

# Talking Tools for Reducing Climate Risks 2025

## Resources for Reducing Climate Risks with Diversification and Sustainable Agricultural Management Tools

Sustainable agriculture management solutions comprise information and technology aimed at improving farm output while maintaining clear records to make informed decisions.

Among these tools are calculations, farm management software and precision agriculture technologies for managing farming practices sustainably. Some examples of these tools include pasture and livestock management software, crop planning optimization, and record keeping tools. Some of these tools may present precision agriculture technologies such as global positioning systems (GPS), remote sensing, or can be connected to sensors and “internet of things”, IoT. Many agricultural practices can benefit from sustainable agriculture tools.

Here, we present three specific sustainable agriculture management tools to manage silvopasture and grazing management, designed to keep records and increase certainty by using data to farm precisely.

Silvopasture is the deliberate integration of trees, forage crops and animals (often ruminants) in space. Managed grazing involves rotating animals throughout subdivided pastures that are grazed from 0.5-3 days, resting them for a minimum of 20 days, while allowing animals to harvest the best and most abundant forages.

These two practices are among the most sustainable in agriculture. They are complementary, and they can be combined. Their adoption offers several economic, social, and environmental benefits such as food, fiber and energy production, soil function, carbon sequestration, water quality, aesthetic beauty, and more.

### A. **Agricultural Management Tool 1:** PastureMap

Pasture Map is a digital mapping software recommended for ranchers, agricultural extension services, land managers, and agricultural researchers seeking comprehensive pasture management solutions to managing grazing lands comprehensive spatial analysis of pasture resources to support precision and sustainable livestock management. It is designed to track

animal feed consumption, health, and other important data for livestock operations. It can also assist with pasture rotation planning, nutrient management, and other aspects of grazing management.

Pasture map is a great record keeping tool to manage livestock, pastures and overall farming records. It provides producers with cost-effective land use efficiency, improved livestock management, and data-driven decision making for sustainable grazing and pasture ecosystems.

**Pasture map presents the following features:**

- (a) Geospatial mapping, with GPS-enabled boundary mapping for precise land area measurement, terrain and topographical visualization.
- (b) Pasture condition assessment with vegetation type classification and density tracking, soil quality indicators, both essential for grazing capacity estimation.
- (c) Resource management tools for paddock rotation planning, grazing zone optimization, water source location tracking, fence line and infrastructure mapping.
- (d) Allows for economicity of resources, since livestock farmers can design paddock subdivisions in the map, and they don't necessarily have to lay down the actual fixed infrastructure, because they can subdivide the areas just by using a spool of poly wire and portable electric fencing around the water infrastructure zones.
- (e) Data analytics with seasonal productivity analysis, vegetation growth monitoring, and historical grazing performance tracking, for comparative pasture health assessments.
- (f) integrates compatible mobile and desktop technology, cloud-based data storage, real-time data synchronization, which can integrate with precision agriculture platforms such as, satellite and drone imaging, farm management software and real-time crop monitoring systems (such as, soil moisture sensors, weather tracking stations, automated irrigation controllers, yield monitoring equipment)

## **Agricultural Management Tool 2: Agroforestry (Silvopasture economic Tool)**

This modeling tool is web-based integrated, designed to address the gap in resources and information to help farmers plan for future changes as they expressed need for information and resources to manage silvopasture in their farms more effectively.

### **Silvopasture economic tool presents the following features:**

- a) Components of silvopasture systems listing tree species, tree products, livestock species, and forage types (cool season forages).
- b) Costs and benefits, including animal comfort, diverse diets, diversified farms products and income, creation of wildlife habitat, water quality and carbon sequestration, establishment and maintenance costs, management experience or lack thereof, possible reductions in forage hay harvest, etc.
- c) Visualization tool, showing the various stages of practice adoption, allowing users to foresee how silvopasture would develop over time and what ramifications it may have for the farm.
- d) Economic modelling tool for silvopasturing, comprising a free online estimator tool with an input interface where users can input detailed variables related to silvopasture establishment, such as, annual costs, annual revenues, and annual profits and cumulative revenue, obtaining in turn net present value and a benefit / cost ratio, to help inform farm decision-making.
- e) This modelling tool can also estimate the cost and revenues for irrigation and use of tarping in horticulture.

