Chapter 2: Introduction to Planning for Agroforestry

Chapter Highlights

- Agroforestry designs use a multifaceted approach to develop farm plans, evaluate economic considerations, and steward landscapes.
- Understanding the relationship between personal resources, business aspirations, climate, biophysical site characteristics, and market considerations is key for a successful agroforestry design plan.
- Planning for agroforestry is an iterative process. Keep learning and adapting as you go.

Why plan?

Developing a plan may seem tedious at the beginning, but the long-term benefits far outweigh the difficulties of plan creation. By having a plan, farmers and land stewards can better envision how to successfully integrate agroforestry onto their farm. The planning process will also help develop a familiarity with the management that is required in order to reach the goals, objectives, benefits, and economic outcomes that are desired. The best way to ensure success is by thoughtful and honest planning.

The development of a plan for integrating agroforestry practices to the farm system is as important as the actual establishment of the practice itself. Planning and the development of a timeline will help maximize the chances for the success of the agroforestry practice. Planning will not only assist in understanding how the practice and its placement on the landscape can accomplish specific on-farm goals, but will also provide assistance in identifying market opportunities for products that may be grown in the practice. *Remember: diagnosis precedes treatment.*

An agroforestry development plan is based on the capability of your land, your personal goals, your business goals, and your land stewardship objectives. These goals and objectives will be reassessed and changed as you obtain new information during the planning and initiation of an agroforestry development. Agroforestry practices are always changing; understanding and working with change will help you best achieve your goals.

Coupled with the *Handbook for Agroforestry Planning and Design* (available for free download at the Center for Agroforestry's website), these steps are designed to help guide you through the various stages of creating a plan for your agroforestry development area(s), and will assist you in gathering information on:

- Your objectives and priorities
- Personal resources (e.g., labor, equipment, buildings, animals, plants)
- Climate, soil conditions and physical features
- Current land use
- Land available to practice agroforestry
- A non-timber plant inventory (for woodland only)
- Market conditions for potential products

Handbook for Planning and Design

This chapter frequently references the ***Handbook*** (and the accompanying Workbook). You can download the *Handbook* for free by scanning the QR code or by visiting our website.

Steps to Developing an Agroforestry Plan

Personal Assessment

Step 1: Initial Objectives and Priorities

Step 2: Evaluate Personal Resources

Biophysical Site Assessment

Step 3: Identify Current Land Uses

Step 4: Map Area(s) for Agroforestry Development

Step 5: Climate Assessment

Step 6: Soil Assessment

Step 7: Physical Features (Terrain)

Step 8: Timber and Non-Timber Forest Crop Inventory

Agroforestry Development Ideas

Step 9: Agroforestry Ideas – Brainstorming

Step 10: Listing 'Best Bets'

Evaluating the 'Best Bets'

Step 11: SWOT Analysis

Step 12: Porter Five Forces Model

Step 13: Revising your 'Best Bets'

Marketing Strategy for 'Best Bets'

Step 14: Select and Describe Target Market(s)

Step 15: Adding Value to Products

Step 16: Getting Products to the Buyer

Step 17: Setting the Price

Step 18: Promoting Your Products

Agroforestry Practice Design & Management

Step 19: Revisit Your Objectives and Priorities

Step 20: Detailed 'Best Bets' Crop Information

Step 21: Designing Your Agroforestry Practices

The Agroforestry Development Plan

Step 22: A Five-Year Management Projection

Step 23: Yearly Activity Schedule

These steps, along with the information provided throughout this Manual, will allow you to identify what agroforestry products can grow on your land, which of these products you can sell profitably, and how to develop basic business and marketing strategies. The final steps are a five-year development plan and yearly activity schedule, outlining the work you plan to do to establish your agroforestry system(s). The time you put into researching, preparing and following your plan is an investment in your future agroforestry success.

The succession of steps has been organized to help you develop your plan logically. You need not complete each step in the order they are presented. In fact, the steps presented in the following pages are often interrelated. Information gathered in one step will likely impact information gathered in other steps. For this reason, the creation of your plan will likely require you to revisit (and expand upon) each step as you learn more and develop new ideas.

In addition to identifying available resources, site conditions and marketable plants, filling in the *Handbook* forms will help you explore and articulate your values and attitudes. Every land steward will have different personal and production goals for their agroforestry development. Your plan for your land will be different from someone across the country, state, or even across the road. To accommodate these differences, this guide is not based on a single set of goals. Instead, it has been developed to provide a set of tools that you can use to make informed decisions in creating a profitable agroforestry business.

