the herd. If fed properly, cows will cycle and breed early after calving, preventing problems with open cows or late-calving cows.

While most people strive to have cows in condition score 3.5 for heifers and 3.75–4.0 for cows (1–5 scale) at calving, the critical point is to have cows maintaining weight before breeding, especially if seasonal. Sheep and goats do not have as much problem maintaining body condition since both are seasonal breeders. Does need to be in a similar body condition as cows, although they will be about two-thirds of the way through their lactation when they are bred. Ewes, not being milked more than ten weeks, should be in good body condition at breeding.

___ Do you have a regularly scheduled herd health check with your veterinarian? ______________
___ What vaccinations do you give? _________________________________________________
___ Do you use rBST?____________________________________________________________
___ When, how often and on what basis do you deworm? ________________________________
___ What is your calving interval? __________________________________________________
___ What is the body condition scores of your animals?_______________________________
___ At beginning of dry period? _________________________________________________
___ At parturition? ___________________________________________________________

Mastitis is an infection that every dairy must constantly be vigilant against. It can be very expensive, both in terms of lost milk production and in treatment costs. However, if steps are implemented and carefully followed, it does not have to be a common occurrence. Farmers whose animals spend the majority of time outside on pasture find their incidence of mastitis decreases by that one thing alone. The environmental pathogens are no longer able to survive and infect the udder. Contagious pathogens are best guarded against by making sure milking procedures are managed correctly, as this is where
most infections occur. Somatic cell counts are the best indication of potential mastitis problems. While bulk tank samples, if done often enough, provide some indication of level of mastitis, testing each animal will identify those animals with elevated counts and help determine the best management strategy.

___ List the steps in your milking procedure.
___ What is the somatic cell count for each milking animal?
___ What is your average number of lactations?
___ What percentage of animals have mastitis?
   Is it:
   Staph aureus? __________________ Strep? __________________
   Environmental? ______________ Do you know? ______________
___ In what order do you milk your animals?
___ What do your cows do after being milked?
___ Where do animals lie?
___ How is milking equipment cleaned?

Do you have a problem with
acidosis? ___________________ displaced abomasums? ______________
dystocia? ___________________ detained placentas? ______________
internal/external parasites? __________ milk fever? ______________
pregnancy toxemia? ______________ feet? ______________
legs? ______ What percentage of your cattle have problems with their legs?
   To what degree do they have a problem?
   How often do you trim feet?
bovine leukosis? ______________ Johne’s? ______________
caprine Arthritis Encephalitis? __________ other chronic diseases? ______________

Stress can be additive, in that one stressor alone may not be a problem, but when multiple stresses occur animals perform poorly or get sick. For example, parasites may not be a problem in well-nourished animals but cause problems when animals are under nutritional stress. Stress to animals can be decreased by careful design of facilities, proper consideration of animal behavior, adequate nutrition and awareness that drastic changes in diet can stress animals. Behavior of animals can cause stress to both handler and animal. The comfort zone of cattle is 30-75 degrees (effective temperature including wind chill). Outside of that temperature range, cattle have to expend energy to keep warm or cool. When temperatures exceed 75 degrees, cows will eat 3.4% less feed for every 2-degree rise in temperature. Above 80 degrees and 60% humidity, milking cows will begin to feel heat stress.

___ Are animals stressed
   during milking? ______________ during weather extremes?
   do you have wind breaks in winter?
   do you have shade? ______________ sprinklers?
   do you use techniques that minimize stress?
   are animals on slick concrete? ______________ in deep mud?

___ ____
_____ is dry matter intake/forage availability high enough to meet animals’ needs to prevent sickness at high stress times?_______________________________________________

_____ what are the condition scores of animals which show stress?______________________

_____ is there good quality and adequate quantity of water during hot weather?____________

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B. Breeding, genetics, and selection program

Breed selection should be based on the actual merits of a particular breed for a specific marketing program (milk, cheese, etc.) or forage utilization program. Consideration of animal type and of the kind of environment or management the seedstock were produced in helps predict how they will perform in another person’s program. For example, cattle from one geographical region may not perform well in another, or cattle developed in a confinement setting may not perform well on a pasture program.

