Intercropping cowpea with other crops

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Introduction

- **Intercropping:** Is a method of growing two or more crops together in proximity on the same land
- The original objective of intercropping was to provide insurance against total crop failure
- At present farmers recognized that it increases overall crop productivity and profitability, and helps in managing pests
- Over 89% of cowpeas in Africa are grown in mixed stands

Other Concepts related to intercropping

- Monoculture/sole cropping: One crop
- Polyculture: Many crops
- Crop rotation: crop planting separated in time

- In monoculture, it's hard to maintain soil cover
- Encourages pests, diseases and weeds
- Can reduce soil fertility and damage soil structure

Intercropping: Types

Intercropping practices differ in the arrangement, sowing time, and plant combinations

Some common types:

Row intercropping: Growing two or more crops at the same time with at least one crop planted in rows

Intercropping: Types

Mixed intercropping: Growing two or more crops simultaneously on the same piece of land with no distinct row arrangement. It is useful where the land resource is a limiting factor (e.g. Cowpea-millet-sorghum seeds mixed and broadcasted)

Intercropping: Types

Strip Intercropping : In this method two or more crops grow together in strips wide enough to allow separate production of crops using mechanical implements but close enough for the crops to interact.

Intercropping: Types

Relay Intercropping: Planting multiple crops in the same garden sequentially. The second crop is planted when the first is flowering or beginning to mature

Temporal Intercropping: This involved growing two or more crops with different maturing time. When the fast-growing plant is harvested, the slow-growing one has more space to develop.

Intercropping: Types

Alley cropping: This system suggests growing crops in-between trees, bushes, or hedges forming alleys. Higher plants protect the lower ones from winds and shelter from extra sunlight as well as prevent soil erosion with their vigorous root systems.

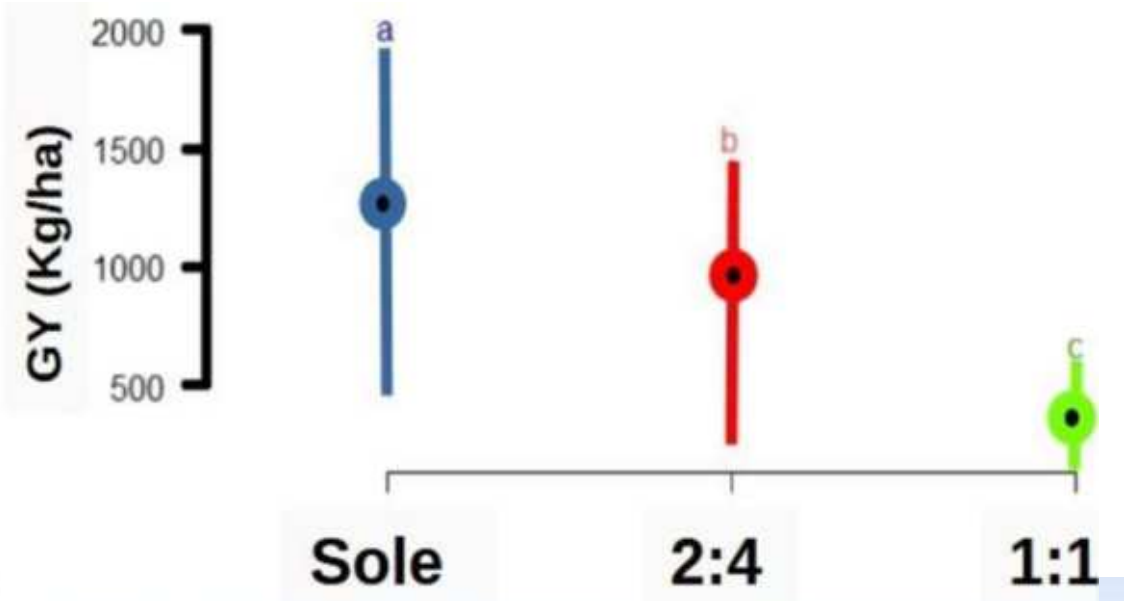
on.