There are many sources of information and advice available to assist you with your agroforestry development. Since agroforestry practices often involve the cross-pollination of expertise in conservation, agriculture, and forestry (e.g., forest management, agronomy, animal husbandry, horticulture, soil science, marketing, etc.), you may have to augment and expand your personal knowledge. Sources listed at the end of each chapter are designed to guide you.

How to proceed

As previously mentioned, the information in this chapter is also available in the *Handbook for Agroforestry Planning and Design*. The information, tools and links you need to complete your plan are found in chapters that follow. It is recommended that you read through these steps before you begin writing your plan.

Note: Depending on the size of your property, you may have one or more areas on which you want to develop agroforestry practices. Planning will be easier if you prepare separate forms for each separate development area, especially if potential agroforestry development areas have different site conditions and current uses.

Step 1: Initial Objectives and Priorities

Farmers and land stewards exploring multiple uses for their land face many preliminary decisions. Not least, if you have a number of different objectives for an area, some may seem to be in conflict. The choices each farmer makes reflect a set of individual values and attitudes. Your personal and business goals become the criteria for assessing the different possibilities for your land.

Your land management objectives and priorities will be specific to your circumstances and the area you want to develop for agroforestry. Among other possibilities, you may want to:

- Develop a new source of income from unproductive land (diversification)
- Reduce costs of an existing farm or forest operation
- Develop a source of long-term income
- Develop a source wof short-term income while awaiting long-term income from tree crops
- Reduce property taxes
- Protect or improve environmental conditions, and/or
- Increase grazing opportunities

Open the *Handbook for Agroforestry Planning and Design* and complete the table of initial objectives and priorities (p. 27). Remember that these initial objectives may change as you learn more about your land and your agroforestry business. After you finish this assessment, you will be able to weigh your objectives against what you can actually produce on each area of your land.

Step 2: Evaluate Personal Resources

In addition to your land base, your agroforestry development will require the input of other personal resources. An evaluation of the resources available to you will help determine which agroforestry options are best suited to your operation.

An evaluation should include:

- ***Management and labor availability***: periods during which you are not busy (between or after harvests) and the periods during which labor and management time will be committed to other activities.
- ***Equipment and buildings:*** buildings and equipment, including machines and hand tools, that can be used for this development.
- ***Livestock***: your operation may already have cattle, sheep, or other animals.
- ***Plant material:*** your own sources of seed, seedlings, cuttings and larger trees.
- ***Other materials:*** resources such as sawdust or shavings, manure and straw for mulch.

List these personal resources, as well as anything else that you consider of importance, in the table provided in the *Handbook*.

Step 3: Identify Current Land Uses

List the present uses of each area of your land and the products you harvest, and record them in your *Handbook*.

These uses could include:

- Residential
- Recreational
- Environmental use
- Farming (which crops)
- Grazing (type of livestock)
- Non-timber production
- Timber production

Step 4: Map Area(s) for Agroforestry Development

An agroforestry development may include all of your land or only specific areas, such as existing woodlands, open field, logged-over area, or riparian zone. In either case, identifying objectives and making decisions will be much easier if you break your land into separate development areas with similar current uses and site conditions (such as soil, moisture, and existing plants). Steps in the Handbook, including the sketch map, should be completed for each separate development area. Pages of the Handbook can be copied for this purpose.

For each agroforestry development area, you should:

- Draw a sketch map of the area you are targeting for agroforestry development. Using the legend

provided in the Handbook, indicate boundary lines, main geographic features, houses, other buildings and roads.

- Identify and measure the area approximately, marking these measurements on the sketch. This will help determine planting requirements wand potential crop production.

There is some overlap between Step 3 and Step 4, since you will indicate these uses on your sketch map. Step 3 gives an opportunity to provide information on land use in greater detail, and by thinking about land uses, you may decide to modify your sketch map.

Step 5: Climate Assessment

Climate on your site ultimately determines what you can grow on your land. Combining this data with the information provided in Appendices II and III will establish the range of possibilities for your agroforestry practice.

Hardiness zone - The USDA Plant Hardiness Zone Map has mapped plant hardiness zones for the entire country. Using the above website you can also locate a Plant Hardiness Zone Map specific to your state.

These zones rate the conditions affecting winter survival of plants. The primary factor is the minimum (coldest) winter temperature, with some consideration for the number of frost-free days, summer rainfall, maximum temperatures, snow cover and wind.

Most information sources and suppliers of seeds and plants list the minimum hardiness zone for particular plants. Plant breeding programs have resulted in cultivars or selections of many plants that differ in hardiness from their parent (check this carefully to prevent a costly error).