_____ What are the goals for your breeding program? _____________________________________

_____ What traits do you want to improve? ______________________________________________

_____ What breeds do you use? ______________________________________________________

_____ Why did you choose those breeds? _____________________________________________

_____ Are there breeds that would better fit your present or potential marketing program?

_____ Are there breeds or breeding stock which would better fit your forage or management?

_____ Is your calving interval consistent with your production goals? _________________________

_____ Are you seasonal?_______________________________________________________________

_____ Are you using rBST and stretching out the calving season? _________________________

_____ Do your goats or sheep breed early in their breeding season?_______________________

_____ Do you breed out of season? ____________________________________________________

_____ On what basis do you choose a sire? _____________________________________________

_____ What percentage of breeding is AI? ______________________________________________

_____ Do you choose a sire to improve weaknesses, such as change frame or body type? _______

_____ Do you choose an easy calving sire for heifers? ____________________________________

_____ Do the majority of your cows calve when your pastures can supply the most forage? _______

_____ Did your animals come from a grazing operation? _________________________________

_____ Do you select for grazing behavior? _____________________________________________

_____ Do you select animals that have been raised in a management/environment similar to yours?

_____ Do your animals have good feet and legs? ______________Udders? ____________________

_____ What percentage of twins are born? ______________________________________________

_____ Do you have a high percentage of heifers become pregnant during breeding?_________

_____ Do you raise your own replacement females?_______________________________________

_____ If so, could you purchase them more economically? _________________________________

_____ Could you contract with someone else to raise them? ______________________________

_____ What is your culling rate? _______________________________________________________

_____ On what basis do you cull? _____________________________________________________

_____ Is your nutritional level adequate to meet the animal’s needs? _______________________

_____ Is your animals’ intake as high as it needs to be? _________________________________
C. Nutrition management

Feeding system and choice of forages are the key components of a dairy nutrition program. Regardless of how animals are raised, the quality of the forages fed, whether grazed or harvested, is the most important nutritional component to consider. Many dairies are grass-based, but many of those could utilize their pastures better by implementing a grazing management plan. We Americans have tended to not use pasture, opting to feed TMR or harvested forages that in some cases drastically increase the cost of production. All aspects of grazing, including when and for how long animals graze, change the pasture by affecting plant species diversity, plant population, and plant density. In a sustainable system, these changes should improve the pasture’s ability to meet the nutritional needs of the animals, minimizing the need for harvested forages and purchased feeds. Dairy producers in other parts of the world avoid the prohibitive costs of harvesting forages (equipment needs, fertilizer costs, fuel use, etc.) by using management techniques that more efficiently utilize pasture. Some dairy producers consider seasonal dairying where they can impact the animal’s needs by changing the time of the greatest nutrient requirement, peak lactation, by timing when the animal calves and matching the forage production to the lactation curve.

Because protein levels are so important, milk urea nitrogen (MUN) tests have been developed to give a measurement of the amount of nitrogen being excreted through the milk. Some people check blood urea nitrogen (BUN) levels, which while more accurate, are not as easy to collect as MUN samples. MUN levels are used primarily to determine if the feeding program is balanced for protein content, including degradable and undegradable protein. Normal levels are 12-18 but individual herds sometimes vary from these levels. Too low protein or MUN levels can cause lower milk production and too high levels can lower reproduction and increase feed costs. Low levels may occur most often in herds using harvested forages where quality was not adequate, whereas high levels may occur on pasture where protein is actually too high with a very high percentage of soluble protein. In the case of high soluble protein, energy is usually lacking, necessitating supplemental feeding on what is thought to be high quality pasture.

___ Are the crude protein levels of your total ration 18-19%?
___ Is the degradable intake protein (DIP) in the 60-65% range?
___ Is the undegradable protein or bypass protein in the 35-40% range?
___ Do you understand the function of the different protein fractions?
___ Do you test for MUN? If so, are the levels between 12-18mg percent?

Fiber keeps the mechanics of the rumen functioning well. The rumen must function well in order for the milking animal to remain healthy and produce an optimal amount of milk. Neutral detergent fiber (NDF) levels are used to determine intake and acid detergent fiber (ADF) levels are used to determine the digestibility of a feed. The best indication of fiber level is amount of time a ruminant chews her cud.