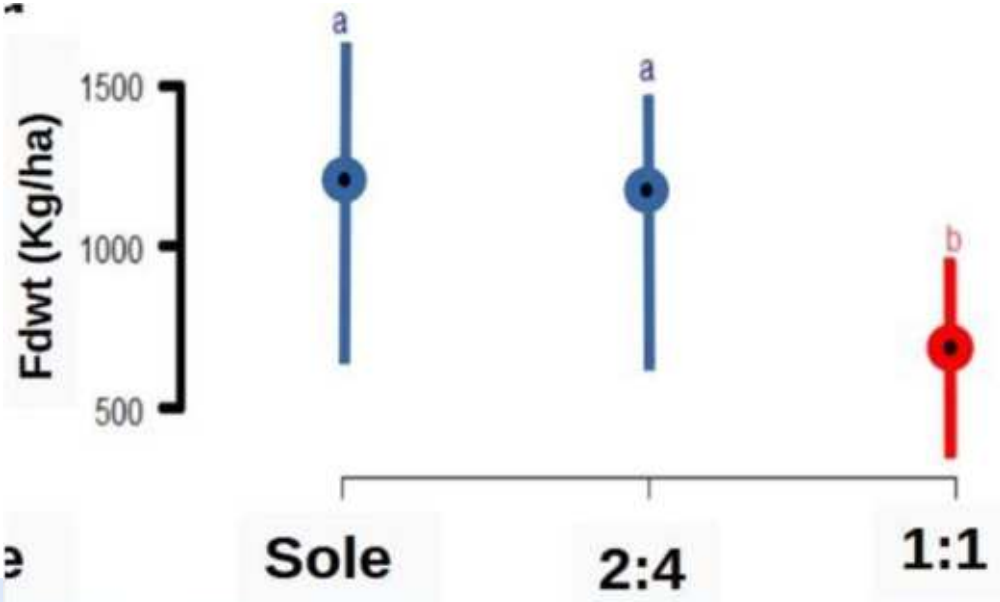
Common intercropping patterns

1:1	2:4	Sole
High competition	Less competition	No competition
Low yields	Optimal yield	No land economy

ation.

Which pattern is better?





2 rows of millet : 4 rows of cowpea was significantly better than 1:1 pattern

ation.

Benefits and challenges of Intercropping

Benefits

- Soil, water and sun energy are utilized in more efficient way
- Increased profit. Secondary crops provide more returns and ensure profit even when the primary crop fails
- Repelling pests and reducing weeds
- Providing nutrients for the neighbouring plants
- Prevention of soil erosion
- Decreased usage of inorganic substances