In some cases, the hardiness zone mapping is only an approximate guide for local conditions.

Enter hardiness zone information in the table provided in the *Handbook*. Additional information you may find, such as frost-free days and date of soil thaw, should also be included in the table.

Why Assess Your Land?

Assess climate, soil and physical features on each site on which you intend to develop an agroforestry practice. These assessments will allow you to determine:

- which plants you can successfully grow on each site.
- limitations to planting and growing these plants.
- the most effective management practices.

Assessments can be as detailed as you want, or as required by the project. The introduction of long-term or special-needs crops such as black walnut trees require a different level of site assessment than the planting of a shallow-rooted annual crop. Even if you plan to begin small, with a few tree seedlings on a fence line and a small planting of medicinal herbs, you should still assess the limitations and potential of your land.

The information provided here, and the accompanying form in the *Handbook*, provide a basic site assessment. More detailed assessments require added time, equipment and expertise. They are only worth doing if it will help with a critical aspect of your agroforestry development. For most developments, they are not necessary.

Step 6: Soil Assessment

Land capability classification

The Land Capability Classification shows, in a general way, the suitability of soils for most kinds of agricultural land use or field crops. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. There are two primary categories in this classification system, (1) the Capability Class and (2) the Capability Subclass.

The Land Capability Classification identifies the potential of local areas for agricultural production. County Soil Surveys contain the Land Capability Classification for all soils in your county. The County Soil Surveys also provide useful climate information.

Capability classes are ranked from I (highest) to VIII (lowest), but the capability subclasses refer to soil groups within a class. Classes I - IV are considered capable of the sustained production of common field crops. Crop species become limiting as the land capability declines from Class

Soil Information Sources

Information about various versions of a soil survey can be obtained with the following means:

- *By mapping your soil using the USDA Web Soil Survey.*
- *By contacting the appropriate state or local office of the NRCS or Soil and Water Conservation Districts.*

Additional information about Missouri soils can be found on the Missouri Cooperative Soil Survey website.

I to Class IV. Class V lands are only capable of producing perennial forage crops or specially adapted crops. Class VI lands are capable of providing sustained pasture. Class VII land are incapable of either arable culture or grazing.

Capability subclasses include: (e) runoff and erosion; (w) wetness; and (s) root zone or tillage problems (shallow, droughty or stony).

List the climatic, capability rating and limiting factors for your site, as well as any other information you believe might be useful, in your *Handbook*.

Soils are an extremely important feature of your land base because they are the material in which the plants of your agroforestry practice will grow. Soil survey publications represent a snapshot in time. They contain information that was current as of the indicated publication date. The text, tables and soil maps may have been updated since publication. The most up-to-date information is available on the NRCS Web Soil Survey.

Read about the soils (formation of soils), look at a soils map, then examine your soils. One way to gain an understanding of your soil is to dig several soil pits at least 18" deep, and examine your soils for several important features. However, soils are landform dependent, and samples taken should represent different landforms and positions on those landforms. It is recommended to dig one or two pits per acre, and more if the area/landform is not uniform. For more detail on soil assessment, see the additional resources at the end of this chapter.

Important note: If you are planning to practice agroforestry on a woodland area, plan to do a plant inventory. Since this requires setting up survey plots in a grid system, you probably want to do your soil assessments at the same time as your plant inventory.

Soil texture and composition

Mineral soils are particles of rock or minerals produced from rock by weathering and other geological processes. Soil textures are grouped into the three particle sizes shown in the table below. Sands and gravel are the largest particles, while clay and silt soils contain the smallest particles. The finer textured soils hold more water and dry out more slowly. Organic soil layers or horizons are derived from decaying vegetation, usually in a thin layer above mineral soils. Where found in a sizable layer, they tend to retain both water and nutrients.

In your *Handbook* list the soil type(s) found in each of your agroforestry development areas, and map the locations if there is more than one type.

Soil depth

Soil depth determines the rooting capability of the plants you may wish to grow. In particular, forest soils can be quite shallow, requiring extra care in management. You will notice distinct layers as you dig down and you may come across restricting layers such as: 1) stones and rock outcrops that can interfere with digging and cultivation, and can reduce the nutrient and water-holding capacity of the soil. Rock outcroppings are areas with very little soil; and 2) hardpan, a hardened layer below the surface of the soil that can prevent penetration of water and roots. Additional soil features that may be problematic include: fragipans, claypans, abrupt textural changes and general discontinuity. Deep-rooted plants such as alfalfa or black walnut will be severely impacted by hardpan. Neighbors and previous land stewards may know if there is a hardpan, but you may have to dig several holes to determine the extent.