## **Agricultural Management Tool 3: Grazing calculators**

### **Grazing calculator 1**

The following two grazing calculators are intended to mathematically match animal forage needs to forage production, calculate stocking rates, stocking density, paddock area, number of paddock and number of acres needed per grazing period and per grazing season, among others.

#### **Grazing calculator 1 allow users to:**

##### ***1. Determine forage needs by animals,***

**Forage DM Demand / Head / Day (lbs)** = Average Live Weight of each Grazing Animal (lbs) X Forage Intake Rate (% of body weight/day)

**Forage DM Demand per Herd / Day (lbs)** = Forage Dry Matter Demand per Head per Day (lbs) X # Animals

**Forage DM Demand / Herd / Grazing Event (lbs)** = Forage Dry Matter Demand per Herd per Day (lbs) X # days grazing

##### ***2. Determine forage available per acre***

**Total Lbs of Forage DM/Ac** = Average Height of Forage in pasture (inches) X Estimated DM (Lbs/in/Ac)

**Available Lbs of forage DM/Ac** = Total Lbs of Forage DM/Ac X Grazing Period Utilization Rate

##### ***3. Determine the size of the grazing area***

**Paddock size per grazing event** = Forage DM Demand / Herd / Grazing Event (lbs) : Available Lbs of forage DM/Ac

**Paddock size (sq ft)** = Paddock size per grazing event X 43,560

If strip grazing:

**Length needed for paddock (ft)** = Width of existing strip X Paddock size (sq ft)

**Grazing calculator 2.** Pasture calculation worksheet (*adapted from Sarah Flack*), This detailed grazing calculator makes creating a grazing plan easy and clear, estimating specific animal's needs, forage assessment, number of paddocks and area needed over the grazing season.

|    |                                                                                                                                                                                                                      |                                      |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 1  | Livestock type (example: beef, sheep, dairy cows, heifers)                                                                                                                                                           |                                      |
| 2  | Number of animals in group                                                                                                                                                                                           |                                      |
| 3  | Estimated total daily dry matter requirement per animal                                                                                                                                                              |                                      |
| 4  | If supplemental feed is fed, how much dry matter per animal is fed from hay, silage, grain or other non-pasture feeds?                                                                                               |                                      |
| 5  | Dry matter to be provided from pasture per animal (total intake required less non-pasture feed fed) <i>subtract Line 3 – line 4</i><br>=<br>If nothing other than pasture is fed, line 5 and line 3 will be the same |                                      |
| 6  | Calculated total dry matter intake for Group <i>multiply Line 2 x line 5 =</i>                                                                                                                                       |                                      |
| 7  | Estimated forage dry matter available per acre                                                                                                                                                                       |                                      |
| 8  | Calculated paddock size required for 24 hours<br>(required amount divided by total available per acre) <i>divide Line 6/line 7 =</i>                                                                                 |                                      |
| 9  | Planned occupancy period (how many days is the herd left in the paddock?)                                                                                                                                            |                                      |
| 10 | Calculate paddock size needed for full planned occupancy period.<br><i>multiply Line 8 x line 9 =</i>                                                                                                                |                                      |
|    |                                                                                                                                                                                                                      | May   June   July   Aug   Sept   Oct |
| 11 | Estimated pasture recovery period*                                                                                                                                                                                   |                                      |
| 12 | Calculating number of paddocks needed <i>divide (Line 11/ line 9) + 1 =</i>                                                                                                                                          |                                      |
| 13 | Calculated total number of acres needed for the grazing rotation<br><i>multiply Line 10 x line 12 =</i>                                                                                                              |                                      |

\*: this period can (and will) vary across different latitudes and altitudes

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