___ What percent body weight do milking animals eat in forage dry matter?
___ Is the NDF level in the diet at least 28%?
___ Is the ADF level at least 19%?
___ How much time do milking animals spend chewing their cud?
___ If feeding silage or TMR, are the lengths of plant material sufficient?
___ Do animals lie down while chewing their cud and appear comfortable?
Energy is the other major component besides protein that must be adequately provided. The rumen microorganisms require energy to break down the plant material fed, in addition to the amount of energy the animal herself needs. Larger breeds of cow, such as Holsteins, should be fed one pound of grain for every four pounds of milk. Smaller cows, such as Jerseys, will need about one pound of grain for every three pounds of milk. Does and ewes should be fed one pound of grain for every two pounds of milk. Feeding too much grain at one time will lower pH of the rumen, causing acidosis. Adding a buffer to the ration, such as sodium bicarbonate, will help to prevent acidosis. Grain intake should not exceed 60% of the ration DM. All animals require fat in their diets, which is available in the forages and grains. High producing dairy cows and some does, however, cannot eat enough energy-containing feeds to avoid losing body condition and need an additional fat source. It is best if this fat is provided in the form of whole cottonseed or roasted whole soybeans, although 2% can be added from a rumenally inert source, as rumen bacteria do not function well if there is too much fat in the diet.

It is important to decrease energy levels in cows as the lactation period progresses and into the dry period, so as not to overcondition the cows.

D. Pastures

These questions are for those times of the year when pastures are being grazed.

The use of pasture is being considered by many dairy farmers in order to decrease their milk production costs and increase the economic and environmental sustainability of their farm. Central to the choice to be grass-based are several questions that need to be addressed. Under continuous grazing, as the season progresses, grazing becomes spotty, as some areas within a pasture are overgrazed and others are undergrazed. Some plants mature and quality decreases while other plants do not persist because of depleted root reserves. Consequently, milk production declines because of poor availability of quality forage and subsequent decreased intake by the grazing animal. Controlled grazing allows pastures to be grazed sooner in the spring and later in the fall, with an availability of forage that allows high animal intake and at the same time gives other pastures the opportunity to grow and rest. By knowing what forage is produced, when and how, we can feed our animals on good pasture for a longer period of time. We can change the forage production curve through management. Dairy producers should consider moving milking animals every twelve hours to fresh pasture. Pasture that is too vegetative will be too high in degradable protein without adequate digestible fiber. Therefore, dairy producers can use grain supplementation effectively to balance the nutritional requirements of their milking animals on pasture.
Is pasture quality or pasture availability a bigger problem for you? ______________________________

What are the options you have to increase forage availability? ________________________________

What are the options you have to increase forage quality? _________________________________

Is your farm soil type/base fertility conducive to being grass-based? _________________________

Do you have a soil map of your farm and have forages that perform well on those soil types?
Which options are realistic considerations for you?

More annuals _________________________________________________________

More emphasis on legumes _____________________________________________

Complete pasture renovation ____________________________________________

Do you have a drought plan? _____________________________________________

Is irrigation an option for you to consider to grow more forage? ________________

Do you cut pastures for silage or hay in order to keep pasture growth under control?

E. Confinement

These questions are for during those times when animals are being confined

Many dairies, even ones that are grass-based during the warmer months of the year, have cows in confinement at certain times of the year. Others have animals confined the majority of the time. Some of these dairies are discovering that allowing cows outside of the barn for three hours a day is eliminating certain problems. Comfort of animals in confinement is an important issue to be aware of. Feeding is another area that a farmer must have knowledge of in order to avoid digestive, breeding and other associated problems, especially in high producing animals.

Cattle in confinement have their environment controlled by the farmer. In order for the animals to produce to their potential and for the farm to sustain itself, nutrition along with comfort has to be optimal. Cows should be fed to consume 4% of their body weight at peak lactation and should reach that level by ten weeks after calving. Protein and energy levels must be in balance. Protein levels must not be too high to avoid acidosis and to prevent nitrogen levels in the urine from being too high which can be an environmental problem. Cows will drink a half gallon of water for every pound of milk produced.