Note and record in your *Handbook* the approximate percentage of rock fragments in the soil (stoniness), and depth and type of any restricting layers. Show their extent on the sketch map.

Soil moisture

Soil moisture, which is key to the establishment and growth of plants, is closely linked to soil texture. The

spaces (pores) between soil particles hold water and air needed by plants for good growth. Generally, coarser soils are well-drained and are often dry for longer periods, while soils with finer textures hold more water and are likely to remain moist longer. Other factors, such as ground water level or the presence of an impermeable layer that restricts drainage, also determine soil moisture.

As you dig your pit, is the soil dusty and dry? Does water seep into the bottom of the hole? Often, the time of year and recent weather will influence soil moisture.

High water table, standing water or flooding

Areas such as wetlands and parts of riparian zones which remain fully saturated for extended periods of time are of special concern. These areas are sensitive to access development and machine use, and are important for wildlife habitat and other environmental values. You will need to identify these areas of your land and plan to use especially careful management. Access may be limited for all or part of the year.

In your *Handbook* and on your sketch map, it is important to note any: wetland features, evidence of flooding, areas that experience overland flows or standing water during spring runoff, and areas with continual seepage or high water table.

Both very wet or dry conditions pose challenges for planting and management. However, some plants are particularly adapted to one or the other of these extremes (see Appendices II & III for a listing of suitable plants). Note the moisture conditions of various portions of your proposed development area on both your sketch map and in your Handbook.

Nutrients

The availability of nutrients in the soil affects the quantity and quality of products produced. You can undertake a soil test to determine the soil pH (acid/alkaline balance), specific nutrient levels, and recommendations for various crops. Tissue analysis is also an effective way (preferred in forest soils) to determine nutritional status of existing trees and plants. Although there are soil sampling field kits, soil and tissue samples are usually sent to a laboratory for analysis and interpretation.

In your *Handbook* note the status of soil nutrients that you have determined and attach any lab reports.

Step 7: Physical Features (Terrain)

The physical features outlined in Step 7 are closely related to – but also different from – the soil characteristics described in Step 6. For ease-of-use, physical features are described separately from soil characteristics. However, the information you generate through each step is entered into the same table in the Handbook. This allows you to easily see the relationships between physical features and soil characteristics. There are several physical features that can influence your capability to produce particular crops on a site.

Aspect refers to the direction toward which the site slopes (if any). South and southwest-facing slopes are usually warmer and drier than those facing north, and naturally support different plant communities. Terrain relief refers to whether the site is steep, flat, sloped, rolling, gullied or broken (steep slopes between benches). This will influence access and machine capability, water management, cold air drainage, and other micro-climate factors. Frost pockets are one additional feature to consider. Cold air flows downhill and pools in low areas. The resulting localized frosts can damage delicate flowers and shoots that start to grow early in the spring. Even crop plants correctly chosen for your hardiness zone can be affected. Assess low areas on your land for potential frost pockets; the absence of native berry plants can be a good indicator. Avoid these areas for frost-sensitive plants. Sloped or bench land that has good air drainage is a better choice.

Enter your observations of the physical features mentioned above in your *Handbook* and on your sketch map.

Step 8: Timber and Non-Timber Forest Crop Inventory

If you want to practice agroforestry in woodland areas, this chapter will help you inventory the variety of plants growing on your land—everything from trees to herbs on the forest floor. The inventory of trees described here is restricted to their potential production of non-timber products (e.g., medicinals, florals) and their interactions with other plants (e.g., shade, moisture, nutrients). A non-timber vegetation inventory can be used to help create a list of 'best bets'— plants that can be successfully grown on your land, and will also help you decide how to manage your woodland efficiently and productively (i.e., managing competition for sun, water and nutrients).

There is literature available elsewhere on timber inventory methods (see additional resources).

If you own more than a few acres of land, you should sample your land base, using inventory plots to obtain a 'best approximation' of the vegetation. Sampling is an excellent compromise between doing nothing (and having a very limited picture of your land) and trying to do the impossible: counting every tree, shrub and herb on your property.

A. Preparing your inventory

An inventory should give you a timely snapshot of your land; it should not take too long, nor should it be too difficult. Inventory plots are the sites where you record information about vegetation and other features on your land. They form a predetermined portion (or percentage) of the larger area you're interested in sampling. Multiplying your plot data by the number of plots that would fit in the larger area will give an estimate of what you would find if you actually measured everything. Size of inventory plots depends on what you're trying to survey and the vegetation cover on the plot. In your forest vegetation survey, you will actually take two separate surveys from the same plot center. This is because you need to collect information about very different types of vegetation beyond tree, including shrubs and other smaller plants.

