Intercropping

CCARDESA
Centre for Coordination of Agricultural Research and Development for Southern Africa

Technical Brief 07

Intercropping is a process of growing multiple crops either together or in proximity to each other on one piece of land, thereby improving crop production, reducing and preventing land degradation and increasing crop output.

There are different methods of intercropping:

- Mixed intercropping – two or more crops are seeded together and harvested together.
- Row/strip intercropping – two or more crops planted on the same field but planted in alternate rows.

Crops selected for intercropping should not have similar properties or compete but should be selected to complement one another and be mutually beneficial. For example, deep rooted crops can be intercropped with shallow rooted crops, so as to not compete for water or nutrients. Intercropping helps achieve ecological benefits not possible with monocropping systems. Intercropping is commonly practiced for maize-legume systems, where legumes introduce nitrogen into the soil benefiting maize production and improving soil fertility during crop growth. Furthermore, the legume crops can be utilised for fodder for livestock. This practice is particularly beneficial for smallholder farmers, who can grow multiple crops on small plots to receive multiple benefits including improving production/yields, and increasing household food security. Intercropping is also a climate-smart practice as it mitigates farmer risk to climate variations, through diversifying and increasing crop production, reduces threats of pests and disease, and increases carbon sequestration in soils and biomass production.

MOST SUITABLE AGRO-ECOLOGICAL CONDITIONS

Value chain

Maize | Sorghum | Rice | Livestock | Other

Soil texture

Light | Medium | Heavy

Climatic zone

Arid | Semi-arid | Sub-humid | Humid

Water source

Rainfed | Partly irrigated | Irrigated

Annual average rainfall (mm)

< 250 | 250 - 500 | 500 - 750 | 750 - 1000 | 1000 - 1500 | > 1500

Topography

Flat to gentle slope (0 – 5 %) | Moderate to rolling slope (6 – 15 %) | Hilly slope (16 – 30 %) | Steep slope (> 30 %)

MOST APPROPRIATE CONDITIONS AND REQUIRED INPUTS

Farming system

Does it require collective action

Yes | **No**

Characteristics

Subsistence | Commercial Small | Commercial Medium | Commercial Large

Farm size (ha)

< 2 | 2 to 5 | 5 to 10 | > 10

Mechanisation

Manual | Animal | Mechanised

Human resources

Labour intensity – level of effort

Low (household) | Medium (seasonal) | High (outside labour)

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

Yes | No

Financial resources

Initial investment

Low | Medium | High

Maintenance Costs

Low | Medium | High

Access to finance capital or credit required

Yes | No

Enabling Environment

Extension support

Yes | No

Access to inputs

Yes | No

Market access

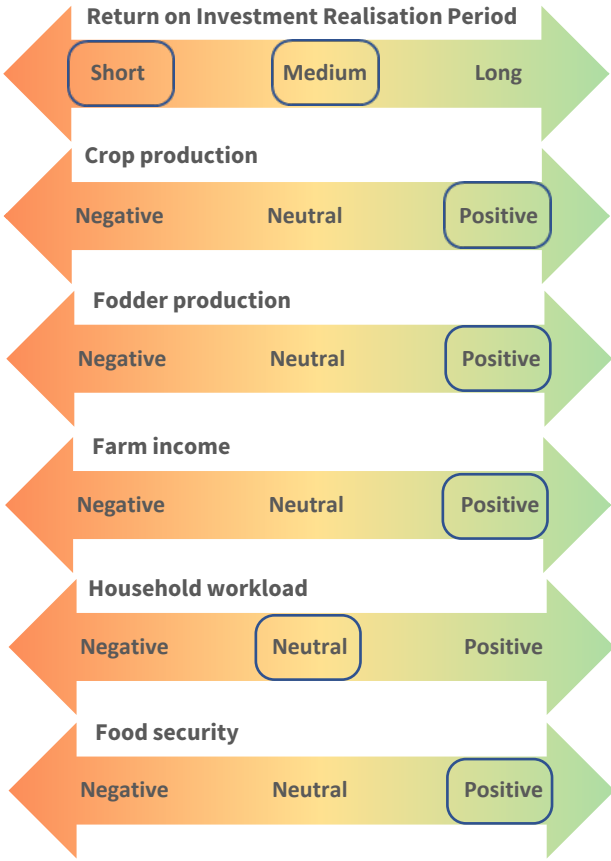
Yes | No

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.