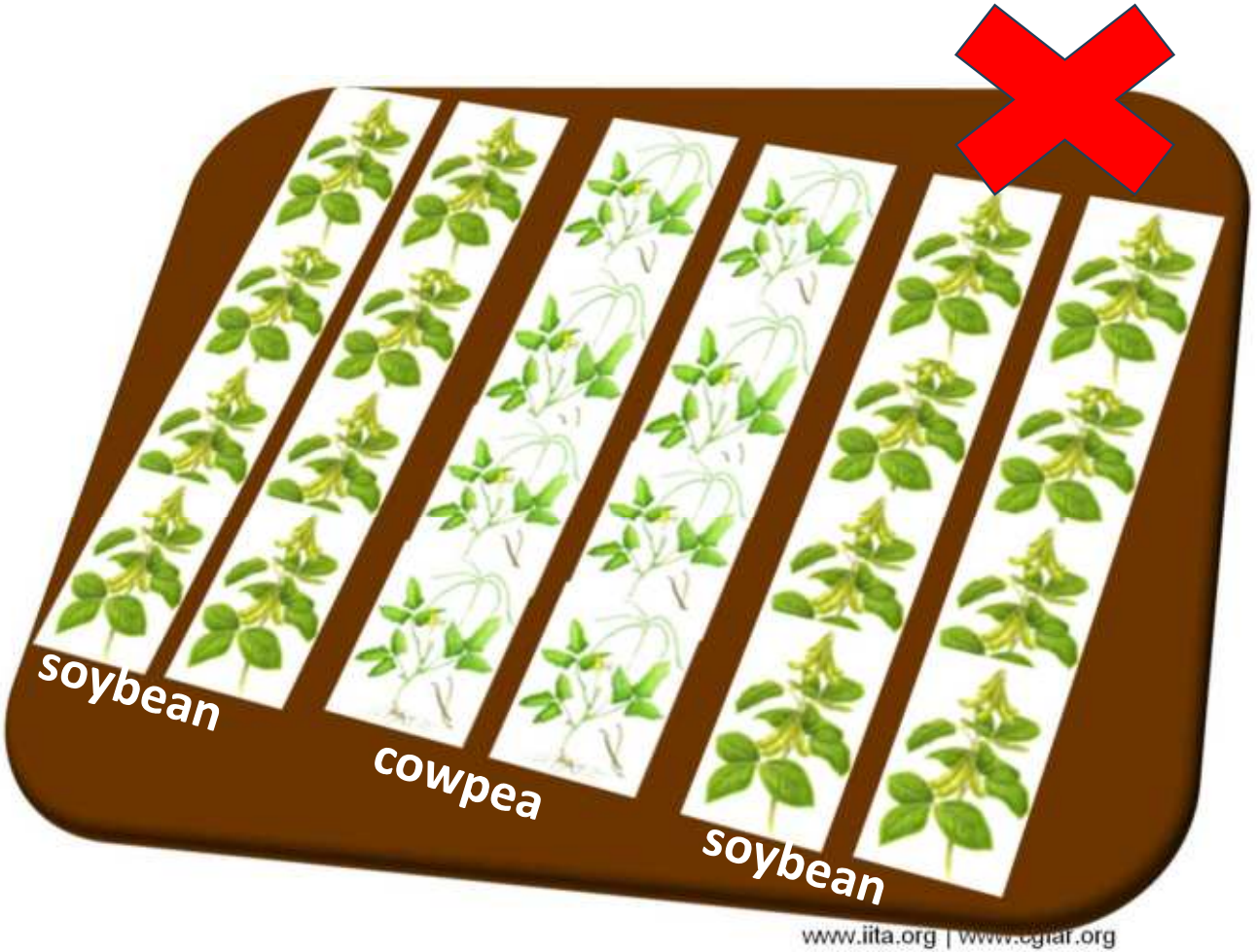
Challenges

- Inadequate planning and practice may result into losses
- Consumes more time
- Difficult to practice on large scale

Factors to consider before intercropping

The basic idea in proper companion matches is to make them benefit from each other, not compete

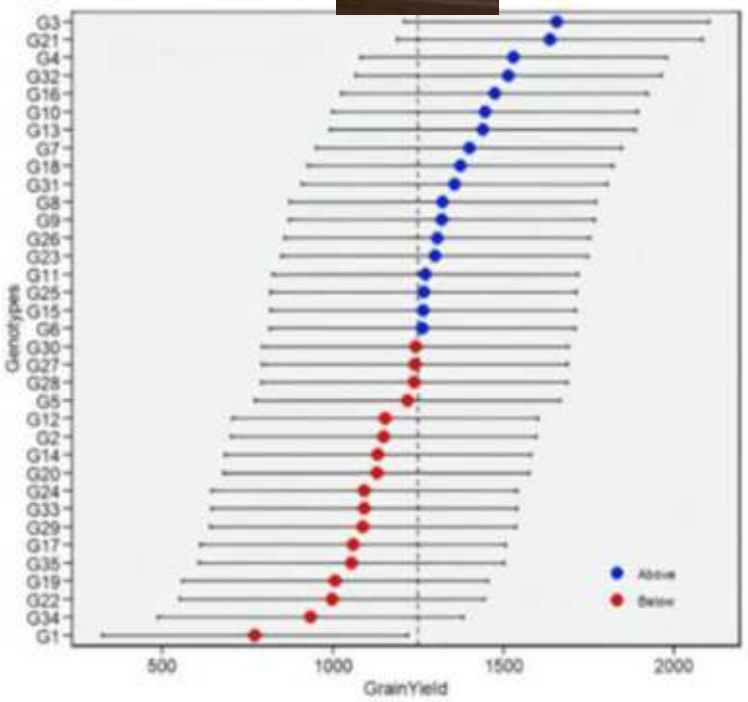
- **Crop group:** Crop belonging to the same group should not be grown along each side (e.g. legume—Legume or cereal--cereal)
- **Pests:** Plant that have the same pests should not be planted together



Factors to consider before intercropping

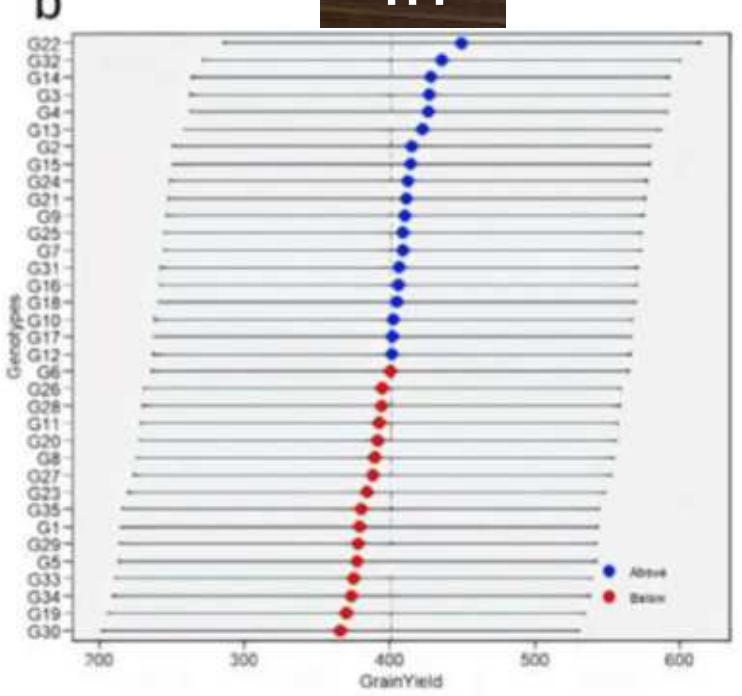
- **Variety choice:** Must chose the right variety. Some cowpea varieties are not shade tolerant, will give poor yield when grown in intercrop with other crops.