Plot cruises can be used to estimate the number of plants in a forest by species, diameter, height, form class and grade. All fixed plot cruises have statistical sampling error which is important to know and understand before relying on the data. A plot cruise simply consists of counting and classifying all trees or plants species in a series of circular sample plots. Circular plots are usually 1/10-acre in size (37.2 feet radius). The plots are evenly spaced throughout the stand to provide an equal sampling of all forest types across all topographic changes depends on what you're trying to survey and the vegetation cover on the plot. In your forest vegetation survey, you will actually take two separate surveys from the same plot center. This is because you need to collect information about two very different types of vegetation: Trees; shrubs and other smaller plants. Plot cruises can be used to estimate the number of plants in a forest by species, diameter, height, form class and grade. All fixed plot cruises have statistical sampling error which is important to know and understand before relying on the data. A plot cruise simply consists of counting and classifying all trees or plants species in a series of circular sample plots. Circular plots are usually 1/10-acre in size (37.2 feet radius). The plots are evenly spaced throughout the stand to provide an equal sampling of all forest types across all topographic changes.

B. Doing your inventory

Locating your plots in the field. Following a compass line is a vital skill when conducting your vegetation inventory. It is beyond the scope of this training manual to review compass work in detail but here are a couple of points to remember:

- Make sure to get the right compass for the job. Ideally, you should have a 'ranger' type with a mirror in the lid, gunsight sighting, liquid dampened needle, and an adjustment for setting declination.
- Stay on track. With a little practice, staying on your traverse line is not difficult. Hold the compass level, line up the arrow in the mirror face, sight on the farthest object you can pick out through the gunsight (e.g., recognizable tree, rock, stump), and walk toward it. When you reach that landmark, sight again and find a new object to focus on.

Obtain a good guidebook to the plants of your area. Remember that quality can have a big impact on the prices you receive for non-timber forest products. That means you will have to make judgment calls when doing your inventory. Information on product specifications, including acceptable quality, can be found in Appendices II and III. It is also important to remember that you should contact buyers before you harvest, so that you can harvest to the correct specifications.

C. Using your inventory

First, make sure all areas inventoried are marked on your map(s). Next, you need to take the raw data from your inventory (plot sheets), compile it, and present it in a useful format. That means taking the information from your sample plots and organizing the information so it represents your entire development area.

Trees and/or other resources per acre

Among your survey information, you have recorded the number of each plant species that appears in each inventory plot. Now you want to convert that number

Tree Inventory

The tree inventory described here is only intended to determine the non-timber resources available (e.g., boughs, vines, bark, burls).

Number of trees and species. Record the number of trees of each species found at the plot. This will assist in determining what non-timber products can be obtained, and what plants can be grown under the canopy.

Tree age. This is optional, but can be useful to know. An increment borer is easy to use and will not harm the trees. Record the age of one or two average trees per plot.

Tree height. This is also optional, and only really useful for a timber inventory. Details on calculating height can be found in the University of Tennessee Extension guide, "Conducting a Simple Timber Inventory".

Condition of trees. Helpful in determining whether marketable non-timber products can be harvested. Also helpful in assessing the possible function as a windbreak.

Crown closure. The degree of canopy closure will determine the conditions for raising or enhancing shade-loving species in the understory.

Non-tree Inventory

Begin your inventory by identifying and listing all the harvestable non-tree species found in the plot on your plot sheet. Include plants that provide good browse if you intend to graze the area.

For each species, record the following:

Total number of plants for each species. Where possible/feasible, count the number of individual plants of each species found in the plot. This will be easier on an open forest floor than it will be on dense sites. You may choose to record sites like the latter simply as 'dense coverage.' This is one of those instances where judgment calls come in. Even an approximate number could be useful in developing a harvesting plan.

Estimate of the percentage cover for each species. How much of the plot do you think the species covers? Provide an estimate to the closest 10%.

Proportion of harvestable vs. non-harvestable individuals. The aim here is to estimate the amount of harvestable individuals for each species (none, 20%, 50%). Your decisions will be based on factors such as size, color, and insect or other damage. If many of the plants are not harvestable in their current condition, cultural practices such as fertilization and pruning may be available that would improve product quantity and quality.

into the number of plants per acre. This is done by first calculating the average number of trees per plot, and then multiplying this by the expansion factor (i.e. the plot size denominator).