How many pounds on a dry matter basis do you feed your milking cows? _________________

Do you have fresh feed available after every milking? _________________________________

Do you allow your first fresheners enough time to eat? ___________________________________

Do you feed them separately from your older milkers? _________________________________

Where do you feed your milking herd? _____________________________________________

How many times a day are they fed? ______________________________________________

Is there enough bunk space for each animal? __________________________________________

Are cows milking what they should be milking? ______________________________________

What is the protein level of the feed? ______________________________________________

What is the energy level of the feed? ______________________________________________

Do you raise your milking animals in confinement but raise your heifers on grass? __________
F. Harvested forages

General
_____ Do you utilize harvested forages in your dairy operation? If so, which ones? __________

_____ Where are these forages obtained?
  _____ grown on farm _____________________________________________________________
  _____ purchased locally _________________________________________________________
  _____ purchased from other areas of state or country ____________________________

_____ If forages are harvested on your farm, which of the following are major justifications for this practice?
  _____ control excessive spring growth in pastures _________________________________
  _____ extra hay or silage for cash crop __________________________________________
  _____ provide all or significant portions of the forage for your dairy herd and replacements
  _____ maintain appearance of farm and/or weed control ___________________________
  _____ other ___________________________________________________________________

_____ How are your harvested forages delivered to your livestock? _________________________
  _____ all are fed directly in bunks, hay rings, etc. (no blending with other ingredients) ____
  _____ all forages are fed as part of a TMR (total mixed or blended ration) ______________
  _____ modified TMR - a significant portion of the forage consumed is delivered with concen-
   trates via TMR, but the balance is supplied either by supplemental grazing or by directly feed-
   ing harvested forages elsewhere __________________________________________________
  _____ combination of these approaches (please describe) ____________________________

Ideally, forages should be harvested at the boot stage or beginning bud stage, but your goals will also determine when it is best for you to harvest. For instance, if top quality is not necessary, alfalfa should be harvested at least 1/10 bloom to promote positive growth reserve balance and persistence. Cereal grains probably should be harvested at boot stage, but most of these (excepting cereal rye) also get a quality bump during grain fill. It may be advantageous in some cases to wait until soft-dough stage. The weather may be better then and you could direct cut because the moisture content is lower. Many crops tend to be drier and dry faster as they mature; if top quality is not needed, you may want to take advantage of this. Also, there are various ways to manage mixtures, which can easily vary depending on your goals. The point is not so much that there is a right and wrong way to manage things (although there are certainly absolutes), but that you should be encouraged to think through a reason for what you do.

_____ What plant growth stage (maturity) do you target for harvest?
  _____ cool-season perennials ____________________________________________________
  _____ warm-season perennials _________________________________________________
  _____ cereal grains and ryegrass _______________________________________________
  _____ legumes __________________________________________________________________
  _____ corn _____________________________________________________________________
  _____ forage sorghum ______________________________________________________________________

_____ Which of these numbers that are typically reported on your forage tests do you not understand?
Do you understand how these numbers change as plants mature? Do you understand how different forage classes (like those identified in the previous question) vary with respect to these numbers?

_____ Crude protein ____ NDF ____ ADF ____ TDN ____

_____ Do you understand the relationship between forage fiber content (NDF) and intake?
Silage

_____ What criteria do you use when selecting a variety for
_____ corn silage?
_____ sorghum silage?
_____ alfalfa silage?

_____ How are your silages stored?
_____ covered pile
_____ trench or bunker
_____ upright silo (traditional)
_____ silage bag
_____ upright silo (oxygen limiting)
_____ balage
_____ other

_____ Are bunker or trench silos covered with plastic and sealed?
_____ Is this plastic weighted with tires or other weights?
_____ Is all runoff water diverted from the silo?
_____ Is there evidence that rodents, racoons, or other animals are destroying the plastic and exposing
the silage to the air?
_____ If silage bags or balage are used, do you place these “silos” in sites that are weed and debris
free?
_____ Do you practice aggressive control of rodents and other pests?
_____ Do you regularly inspect silage plastics for holes and then patch with the appropriate UV-
resistant tape?
_____ Has some thought been given to diverting runoff water away from these “silos”?
_____ Are these “silos” used within the expected life of the plastic?

