

Agroforestry: Silvo-Pasture

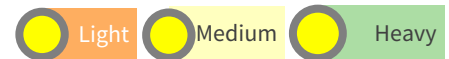
Agroforestry is a land management practice that combines the planting and management of trees and shrubs with crops and pasture, providing benefits of soil health, crop yields, resilience to climate change, biodiversity and economic opportunities. Agroforestry encompasses numerous practices, including silvo-pasture, agro-silvo cultural, and agro-silvo-pastoral. One such successful agroforestry practice is silvo-pasture – the planting of trees and shrubs within livestock grazing pasture lands. Not to be confused with agrosilvopasture (combination of crops, shrubs/trees and livestock, silvopasture is the combination of trees and shrubs with pastural grazing land. The trees can be regularly or irregularly placed, and in addition to improving soil conditions in pasture lands, also provide production of protein-rich tree fodder for on farm feeding and for cut-and-carry fodder production. If growing larger species of tree, coppicing can also produce timber for building materials and firewood.

MOST SUITABLE AGRO-ECOLOGICAL CONDITIONS

Value chain



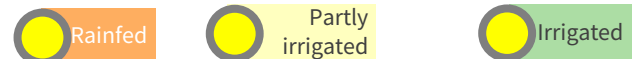
Soil texture



Climatic zone



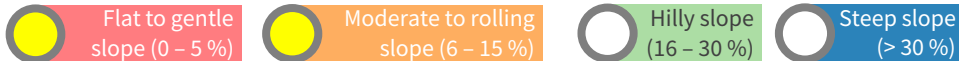
Water source



Annual average rainfall (mm)



Topography



MOST APPROPRIATE CONDITIONS AND REQUIRED INPUTS

Farming system

Does it require collective action



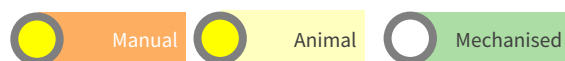
Characteristics



Farm size (ha)

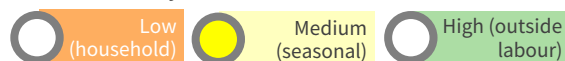


Mechanisation



Human resources

Labour intensity – level of effort

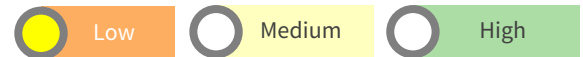


Gender/youth smart (low investment/low labour requirements)