For example, if you counted 8, 12, and 4 individual witch hazel shrubs in your 3 plots 1/10 of an acre, when:

- the average trees per plot is: (8+12+4) ÷ 3 = 8
- the expansion factor is: 10
  (where 10 is the denominator of 1/10-acre and 3 is the number of plots)
- total estimated number of witch hazel per acre is: 8 x 10 = 80

Once you know the approximate number of plants of a given species per acre you have a fairly good idea of the plant resources you have on your land. Record the information in the tables provided in the Handbook.

Step 9: Agroforestry Development Ideas – Brainstorming

After reading this training manual, you will probably come up with some ideas for agroforestry developments on your property. Once you have done this, it is time to engage in some brainstorming. In addition, check out Appendices II and III to develop additional ideas.

Brainstorming is the process of putting ideas down on paper as they come into your head. List them all and don't try to self-censor the ideas. You can reduce this list to 'best bets' later. Input from family and friends, as well as ideas from neighboring land stewards, can help generate useful ideas. This is also a point at which expert advice may expand the list of possibilities. For additional assistance consult the additional resources that are listed at the end of every chapter.

For each development area, sort the list by practice and

record this information in your Handbook. In general, more intensive agroforestry practices (e.g., forest farming) are suited for smaller units of land, while the more extensive practices (e.g., silvopasture) are suited to larger units of land.

Step 10: Listing 'Best Bets'

The intent of this short but important step is to create a list of potential crops that can be grown on your land. This list of 'best bets' will be based on the information you have gathered so far—including land and personal resources, site conditions and current land use—combined with the plant information provided in Appendices II and III.

Perhaps the easiest way to approach this list is by first determining what plants can grow under the climatic, soil and physical conditions that occur in each of your agroforestry development areas. Plants you already cultivate on your land, plants revealed by your non-timber inventory, and crop ideas you have developed while gathering information, will all form part of this list. You want this list to be as extensive as possible, so you can consider the widest possible range of options.

Your list can be refined by considering the resources at your disposal (e.g., labor, buildings, equipment) at different times of the year. These factors will limit the crops and crop combinations you can grow. Finally, you can further refine your list by revisiting the objectives you have for your land, such as income diversification, reduction of land taxes or environmental protection.

The list of 'best bets' you make in this part of your *Handbook* should include all the plants that can grow on your land, and the products that can be derived. Make sure you include timber products that can be made from trees you would plant as part of an agroforestry development. If you have done a timber inventory—in addition to the non-timber vegetation inventory list those possible timber products as well. Along with Chapter 10, the following steps will help you develop a marketing strategy, or marketing plan. Each step contains directions needed to complete corresponding sections in your *Handbook*. You should note that every part of every step might not apply to your situation.

Step 11: SWOT Analysis

Having analyzed the current situation of your farm with respect to objectives and priorities, personal resources, site assessment and vegetation inventory and brainstormed ideas of agroforestry practices, you can use that information to identify Strengths and Weaknesses, Opportunities and Threats or "a SWOT analysis" for the crops you think may produce. This can be helpful in defining and clarifying the issues you need to address in the rest of the planning process.

As detailed in Chapter 10, in identifying strengths and weaknesses, you will be focusing on factors that are internal to your business. Opportunities and threats refer to the external environment of your business. The plan you will develop will be shaped by both internal and external factors; it will build on your strengths and minimizing the impacts of your weaknesses while in the same time be responsive to the opportunities and threats your environment offers. In the SWOT Analysis worksheet, summarize the internal strengths and weaknesses and the external opportunities and threats for your business as you identify them today. Consider all aspects: natural, physical and human resources, marketing, operations, and finances.

Step 12: Porter Five Forces Model

The Five Forces Model (developed by Dr. Michael Porter of Harvard University) serves as a good framework for assessing different industries you would like to get in. The Five Forces Model identifies coordination and control aspects of an industry and provides a guideline for understanding the resources and relationships needed to be successful in a market. With the information and examples provided in more detail in Chapter 10, use the following ideas to evaluate the chosen crops in the context of the industry.

- Identify barriers to entry.
- Identify suppliers/bargaining power of suppliers.
- Identify buyers/bargaining power of buyers.
- Identify substitutes.
- Identify competitors and their competitive advantages.

Step 13: Revising Your 'Best Bets'

In Step 11 you identified the plants that can grow on your land, and which you can produce with the resources you have available.

After a thorough analysis using the SWOT Analysis and Porter Five Forces Model, the list of 'best bets' can be refined to include those plants and products you think have the best market potential. Consider the following when selecting a list of marketable 'best bets'.

