Hybridisation Traditional Breeds

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

Technical Brief 49

Hybridisation is the agricultural practice of genetically manipulating flora and fauna that differ in heredity. Hybridisation and mutations are the main source of hereditary variation and can result in the increased growth rate, manipulated gender ratios, increased yields, sterile animals, improved flesh quality, increase disease resistance and improve environmental tolerance. Intraspecific hybridisation method is used for livestock breeding whereby individuals of different breeds or strains are mated. Distant hybridisation for livestock is difficult to accomplish as hybrids are usually sterile. Hybrid animals are extremely difficult to produce and specialists often spend their careers attempting to create a new breed of animal. Hybridisation is plant species is more common and has a greater success rate than animal species, however successfully creating a hybrid species remains difficult to achieve. Specialists are trained on the gene sequence and different methods for accomplishing hybridisation. The development of hybrid flora and fauna is often undertaken to address a problem or issue. For example, to address socio-economic challenges agricultural researchers may attempt to produce a species of chickens who lay lager eggs or cows who produce more milk. Hybridisation is also applied to address the challenges of a changing climate including producing crops that are more drought resistant. Due to the research and development of these hybrid species they are expensive to access and often not available in remote areas. Traditional breeds are pure individual species with no DNA alterations. They are often endemic to an area and because of this have evolved and adapted to the geophysical area they are found. Thus, traditional breeds are often found in certain areas, and through traditional knowledge have been incorporated into local farming systems for generations. With an increasingly globalised world, it is difficult to maintain distinct traditional breeds as trade in species, seeds etc. is increasingly prevalent. However, with a new focus and dedication of farmers and researchers to explore indigenous knowledge there is an increased focus on reinvigorating the incorporation of traditional breeds of both flora and fauna.

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

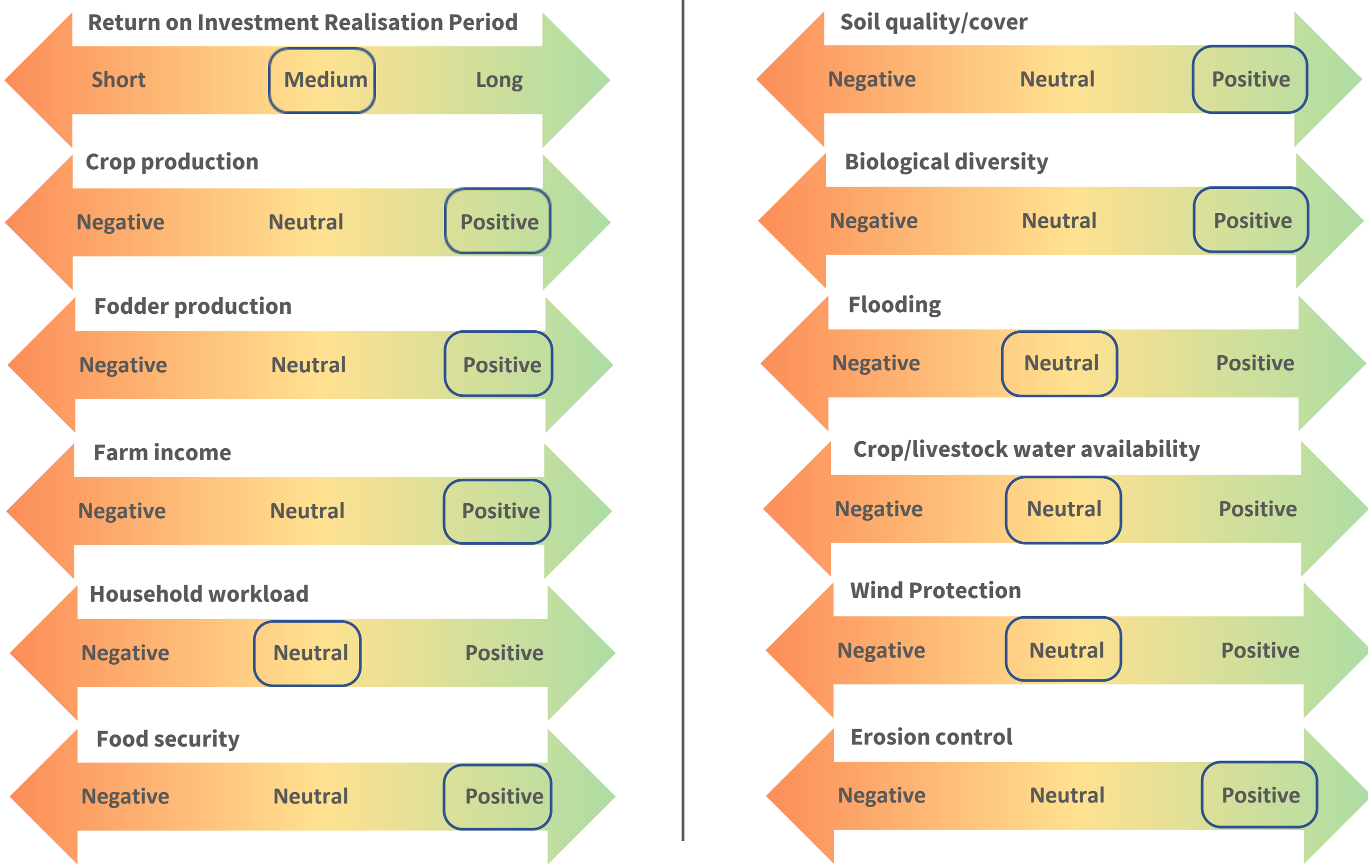
The purpose of this technical brief is to guide where this **practice, technology or strategy** could be applied. It may be applicable in other circumstances, but this brief focuses on where it is possibly **most suitable**. Content is general, and should be contextualised depending upon locality. The 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 effectively leverage hybridisation:

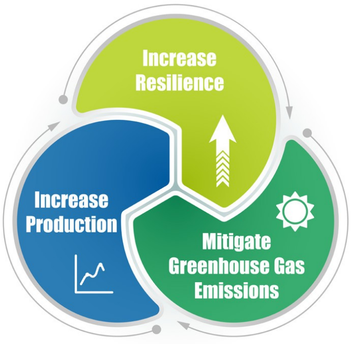
- **Step 1:** Contact national extension and research as they are often working on developing new species of flora and fauna to meet local challenges including climate variance and introduce them to local farmers.
- **Step 2:** Research best methods applied to the practice of hybridisation in the region.
- **Step 3:** Meet with national agricultural extension and research staff as well and local breeders to determine desirable characteristics and possible crossing of livestock differing in heredity. For example, the mating of two different goat breeds to obtain an improved breed.

CLIMATE SMART AGRICULTURE OUTCOME(S)

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

Increased the milk yield or weight gain of animals, thus increasing the amount of food that farmers can produce within available resources.

Breeding for resilience to:
- Pests/disease
- Heat and drought



SUMMARY/KEY ISSUES

Benefits

- This agricultural practice is widely used in breeding to increase growth rate, manipulate sex ratios, produce sterile animals, improve flesh quality, increase disease resistance and improve environmental tolerance.

Drawbacks

- This agricultural practice is widely used in breeding to increase growth rate, manipulate sex ratios, produce sterile animals, improve flesh quality, increase disease resistance and improve environmental tolerance.

REFERENCE MATERIAL

CCARDESA Related Content

- CCARDESA, 2019. Technical Brief 17, Climate Smart Genetic Improvement Options for Livestock.

Additional Information

- FAO,2003. Community-Based Management of Animal Genetic Resources. Rome, Italy.
- FAO, 1964. Unasylva – FAO/IUFRO meeting on forest genetics. Rome, Italy.
- FAO, 2000. The use of inter-species hybrids in aquaculture and their reporting to FAO. Rome, Italy.

Citation: CCARDESA and GIZ 2019. Technical Brief 49: Hybridisation Traditional Breeds. CCARDESA Secretariat, Gaborone, Botswana.