Sole



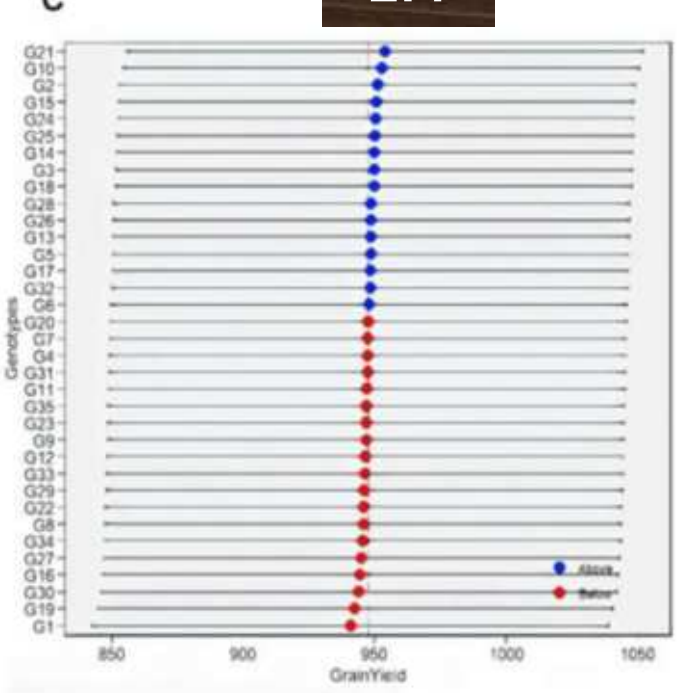
IT07K-297-13 best under sole cropping

1:1



IT17K-1314-4-2 best under 1:1

2:4



IT17K-1257-1-2 best under 2:4

Other factors and strategies

- Chose crops that complement each other
- Chose crops that utilize resources efficiently [deep vs shallow roots]
- Chose crops that maintain and enhance soil fertility [Legume vs cereal]
- Chose crops that have diversity of growth cycle. Duration of plant growth determines whether they can be planted together [temporal vs relay cropping]
- Planting time----Understand clearly the right time to plant each crop
- Plant density -----Use the correct planting density that will generate optimum output

Efficiency of intercropping

The aim of intercropping is efficient utilization of resources: land, water, sun energy, maintaining stability in production and obtaining higher net returns

Efficiency is measured by amount of yield obtained per unit land area where both crops are grown at a particular time.

This is technically called Land equivalent ratio (LER)

Efficiency of intercropping

Land equivalent ratio is the relative land area under sole crops that is required to produce the yield achieved in intercropping.




$$LEE = \frac{(Yield\_cowpea)intercrop}{(Yiled\_cowpea)sole\ crop} + \frac{(Yield\_millet)intercrop}{(Yield\_millet)sole\ crop}$$

LER Example

LER > 1 indicates yield advantage of intercropping
LER = 1 indicates no gain, no loss
LER < 1 indicates yield loss

900 kg/ha

÷

1,500 kg/ha

+

2,500 kg/ha

÷

3,000 kg/ha

LER = (900/1500) + (2500/3000)
= 0.6+0.83
= 1.43 [LER is more than 1 by 0.43, indicating 43% yield advantage!

Conclusion

- Intercropping is an important concept in Agriculture
- It helps to ensure proper management of land, water, energy, pests, weeds, and other resources
- With good planning and practice, farmers can increase their profits and also improve the ecosystem
- For every crop combinations it is important to know the intercropping efficiency
- Extension agents should have a good understanding of intercropping system to be able to advise farmers accordingly

Readings

- Ongom, Patrick O.et al, 2023. "Exploiting the Genetic Potential of Cowpea in An Intercropping Complex." Agronomy 13, no. 6 (2023): 1594. Accessed May 23, 2024. https://doi.org/10.3390/agronomy13061594.Singh B.B, 2014.

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Thank you!