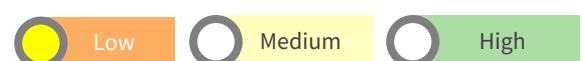


Financial resources

Initial investment



Maintenance Costs



Access to finance capital or credit required



Enabling Environment

Extension support



Access to inputs



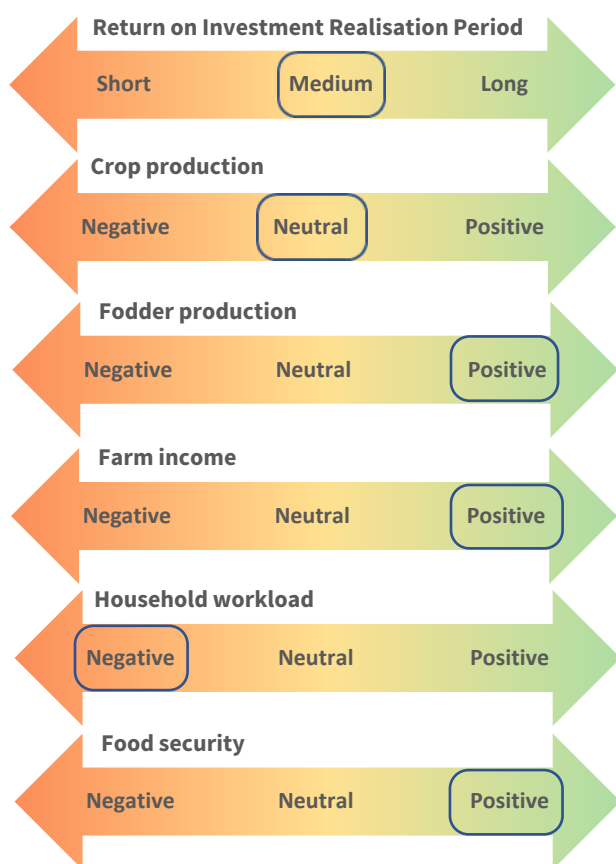
Market access



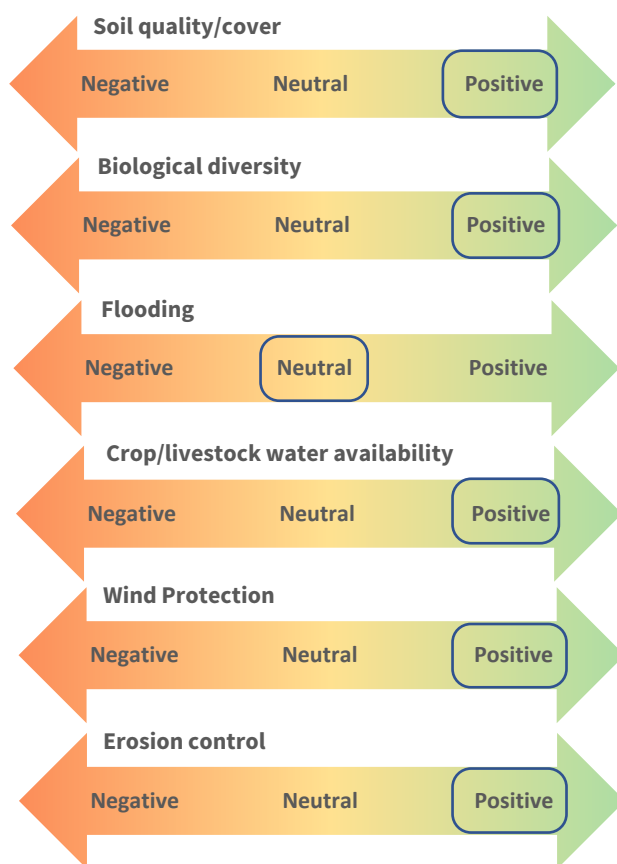
The purpose of this technical brief is to guide where this **practice, technology or strategy** could be applied. It may be applicable in other circumstances, but this brief focuses on where it is possibly **most suitable**. Content is general, and should be contextualised depending upon locality. The brief provides an overview, details of appropriate agroecological characteristics, appropriate conditions and inputs, possible outcomes and impacts, how the **practice, technology or strategy** should be applied, potential benefits and drawbacks, and provides suggestions for further reading in terms of CCARDESA materials and other sources, including those used to develop this technical brief.

POSSIBLE IMPACT/OUTCOMES

Socio-Economic Impacts Positive or Negative



Ecological Impacts Positive or Negative



These descriptors indicate whether the practice, technology or strategy has a positive, neutral, or negative impact or outcome. Those with no box are deemed not-applicable.

TECHNICAL APPLICATION

To effectively implement hedge planting:

- Step 1:** Purchase saplings of selected tree species from a local nursery or grow saplings in separate on-farm nursery. If growing on-farm, saplings should be held-up with an upright support bamboo/wooden pole. Ideally, the farmer should begin exploring silvopasture tree species beginning with indigenous trees, such as acacias, and other local trees. It is worth considering a mixture of species, as well as mixed shallower and deeper rooted trees.
- Step 2:** Once at a meter or over in height, transplant to pastures, surrounding each individual sapling with a wire mesh cage-tube or insert into five-centimetre diameter PVC pipe to protect from browsers. Plant at least ten to twenty meters apart, in either a random or uniform pattern. This is a matter of preference.
- Step 3:** Once saplings are planted, only allow grazing livestock (cows, sheep, ducks, geese, chickens) in the silvopasture, avoiding browsers (goats, etc), which will strip, damage or destroy the saplings.
- Step 4:** Once mature and above browsing height, two plus meters, remove protective cage or pipe.
- Step 5:** Depending on species, pruning, coppicing etc should be performed every two months to ensure that trees remain healthy and productive, while maximising outputs for in-field and cut and carry fodder.

