Appendix 2

Department of Agricultural Research

Best CSA Practices

Best CSA practices

- Conservation Agriculture
- Use of improved germplasm
- Water harvesting technologies
- Keyhole gardens
- Use of legumes to improve soil fertility
- Planting dates and spacing
- Improving the effectiveness of pest, disease, and weed management practices through wider use of integrated pest and management
- Intercropping
- Fodder production and high density grazing

Conservation Agriculture

Conservation agriculture (CA) is underpinned by three basic principles:

- soil disturbance is minimized by reduced or zero-tillage;
- the soil is kept covered with organic materials (crop harvest residues or cover crops) – at least 30% soil cover; and
- crop rotations/associations are used.

Conservation Agriculture (Machobane farming system)

- Farmers' resource base (land, livestock, labour, household by-products) used to establish intensive inter-cropping by growing several crops simultaneously or in relay in the same field
- The household "waste" produced by a typical family (mostly ash, up to 2 tons per annum) and FYM (1 - 2 tons per annum) is sufficient for 1 acre of land using localised placement techniques
- Intensive cropping of one acre of land is sufficient to grow enough, for home consumption and sale, to ensure sufficient food for the family (grown or purchased with the earnings of surplus crops, sold so as to meet consumers' preferences)

Conservation Agriculture (Machobane farming system

- Continuous intensive cropping, with appropriate incorporation of organic matter and ash in the soil, offers a further, synergistic, means of enhancing soil and moisture conservation
- Pest control is best carried out by traditional methods, including local concoctions, local practices, and understanding of pest biology
- Multiple cropping will substantially reduce farm income fluctuations, through a combination of lowering yield fluctuations of individual crops, and spreading risk of fluctuations in yields and prices by planting a range of crops simultaneously

Use of improved germplasm

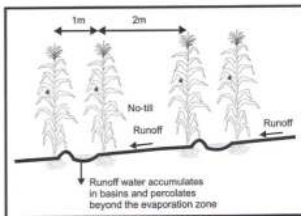
Yield = G (genotype) X E (environment) X M (management)

It is important that the farmer uses the crop planting materials best adapted to the particular farm in terms of adaptation to the local environment (soils, climate); and resistance to pests and diseases

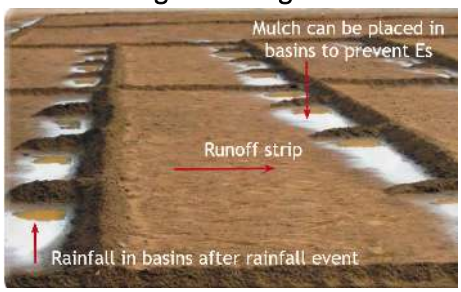
Drought tolerant or short maturing to adapt to late onset of rainfall

Water harvesting technologies

- Ex-field water harvesting
- In-field rain water harvesting (Basin tillage)



Water harvesting technologies



Keyhole gardens

All year round cultivation of leafy vegetables

Easy to manage

Use of legumes/green manure to improve soil fertility

- legume plants convert atmospheric N2 into mineral N by biological fixation
- Green manure legumes must yield at least 2 t/ha dry matter or roughly 50–60 kg N/ha – which is likely to give an extra 1 t/ha of grain in the following cereal crop, to take into account the potential loss of land productivity.
- The greater the biomass produced, the larger the inputs from N2-fixation – so the soyabean varieties, or the creeping varieties of beans and cowpea leave behind the most N.

Planting dates and spacing

- **Planting date**. A delay in planting date usually affects yields negatively, particularly where the growing season is short. Planting date should be selected based on knowledge of the onset of the rainy season. We need short maturing varieties.
- **Spacing**: When crops are planted together, they compete with each other for nutrients, light, and water. Appropriate planting densities, expressed as number of plants per hectare need to be adjusted for different environments and these are often reduced when rainfall and soil fertility conditions are suboptimal

Pest and disease management

Pests and diseases must be controlled at specific crop growth stages. Treated seed should be used where there is a risk of pest attack in the seed bed. In many crops, pest and disease control will be required, usually between flowering and pod or grain filling. Failing to do so will result in an unhealthy crop that will use nutrients and water inefficiently.

Intercropping

- Intercropping arrangements need to take into account the specific growth features and needs of the individual crops to minimize intercrop competition. Sometimes the planting of one of the intercrops is delayed to minimize competition
- Whilst beans can be intercropped with maize effectively at normal maize spacing, the maize spacing should be increased (i.e., fewer plants per ha) when intercropped with cowpeas or soybeans, which requires relatively more space compared with beans
- Specific crop management practices in intercrops need to be adapted to the needs of each crop in terms of spacing, nutrient management, relative planting dates, or pest and diseases control practices.

Fodder production

- Very important for nutrient recycling and restoration of degraded land
- Enhance complementary or stall feeding

High density rotational grazing (Oa senkhome)

- Paddock rotational grazing in concentration camps
- Groups of livestock are limited to a clearly defined area using fencing to prevent them from preventing selective grazing.
- They trample on plant residues, breaking down dead plants mixing it into soil with urine and faeces to facilitate decomposition and fertility of the soil. New growth becomes vigorous and dense

Conclusion

- Policy environment
- CSA investment plan available and needs workplans that can be financed by GoL and NGOs
- Proper extension manuals

Thank you