Most dairymen harvest several types of forages and may store them in different types of silos. These factors may
affect the proper moisture content for each forage at the time it is ensiled. They also may determine whether the
forage can be direct cut or whether it must be wilted prior to chopping or baling for balage.

For each combination of forage and silo type that you utilize, describe the moisture content that you
target for proper fermentation, stability, and animal performance

_____ Is there evidence of excessive effluent production?
_____ Is there evidence of undesirable fermentations?
_____ ammonia odor
_____ butyric acid odor
_____ acetic acid
_____ poor intake and performance

_____ Is the silage excessively dry?
_____ Does the silage appear to be moldy?
_____ Is there any evidence of heating in the silages being offered to dairy cattle?

During feedout, silo management is very important. The following questions apply to the feedout phase
specifically.

_____ Is the silo too large for the numbers of cattle being fed?
_____ Is some silage removed from the entire exposed silage surface each day in order to keep the
exposed silage face or surface fresh?
_____ Is there evidence of excessive loose silage in the trench or bunker silo? Does this silage appear to be heating? Does the individual responsible for feeding habitually loosen more silage than necessary, thereby exposing large quantities of unfed silage to the air? __________________________________________

_____ Are cattle fed several times per day? Are cattle encouraged to eat during hot weather by using sprinklers, fans, etc? __________________________________________________________

_____ Are feed bunks cleaned regularly? __________________________________________________________

**During filling, every effort should be made to fill quickly and pack thoroughly to limit air access to the silage mass. The following questions apply to this phase of silage harvest.**

_____ Do you make every possible effort to fill silos rapidly and pack thoroughly? ________________

_____ Within trench or bunker silos, are there large fault lines of poor or spoiled silage that would indicate prolonged or multiple exposures to the air during filling? ___________________________

_____ If more than one crop is ensiled, are additional silos available to maximize flexibility and prevent the necessity of opening sealed silos to accommodate additional crops? _____________

_____ Is it necessary for you to feed unfermented corn silage at any time during the fall? __________

_____ If you rely on a custom harvester in the silage making process, are you satisfied with the reliability of this individual? _______________________________________________

_____ Is service provided within a reasonable window of time?

_____ If the answer to either of these questions is no, can you estimate what this frustration costs you in excessively mature forage, additional grain costs, and lost milk production? ________________________________

_____ Does this cost warrant changing the custom harvester, buying silage-harvesting equipment, or relying exclusively on hay and/or grazed forages? ___________________________

_____ If you harvest your silages yourself, what are your biggest impediments to rapid filling?

_____ capacity of chopper is too low

_____ labor

_____ transport of chopped forage to silo by wagon or truck

_____ unloading silage at silo

_____ packing

_____ sealing

_____ other __________________________________________

_____ Can these inefficiencies be improved in an economical manner?

_____ Have you considered using silage inoculants on high-risk crops, such as alfalfa? ________________

**Hay**

_____ Do you use a plunger-type baler to harvest legumes? _______________________________________

_____ Do you rake legumes at moisture contents > 40% ?

_____ Do you avoid baling excessively dry legumes, which results in elevated leaf loss? ___________

Realistically, is it feasible to expect to bale dairy-quality hay in the spring in your area? Can other livestock classes utilize rained-on hay? Should you consider balage or silage to harvest excess spring forage at dairy quality?

_____ Is there evidence of bloom in your alfalfa hay? ______ contaminant grasses?_______________

_____ Can you buy dairy-quality alfalfa hay easier or cheaper than producing it yourself?___________

_____ Regardless of forage type, is there evidence of heating and/or mold in your hay? ____________

_____ Is outside hay storage appropriate for your climate? _______________________________________

_____ If hay is purchased, on what basis do you buy? __________________________________________

_____
V. NUTRIENT MANAGEMENT

____ Do you have a nutrient management plan? _________________________________________
____ Is it an approved plan by your state regulatory agency? ___________________________

Have you implemented it? ________________________________________________________
____ How do you handle waste water from the milking facility? ________________________
____ Are you utilizing the nutrients where they do the most good on your farm? __________
____ Do you know which pastures/croplands need the most fertility? ________________
____ Do you know the best time of the year to spread nutrients so they are most effective? _____
____ Do you soil test to monitor phosphorus levels? ______ salinity? ______ potassium? ______