- How difficult is to enter the market?
- Is the required supply available?
- Are there buyers nearby?
- What is the demand for the crop, relative to supply?
- How does harvesting and selling these crops fit in with the rest of your production system? For example, will the crop(s) require big inputs of labor during an already busy period?
- Is investment of resources (labor and capital) likely to provide an adequate return?
- How does that return compare to other possible crop/product options?

Where possible, use your vegetation inventory to list the approximate volumes of the crops you have for sale. For crops not yet planted, estimate how much you'll be able to sell so you have an idea of how much to plant.

Step 14: Select and Describe Target Market(s)

Refer to Chapter 10 to develop Steps 14-18, creating a marketing strategy. Your marketing strategy is about defining your customer or target market and tailoring your product, pricing, distribution and promotion strategies to the market's satisfaction. Target markets are most commonly characterized as either individual households or businesses. Begin your target market research by developing a customer profile. Customer profiles can help you determine if a market segment is large enough to be profitable. Break your target market up into segments based on differences in their geographic location, demographic characteristics, social class, personality, buying behavior or benefits sought.

Step 15: Adding Value to Products

As you think about the products your business will offer, try to describe them in terms of the value they will bring to your customers. List all value added opportunities and identify "pros" (how it will benefit the needs of each customer segment) and "cons" (e.g., costs, risks) for each of them. Identify unique characteristics that will differentiate your product from competitors. Define each product to address specific needs for each market segment.

Step 16: Getting Products to the Buyer

Now that you have a customer and product in mind, your next task is to identify how to move or distribute products from your farm to the customer's house or store shelves. Distribution strategies typically describe:

- ***Location:*** where will you sell your product?
- ***Distribution:*** which sales channels will your product follow?
- ***Transportation***: how will your product reach the buyer?

Example: Elderberry Consumer Preferences

Label considerations: Comparing average prices of a 12-ounce bottle:

- *Certified organic:* Compared to conventional, consumers paid on average $3.51 more.
- *Pesticide-free:* Compared to conventional, consumers paid on average $3.97 more.
- *Carbon neutral:* Compared to a bottle with no carbon emission information, consumers paid $1.91 more.
- *Origin of elderberrie:* Compared to juice made from European-grown elderberries, consumers paid $2.00 more for juice made from American-grown elderberries.

Changes in consumer trends: Frequently purchased value-added products:

- *Supplements*: 7% of consumers purchased this product in 2011 compared to 49.9% of consumers in 2022.
- *Juice*: 45.2% of consumers purchased this product in 2011 compared to 35.1% of consumers in 2022.
- *Carbonated drinks*: 33.3% of consumers purchased this product in 2011 compared to 8% of consumers in 2022.

Data sourced from Cai et al., 2022

Step 17: Setting the Price

In general, pricing strategies are based on two factors: prevailing market prices and your costs. In the long run, your price has to cover your full costs—including production, marketing and promotion—as well as a return for your time and investment. Try to identify prevailing market prices for similar products if they exist; learn about what customers are willing to pay and what prices your competitors charge. Also identify and document all your production, marketing and promotion costs.

Decide how you want to price your product for each market segment. Take all these aspects into consideration; try to establish a realistic price or range for each product.

- Do you want to undermine the competition by offering a lower price?
- Can you set a high price that reflects your quality image or market demand?
- Are you simply looking to cover costs? Do you have power to set a price?
- How sensitive is demand to price changes?

Step 18: Promoting Your Products

Promotion is very important to gain product recognition among customers. Promotional strategies often are built around a "message". The message that you deliver about your product or business is just as important as the product itself. Equally important is how and when you deliver that message through the use of advertising tools and media. Consider also the costs of each promotion method.

Step 19: Re-visit Your Objectives and Priorities

The first step in developing your agroforestry plan was to outline your initial objectives and priorities for your land-based business. Since then, you have gathered considerable amounts of information that will likely change at least some of those original goals. Record your revised objectives and priorities in the space provided in the *Handbook*.

Step 20: Detailed 'Best Bets' Crop Information

To develop the most functional and profitable agroforestry practices, you should know as much as possible about each plant you intend to grow. You will have gathered much of this information while filling out your *Handbook*, using your land assessment, plant inventory (where appropriate), market research, Appendices II and III, and possibly your own additional research.

Important information includes the biological requirements of each plant, the agroforestry practices they can be grown in, what other plants (and animals) they are compatible with, labor requirements for harvesting, potential volumes, value-added opportunities, and useful market information.

The table provided in the *Handbook* may include categories of information you do not have. You can exclude these or take extra time to find the information. There is also extra space for additional information you consider important but not specifically listed here.