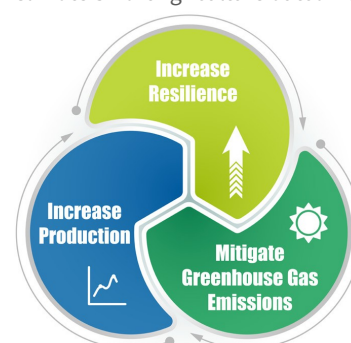
CLIMATE SMART AGRICULTURE OUTCOME(S)

Reflecting how this **practice, technology or strategy** contributes to Climate Smart Agriculture outcomes

Diversified agricultural outputs supports sustainable agricultural productivity, providing multiple streams of revenue, reducing labour and cost for land clearance and maintaining healthy pasture land.

As climate change alters local grazing land, silvopasture can reduce overgrazing and land degradation. Trees introduced into pasture can create a more positive environment for livestock, including shade in warmer climates, and shelter during rainfall.

Retaining trees within pasture land and minimising complete conversion of land reduces greenhouse gas emissions and retains carbon in the soil.



SUMMARY/KEY ISSUES

Benefits

- Presence of trees can be beneficial to livestock in terms of shade and shelter, as well as enhancing carbon storage and enriching biodiversity.
- Manure from livestock can improve soil health in grazing land.
- Leaf litter and pruned material also add organic matter to soil, improving productivity and drainage
- Presence of trees can contribute to reducing soil erosion.
- Trees can produce numerous forest products, including timber for firewood and construction.
- There is an opportunity to diversify income for small-holder farms and increase food security.
- Tree trimmings and leaf litter can also be used for in-field or cut and carry fodder.

Drawbacks

- Requires some investment in terms of purchase of seed and/or saplings.
- May require adjustment for mixed grazing and browsing livestock patterns
- If dietary requirements of livestock are not complete, animals may strip bark from trees. This can be avoided by ensuring that pasture stocking is not too high, and best efforts are made to encourage pasture health and supplementing livestock feed with the necessary minerals, energy and protein.

REFERENCE MATERIAL

CCARDESA Related Content

- - Centre for Coordination of Agricultural Research and Development in Southern Africa (CCARDESA), 2019. Knowledge Product 12, Climate Smart Agroforestry Options for Maize, Sorghum & Rice. CCARDESA, Gaborone, Botswana
- - Centre for Coordination of Agricultural Research and Development in Southern Africa (CCARDESA), 2019. Knowledge Product 15, Climate Smart Pasture/Rangeland Management Options for Livestock. CCARDESA, Gaborone, Botswana
- - Centre for Coordination of Agricultural Research and Development in Southern Africa (CCARDESA), 2019. Technical Brief 17, Agroforestry: Alley Cropping. CCARDESA, Gaborone, Botswana

Additional Information

- Balehegn, M., 2017. Silvopasture Using Indigenous Fodder Trees and Shrubs: The Underexploited Synergy Between Climate Change Adaptation and Mitigation in the Livestock Sector. Chapter from book The Need for Transformation: Local Perception of Climate Change, Vulnerability and Adaptation Versus 'Humanitarian' Response in Afar Region, Ethiopia (pp.493-510). ResearchGate.
- Jose, S. & Dollinger, 2019. Silvopasture: a sustainable livestock production system. Chapter in J. Agroforest Syst (2019) 93: 1. <https://doi.org/10.1007/s10457-019-00366-8>