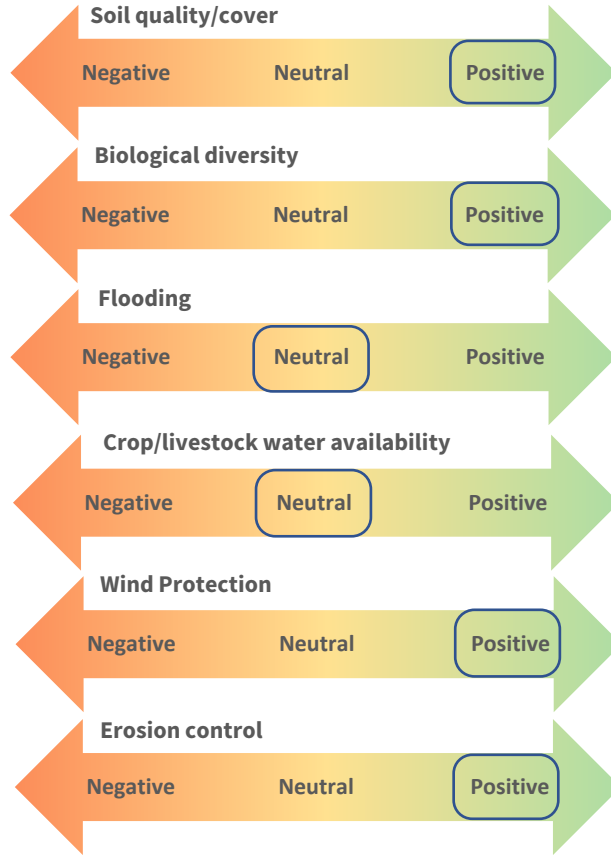
CCARDESA is a subsidiary of SADC, coordinating and harmonising agricultural research and development in Southern Africa.
*This **Technical Brief** is part of a series of materials designed to support **Knowledge Products on climate smart agriculture** available here: www.ccardesa.org/saaiks-knowledge-hub*

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 implement intercropping practices:

- **Step 1:** Consider soil properties - has the soil been mono-cropped and/or is it leached?
- **Step 2:** Consider crop characteristics – will crops be competing for nutrients, water space, sunlight or will they be mutually beneficial adding nutrients
- **Step 3:** Prepare land through clearing and weeding. A no-tillage approach is recommended – see Technical Brief 12.
- **Step 4:** Select whether the farmer should undertake Mixed Intercropping (Good for smaller plots however plants compete) or Row/Strip Intercropping (crops less likely to compete). See also KP07 – Climate Smart Planting Options for Maize and Sorghum.
- **Step 5:** If mixed intercropping is selected, sow two crops simultaneously mixing seeds to together while planting. Harvesting may not be a simultaneous process as different crops have different growth rates and seasons.
- **Step 6:** If row/strip intercropping plant two or more crops in the same field but in separate rows patterns. Rows should be spaced 50 cm apart and can have a row of 1:1 or 2:1 ratio of cereal crop to legume.
- **Step 7**: Harvest as individual crops require, be careful not to disrupt other crops that have not yet matured.

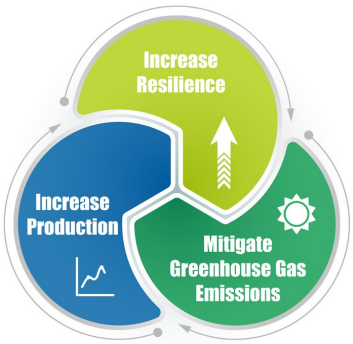
CLIMATE SMART AGRICULTURE OUTCOME(S)

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

Higher levels of production from the same area of land, due to healthier soils.

Reduces losses due to pests and diseases and can mitigate losses due to drought as they increase organic matter, with increased water holding capacity and stimulated bacterial growth.

Helps lock more carbon in the soil and plants.



SUMMARY/KEY ISSUES

Benefits

- Increased and diversified crop yield.
- Food security/farm income increase.
- Nutrient fixing.
- Food security/farm income increase.

Drawbacks

- Competition between plants for nutrients, water, space, etc.
- Increase farmer workload as weeding, planting and harvesting are less efficient. Requires consideration especially if women's workload increases as a result.

REFERENCE MATERIAL

CCARDESA Related Content

- CCARDESA, 2019. Knowledge Product 07, Decision Tool: Climate Smart Planting System Options for Maize & Sorghum
- CCARDESA, 2019. Knowledge Product 08, Decision Tool: Climate Smart Land Preparation Options..
- CCARDESA, 2019. Technical Brief 07: Intercropping.
- CCARDESA, 2019. Technical Brief 12: No Tillage.
- CCARDESA, 2019. Technical Brief 08, Relay Cropping

Additional Information

- African Soil Health Consortium, 2016. Maize-Legume Cropping Systems. Nairobi, Kenya.
- FAO, 2015. The Food and Agriculture Organisation of the United Nations. Traditional systems make more productive use of land. Rome, Italy.
- Climate Change, Agriculture and Food Security (CCAFS) CGIAR, 2013. Intercropping innovations may help build resilience in semi-arid areas. CLI
- WOCAT, 2017. Intercropping, Uganda
- Southern African Development Community (SADC), 2011. SADC Region Agricultural Policy. Gaborone, Botswana.

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