What is the pH of the soil? ______________________________________________________
____ Could you change the way you store waste products that would allow better utilization? _____
____ Could you change the way you raise your animals to reduce the amount of waste products that need to be stored? ____________________________________________________________

VI. ALTERNATIVE DAIRY FARMING

A. Minor dairy species

Even though all the questions thus far pertain to all dairy species, there are certain questions that must be asked when one is thinking of producing some of the minor dairy species, usually goats or sheep. These animals have their own unique challenges for someone wanting to produce a marketable product from their milk. Many dairy goats, for instance, are raised for show. These animals, while milking well in a small herd fed for showing, may not do well in a commercial herd in which economics is a bigger factor in production and feeding decisions.

____ Do you have access to good quality milking animals in your area? ______________________
____ Do you know how to select animals that will fit into your herd or flock? ________________
____ Do you have a market for the milk or unique products that can be made from goat or sheep milk? ____________________________________________________________

____ Are there other farmers or educators nearby who can give you information on how to produce good animals and milk from those animals? __________________________________
____ Do you have a market for kids? ___________________________________________________
____ Do you have the facilities needed to raise and milk these animals? ____________________
____ Can you build or buy the needed facilities and appropriate equipment? ______________
____ Do you have a financial plan? ___________________________________________________
____ Do you have a veterinarian who knows about sheep and goats? ______________________
____ Are there veterinary products available?__________________________________________

B. Seasonal dairies

Seasonal dairying means breeding cows to calve in a two month period, then drying them off at the same time, about ten months later. This can occur so the dry period is in the middle of winter in the North, but in the South, having the dry period during the hot summer months is often more feasible. Most seasonal dairies are pasture-based, using few purchased inputs. While being seasonal can be good for a farm’s quality of life, there are problems associated with being seasonal. Getting cows bred in the narrow window necessary can be difficult. Some milk buyers are not happy with seasonal dairies, especially if those dairies are dry during a period of high milk demand.
Do you have the pasture available to provide the majority of forage for the herd? ____________

Is your market or milk buyer accepting of you being seasonal? ________________________________

Do the majority of your cows breed in the eight week window necessary to fit your season? __________

Can you buy in bred animals to meet your production goals? ________________________________

Do you have an outlet to sell animals which don’t breed within your window? ______________

C. Organic dairies

The demand for organic milk is growing in all parts of the country. There is a lack of processors set up to process organic milk. The ones that are available are on the coasts and in Wisconsin primarily. For many farmers wanting to produce organic milk, the only alternative is to process and bottle it themselves. While consumers of organic milk and milk products have various reasons for buying these products, the main reasons are philosophical and related to perceived health benefits to themselves and the environment. For the farmer, raising animals to produce an organic product requires that certain things be done differently, such as the use of certified pastures and other feeds, no antibiotic use, and cleaning of equipment with certain specified products.

If you are interested in organic production, do you:

Know the regulations to raise and sell organic food products? _________________________

Have access to the allowed feeds and products? ________________________________

Understand the rationale behind organic production? ___________________________

Have a veterinarian available who is willing to work with you on raising animals without conventional medicines? _________________________________________

Have a processing plant close enough that is certified organic? _____________________

Know if the price you receive is adequate for the additional costs? ________________

VII. MARKETING

Most cow dairies sell their milk through traditional milk channels and so are governed by the new milk marketing orders for their region.

What are your marketing goals?________________________________________________________

Could you produce a more marketable product with a change in your breeding program?

Are you in an area where niche marketing could be established, such as near a metropolitan area where direct-marketeted milk and milk products would have potential?__________________

If you are interested in direct marketing, do you:

Know the training and licensing regulations?_______________________________________

Have labor available?___________________________________________________________

Have adequate capitalization of facilities and equipment?__________________________
VIII. ASSESSMENT OF INDIVIDUAL PASTURES

Routine pasture assessment can be used effectively as a feed budgeting process as well as an evaluation of how well your grazing program is working and how individual pastures (paddocks) should be managed. Individual pastures should be regularly evaluated to determine short-term management decisions, such as grazing pressure, fertility needs, forage availability within a short time span, potential for hay production, etc. Pasture assessment can be as important to your operation as animal evaluation (and economically, may be more important). Each pasture should be assessed at various times of the year. Additionally, when assessing a pasture, evaluate how previous management and use over time has influenced the pasture.

