



Intercropping and its Relevancy to Small-holder farmers

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What Is Intercropping

Intercropping is a farming practice whereby two or more crop species, or genotypes are grown together and coexist on a same piece of land (Brooker et al, 2014 & Carlson, 2008). Intercropping exploits the nature's principle of diversity on the field and can increase productivity per unit of land (Preston, 2003). Intercropping offers diversification, risk avoidance, and efficient utilization of resources (Thayamini et al, 2010, Gohole et al, 2008), which are critical for the small-holder farmer to achieve food security. Intercropping is common in subsistence farming.

White maize (SC 701) was intercropped with Orange fleshed sweet potatoes (OFSP) at Ndwedwe and Maphumulo areas to explore means of supplementing householders' diet with vitamin A rich food thus contributing to food security.

Types of intercropping

Intercropping can be grouped into:

1. **Row-intercropping:**

Growing two or more crops simultaneously where one or more crops are planted in regular rows, and crop or other crops may be grown simultaneously in row or randomly with the first crop.

2. **Mixed- intercropping:**

Growing two or more crops simultaneously with no distinct row arrangement. This type of intercropping can be suitable for grass-legume intercropping in pastures

3. **Strip-intercropping:**

Growing two or more crops simultaneously in

different strips wide enough to permit independent cultivation but narrow enough for the crops to interact ergonomically.

4. **Relay-intercropping:**

Growing two or more crops simultaneously during part of the lifecycle of each. A second crop is planted after the first crop has reached its reproductive stage but before it is ready for harvest (Preston, 2003).

Farmers in rural areas of KZN are familiar with the concept of intercropping as can be witnessed by the findings from a survey conducted in ILembe District Municipality (Mpanza, 2004). In this study, more than 40% of the respondents were practising intercropping.

To determine the land use efficiency of intercropping and its effects on yield of crops involved, **row-intercropping** where one row of maize was alternated with one row of orange-fleshed sweet potatoes was chosen in an on-farm trial that ran for four seasons between November 2014 to May 2019 at Ndwedwe training centre and Maphumulo in Mambedwini area.

Potential Benefits of intercropping

Intercropping may be a means to address some of the major problems associated with modern farming, including moderate yield, pest and pathogen accumulation, soil degradation and environmental deterioration. Benefits of intercropping are attributed to the greater efficiency of resource utilisation in intercropping (Thayamini et al., 2010). Following are some potential benefits of intercropping:

- **Diversity of Produce**

Intercropping ensures diverse produce in the same available piece of land. This provides a variety of produce to meet the farmer's household food preference compared to monocropping.

- **Risk Avoidance**

Intercropping can minimize loss of produce during adverse weather conditions, pest, or disease infestation detrimental to a specific crop in a particular season. Yields may be reduced but total losses may be avoided.

- **Efficient Utilization of Resources**

Combination of complementary crops in the intercropping system provide an opportunity to exploit available resources for the benefit of the intercropped crops. The root and canopy architecture of the intercrops may interact positively to encourage resource sharing (Brooker et al, 2014). The outcome would be more production per unit area.

Land Equivalent Ratio (LER)

Research with different combinations of crops such as maize, sweet-potatoes, cow peas & sorghum; has shown that there are biological advantages of intercropping over sole cropping (Afe et al, 2013). In a study in Kenya where maize was intercropped with sweet potatoes, the Land Equivalent Ratio (LER) showed that the intercrop had a higher land use efficiency compared to the monocrop (Gohole et al., 2008). Carlson (2008) stated that one of the main benefits of intercropping is an increase in yield per area of land.

Land Equivalent Ratio (LER)

In figure 1, is algebraically expressed as $LER = Lm + Lsp = Ym / Sm + Ysp / Ssp$, where Lm & Lsp are partial LER's for maize and sweet potato respectively, Ym and Ysp are individual crop yields in this intercropping system and Sm and Ssp are their yields as sole crops.

Results from on-farm trial conducted at Ndwedwe and Maphumulo rural areas indicate higher production per unit area for the yields of intercrops compared to sole crops.

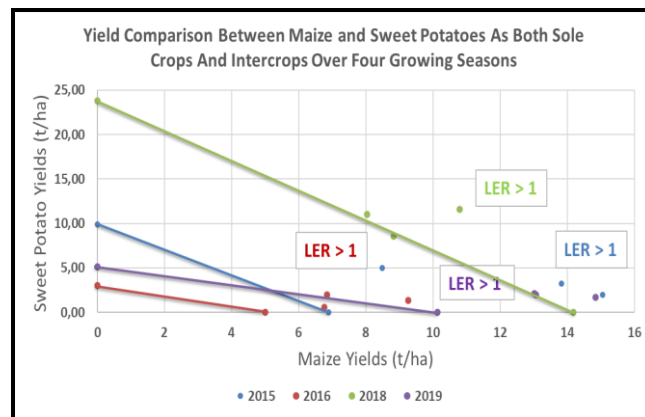


FIGURE 1: Showing the land equivalent ratios for maize and sweet potato intercropping system from four growing seasons.

Figure 1 above indicates yields from the intercropping on the right-hand side of the line graph drawn by joining the yields from the two monocrops; this indicates the land equivalent ratio as greater than one (except for one treatment in 2018, as depicted by the graph). This indicates that intercropping has yield advantage over mono cropping. This is in line with what was found in similar studies (Gohole et al., 2008 and Carlson, 2008).

Potential risks of intercropping

Non-Compatibility of intercrops

Complicated interactions of intercrops both above- and below-ground may negatively affect the growth of one or all intercropped plants thus reducing the yield. High level of knowledge and understanding of crop physiology is vital in selecting compatible crops (Iverson et al. 2014).

Labour Intensive

Mechanisation may not be appropriate for the intercropping system. Most operations would be labour intensive and require more time. Management could be complicated by the different cultural practices of the different crops (e.g., weeding, fertilization and harvesting).

Relevancy to small-holder farmers

Small-holder farmers have limited land for agricultural production. Depending on the production objectives of the small-holder farmer, intercropping presents a survival strategy for small-holder farmers whereby the available limited land resources could be harnessed to obtain diverse produce whilst ensuring sustainability of their limited land.

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