Step 21: Designing Your Agroforestry Practices

Now is the time to arrange your plants into agroforestry practices that best meet the management objectives you outlined in Step 19. The information on each plant crop, and the management information provided earlier in this chapter, will allow you to design and manage agroforestry practices that best meet your objectives. Fill in a table in the Handbook for each agroforestry practice you intend to develop.

Note: Remember that price and marketability are not the only criteria for selection of the plants you will include in your agroforestry practices. Some plants may be chosen because they provide valuable ecological functions to your agroforestry practice, such as trees for shade and windbreaks, or legumes for nitrogen fixation

Step 22: A Five-Year Management Projection

Your five-year management projection is a schedule of the work you plan to undertake in the next five years to develop your agroforestry practices. The specific tasks and timelines you prepare will form the basis for your yearly activity schedule.

Don't worry too much about getting absolutely everything right on the first pass. Your plans will change over time and you can go back and adjust your projections accordingly. For now, you are mainly interested in conceptualizing the overall operation on paper. The

five-year management projection has four sections.

1. ***Area:*** *the size of the area to be managed.*
2. ***Practice:*** *the agroforestry practice and its associated products.*
3. ***Year:*** *the year that you want the management activity to take place.*
4. ***Management objective:*** *the specific objective you hope to accomplish.*

Use the template provided in the *Handbook* to create your own five-year management projection.

Step 23: Yearly Activity Schedule

The yearly activity schedule describes specific tasks that need to be done, when and by whom. This is the document you will use to plan your work schedule on a month-by-month basis. A good yearly activity schedule will allow you to identify potential time and business conflicts, and ensure you avoid overlapping seasonal activities that could create shortages of labor and resources.

A yearly activity schedule—one for each agroforestry practice—has five sections:

1. **Crop plan:** the plants that you have decided you can grow and market.
2. **Management objectives**: a record of objectives, transferred from your five-year projection.
3. **Task and time of year**: a list of specific tasks that must be accomplished to achieve each objective, including timelines associated with each task.
4. **Materials**: estimates of seed, seedlings, fertilizer, fencing, animals, feed and other items necessary for corresponding tasks.
5. **Labor and equipment**: a record of labor and equipment needs (if any) for each of the specific tasks.

Like the five-year management projection, your yearly activity schedule will likely change as you learn more. Remember to leave yourself plenty of time to complete all the work. As land stewards well know, most tasks take longer than expected. The yearly activity schedule will also be helpful in costing the materials, labor and equipment that are necessary for the cash flow projection of your business plan. For details on business planning, refer to *Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses* available through USDA SARE's website. The information in the Handbook will provide a good basis for a business plan that includes a comprehensive cash flow projection.

Building an Agroforestry Development Plan

The purpose of building an agroforestry development plan is to create a schedule of the work that needs to be done in the years ahead in order to fully develop your agroforestry area(s). Your completed Agroforestry Development Workplan will include specific tasks, timelines, and labor projections for each agroforestry practice on a year-by-year basis. You will need a Development Plan for each agroforestry development area.

The Development Work Plan is the final step in your Handbook, and will form the practical basis for your agroforestry development. You will no doubt change and adapt your work projections in the years ahead, but a good Development Plan will form a clear starting point and help focus your management efforts.

The Development Plan includes two distinct parts:

1. *A five-year plan outlining specific tasks for each agroforestry practice*
2. *A yearly activity plan, broken down into specific tasks for each month.*

Additional Resources

Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses. (2003). Minnesota Institute for Sustainable Agriculture.

Conducting a Simple Timber Inventory. The University of Tennessee Institute of Agriculture.

Cover Crop Economics Tool. Natural Resource Conservation Service (NRCS). *Scroll down page to Cover Crops Economics Header.*

Cropping Systems Calculator. Land Stewardship Project.

Financial Decision Support Tools. Center for Agroforestry, Univresity of Missouri.

Fruit and Nut Compass. Center for Integrated Agricultural Systems. University of Wisconsin-Madison.

Handbook for Agroforestry Planning and Design. (2013). Center for Agroforestry, University of Missouri.

Hannum, E. *Inspirations for Creating a Long-Term Agricultural Lease for Agroforestry: A Workbook.* Savanna Institute.

Lovell, S. Center for Agroforestry [@MizzouAgroforestry] (2020). *Introduction to Agroforestry* [Video]. YouTube.

Savanna Institute. *Perennial Pathways: Planting Tree Crops.*

Soil Survey Manual. Natural Resource Conservation Service (NRCS).

USDA Plant Hardiness Zone. United States National Arboretum.

USDA NRCS Web Soil Survey.

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