What are your pasture management goals?_________________________________________________
_________________________________________________________________________________

_____ What changes in plant species are occurring?___________________________________________
_____ Are these changes desirable or undesirable?___________________________________________
_____ Are there spots of bare ground within pastures?_______________________________________
_____ Do you have any erosion problems?__________________________________________________
_____ Is the pasture grazed fairly uniformly or are there areas of spot grazing?_________________
_____ Is there adequate but not excessive residue in the pasture?_______________________________
_____ Is the residue decomposing properly or is it thick enough to contribute to lack of seedling
development of other species, such as clover?__________________________________________
_____ Are the animals doing a good job of controlling the edible weeds, such as ragweed, when
teachative?_________________________________________________________________________
_____ Which weeds or brush are not being controlled by grazing?_____________________________
_____ Are there compaction or pugging problems?___________________________________________
_____ Could a change in water/mineral feeder location or the shape of pasture impact the grazing
pattern?_____________________________________________________________________________
_____ Is wildlife habitat appropriate?_____________________________________________________
_____ Is water runoff excessive, especially on slopes?_______________________________________
_____ Do you need more forage, which might be gained through an application of fertilizer or a longer
rest period?_________________________________________________________________________
_____ Are pastures resting long enough to allow proper plant regrowth and replenishment of root
reserves?_____________________________________________________________________________
_____ Do you need to make better-quality forage available, which might be accomplished with haying
earlier or using better grazing practices?_________________________________________________
IX. ASSESSMENT OF SOILS

*Soil is the natural resource foundation of any farm. Proper management of the soil is the basis for managing the plant-animal interface necessary for a sustainable livestock farm. Whole farm planning includes assessment of soil characteristics. First, study how everyday management influences nutrients, moisture levels and tilth. This is the basis for decisions on fertility and grazing, which will affect species diversity and erosion problems. It is important to understand where your quality soil is, as well as how to improve the quality of all your soil. A nutrient management plan can be used to determine sources of nutrients that can improve the farm’s productivity at minimum costs.*

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>Do you have soil maps of your farm and understand the productivity index of each soil type?</td>
<td></td>
</tr>
<tr>
<td>Do you have specific problems to address, such as fragipans, poor drainage, compaction?</td>
<td></td>
</tr>
<tr>
<td>What is the microbial activity in your soil?</td>
<td></td>
</tr>
<tr>
<td>What does the soil smell like?</td>
<td></td>
</tr>
<tr>
<td>What is the tilth?</td>
<td></td>
</tr>
<tr>
<td>What does a handful feel like?</td>
<td></td>
</tr>
<tr>
<td>Do you have a nutrient management plan for each pasture?</td>
<td></td>
</tr>
<tr>
<td>When was your last soil test?</td>
<td></td>
</tr>
<tr>
<td>What is soil pH, salinity and Na saturation?</td>
<td></td>
</tr>
<tr>
<td>Do you routinely use lime?</td>
<td></td>
</tr>
<tr>
<td>What is the organic matter level in your pastures/fields?</td>
<td></td>
</tr>
<tr>
<td>How deep is the dark surface layer?</td>
<td></td>
</tr>
<tr>
<td>Is it less than the natural undisturbed soils in your area?</td>
<td></td>
</tr>
<tr>
<td>How many days does it take grass or crops to exhibit drought stress?</td>
<td></td>
</tr>
<tr>
<td>How hard are earthworms to find?</td>
<td></td>
</tr>
<tr>
<td>Is there evidence of earthworm activity such as castings on the surface?</td>
<td></td>
</tr>
<tr>
<td>How fast do manure piles and forage thatch degrade?</td>
<td></td>
</tr>
<tr>
<td>Are any plants yellow, spotty or purple-colored?</td>
<td></td>
</tr>
<tr>
<td>Do you have any soil nutrient deficiencies or imbalances that impair forage and animal production?</td>
<td></td>
</tr>
<tr>
<td>Do you have considerable variation of productivity level and nutrient level within pastures?</td>
<td></td>
</tr>
<tr>
<td>Are soil fertility levels adequate to meet forage production targets?</td>
<td></td>
</tr>
<tr>
<td>Are forage production targets too high, leaving inputs that are undesirable for environmental or economic reasons?</td>
<td></td>
</tr>
<tr>
<td>Would a change in fencing allow better use of pastures based on productivity of soil?</td>
<td></td>
</tr>
<tr>
<td>Are any erosion problems due to a lack of water flow control, lack of adequate cover or lack of infiltration?</td>
<td></td>
</tr>
<tr>
<td>Do you have soil compaction problems in any fields?</td>
<td></td>
</tr>
<tr>
<td>How long does it take for standing water to seep in?</td>
<td></td>
</tr>
<tr>
<td>Do you regularly sample soil of individual fields or soil types?</td>
<td></td>
</tr>
</tbody>
</table>
X. ASSESSMENT OF WATERSHED

