

## 2. Cereal-Legume cropping systems

Intercropping is the practice of growing two or more crops in the same area, at the same time. Crop rotation is the practice of growing different crops in the same area, in a special sequence over seasons. The cereal-legume systems comprising maize followed by legumes (common beans, soybeans, groundnuts or cowpea) are common crop rotation practices in many parts of the world.

In general, mixed cropping is better suited to farmers with small landholdings whereas crop rotation is more suitable to farmers with larger landholding. However, there are other factors such as household needs and farm economics that determine choice of these two SAI practices. The land equivalent ratio (LER) is often used to measure benefits of intercropping compared to planting a single crop (sole cropping). The LER is defined as the land required for production of the same yield in the sole crops compared with the intercrop. A LER greater than 1 indicates intercropping is advantageous to sole crops (Table 2.1).

### Advantages of cereal-legume intercropping systems

Intercropping was practiced traditionally by African farmers as mixed cropping but later abandoned when high input-demanding cash crop production systems were introduced in the 1930s but now being promoted again due to their sustainability merits. The advantages and disadvantages of intercropping have been summarized in Table 2.1.



Figure 2.1 Maize intercropped with common beans

Table 2.1 Advantages and disadvantages of intercropping practice

| Advantages  | Disadvantages  |
|---|--|
| <ul style="list-style-type: none"> <li>• Increases total crop productivity.</li> <li>• Diversifies sources of food, reduce risk of crop failure and increase food and feed security.</li> <li>• Improves soil cover and minimizes soil water loss and soil erosion.</li> <li>• Suppress insect pests and diseases. For example, farmers using intercrops often experience reduced attack of maize by Fall Army Worm.</li> <li>• Suppression of weeds including witch weed (<i>Striga asiatica</i>)</li> <li>• Diversification of soil flora and fauna and increase water infiltration.</li> </ul> | <ul style="list-style-type: none"> <li>• Initially yield decreases of the individual component crops to sole crops, and increased crop density enhances competition for water, light and nutrients</li> <li>• Demands more time and expertise.</li> <li>• Difficulties in mechanization so most cultural operations and harvesting should be done manually.</li> <li>• More nutrients and water needed.</li> <li>• Poor supply of legume seeds for intercropping.</li> </ul> |

### Advantages of cereal-legume rotation systems

Crop rotation using cereal and legumes is another commonly used practice by smallholder farmers. The main advantages and disadvantages of crop rotation are presented in Table 2.2.

Table 2.2. Advantages and disadvantages of cereal-legume rotation

| Advantages  | Disadvantages  |
|---|--|
| <ul style="list-style-type: none"> <li>• Increased crop yields especially in conservation agriculture systems.</li> <li>• Improves soil structure and reduce erosion</li> <li>• Improves soil fertility from nitrogen fixation by legumes. Some legumes can fix up to 30kg N/ha per year.</li> <li>• Suppression of pests and diseases by breaking the life cycle of attacking pests.</li> <li>• Mitigate climate change through carbon sequestration in soils.</li> <li>• Improve soil health through macro and micro fauna diversity</li> </ul> | <ul style="list-style-type: none"> <li>• Rotations can effectively be implemented only by farmers with adequate land sizes.</li> <li>• Low adoption due to limited availability and high cost of legume seeds</li> <li>• Risk of losing an entire crop in a rotation.</li> <li>• The need to stick to a defined crop sequence even when the other crop is not financially rewarding</li> </ul> |