Every farm is part of a watershed. Water flows onto the farm and leaves the farm. What happens in the process is the responsibility of the farm owner and can have an impact on the water quality downstream as well as influencing the soil erosion problems on the farm. An understanding of the geological formations of the farm may assist in evaluating water flow and managing the water quality.

_____ What are the water drainage patterns into and from your farm?

_____ Are there litter banks (debris piles, usually wood) present anywhere on your land?

_____ How efficient are you in retaining water on your farm and in your soils?

Riparian areas are the edges of streams, wet weather creeks, ditches or any area where water flows through at various times of the year. Management of these areas can have an impact on erosion and water quality.

_____ Do you have major riparian areas, with flowing water in them most of the time?

_____ Do you have riparian areas with large amounts of water at limited times during the year?

_____ Do you have a management plan for your riparian areas?

_____ Does your plan allow livestock frequent, limited access to help manage the vegetation of riparian areas?

_____ Are riparian areas managed for wildlife habitat?

_____ Do you have buffer zones adjacent to the riparian areas?

_____ Are farm ponds full of algae?

_____ Considering your whole farm as a watershed, do nutrients that contribute to poor water quality leave your farm?

_____ Do you time your fertilizing or spreading of litter/manure to prevent runoff of nutrients?

_____ Do aquatic organisms downstream indicate good water quality? Has this changed?

_____ Do you use pesticides/herbicides tactically for localized infestation?

_____ If using poultry litter or other manures, do you test soil to monitor nutrient management of individual pastures?

_____ Does your soil absorb and retain rainfall?

_____ Is the vegetation adequate to allow water penetration into the soil and prevent excessive water flow?

_____ Are some areas overgrazed to the extent that water flow is excessive?

_____ Do you have an understanding of the nutrient flow on your farm (inputs and outputs) and know what percentages are retained on the farm?
XI. SUMMARY

Now that you have completed the assessment of your farm, go back through the questions you indicated as high-priority items for increasing economic or environmental sustainability. Then use the sustainability manual to explore potential changes in your management program or planning. Spend time reviewing the areas that could be emphasized to allow you to meet your goals.

____ Have your perceptions of your weaknesses and strengths changed? __________________________

____ What are the highest priority areas for you to emphasize? __________________________

____ Have you put on paper your goals for your family and your operation? ____________________

____ Do you understand better the interactions occurring on your farm—i.e., how one decision affects another? ______________________________________________________________________

XII. SUGGESTED RESOURCES

A. ATTRA Publications

Listed below are ATTRA publications that may be useful for addressing many of the questions presented in the check sheet. These may be ordered at no charge by calling the ATTRA office, 1-800-346-9140. Some are also available at our website <http://www.attra.ncat.org>.

- Sustainable Pasture Management
- Rotational Grazing
- Matching Livestock and Forage Resources in Controlled Grazing
- Meeting the Nutritional Needs of Livestock with Pasture
- Nutrient Cycling in Pastures
- Whole Farm Nutrient Management
- Sustainable Soil Management
- Integrated Parasite Management for Livestock
- Introduction to Paddock Design and Fencing-Water Systems for Controlled Grazing
- Financial Tips and Resources for Grass Farmers
- Alternative Fly Control
- Grass Based and Seasonal Dairying

B. Other Resources

Notes
The electronic version of the Dairy Farm Sustainability Checksheet is located at:
http://www.attra.org/attra-pub/dairycheck.html