6. Timely planting and planting configurations/ arrangements for successful intercrops

In rainfed systems, farmers often fail to plant crops on time. Due to the changing climatic and seasonal weather patterns, farmers need to ensure that they make full use of any available moisture in the soil by timely planting at the onset of the cropping season. Late planting often results in lower yields for both cereals and legumes. Key steps to ensure farmers optimize yields in any rainfall season include the following:

(a) Climate Services information: In many countries, meteorological services organizations often give seasonal forecasts of what the rainy season is going to be. It is important for the farmers to make use of this information usually shared on radios, newspapers and even social media platforms such as WhatsApp. To access this information, farmers are advised to ask their local extension advisers on where to find this information.
(b) Timely planning: It is important for farmers to know well before the season starts what crops they intend to grow and on which fields. Once a decision is made on this, the next step is to calculate the required inputs (seeds, fertilizer and agro-chemicals) for the different blocks of land. Please ask your local extension officer for help on this if not sure.
(c) Timely land preparation: Irrespective of whether you use conventional ploughing or no-till methods, it is always important to timely prepare the land before the season starts. Attempting to prepare land when the season has started often leads to disastrous results because land preparation demands high energy, time and resources.
(d) Ensure all fields to be planted are free of weeds.

What planting configurations to use

Performance of different intercropping systems depends on several factors that include (i) time of planting of both crops, (ii) prevailing moisture, (iii) planting density, and (iv) planting configuration i.e. planting pattern.

(1) Conventional intercrops

Traditionally the planting of intercrops was disorganized with no special pattern of planting the mixed crops. The intercrop seeds are usually broadcasted in the field and would thus germinate randomly. With the advent of machinery and the need to maintain prescribed plant populations, farmers in many countries now grow the main cereal crop and the legume on the same row. This is also done to minimize labour required to prepare planting stations for both crops (Figure 6.1). For example, in a maize and beans intercrop system, the maize seeds are dropped in the same hole as the beans so both crops grow from the same rows.

Advantages

- The Cereal and legume crops occupy the same space and same planting furrows / holes
- Easier to cultivate using mechanical weeders resulting in better weed control

Disadvantages

- Increased competition for water and nutrients in the same space
- Shading effects on the legume may be higher

(2) Alternate row systems

The alternate row systems involve alternating rows between the intercrops. However, it is important to ensure the main crop maintains the same planting density as in sole crop systems. For example, while maize may be spaced at 90 cm interrow, the legume crop such as cowpea needs to be planted in between the maize rows i.e. at 45cm between the maize rows.

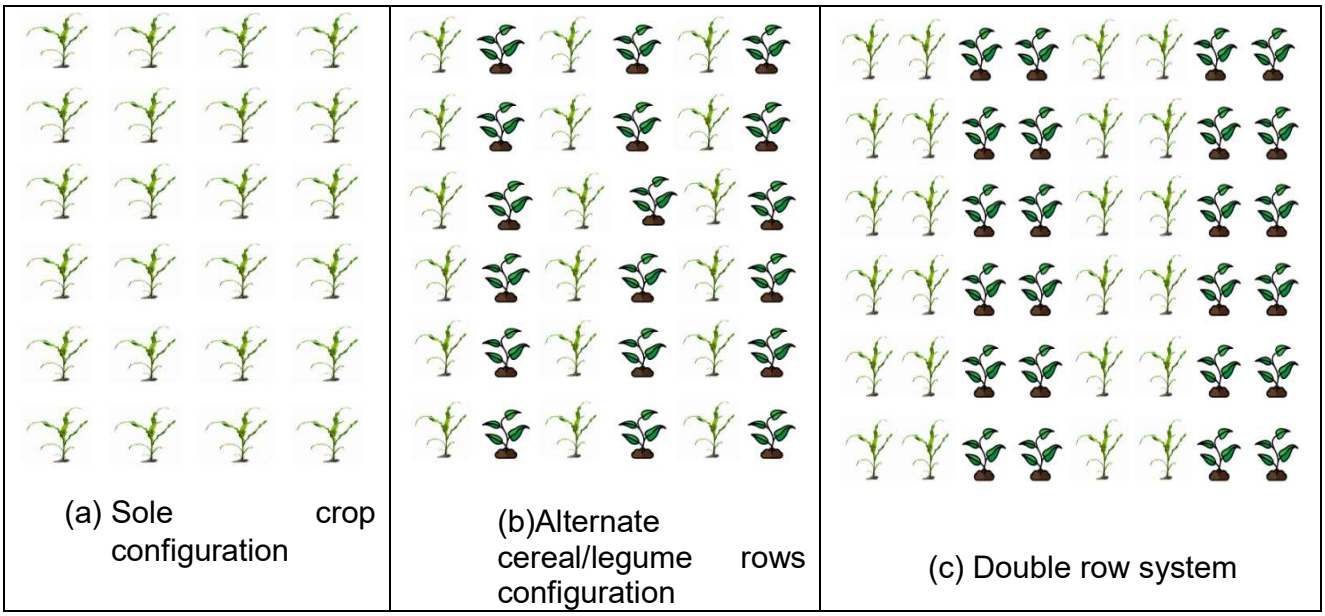

Figure 6.1 Different types of plant configurations in intercrops

(3) Double row cropping systems

The double row intercrop system involves two rows of cereal alternated with 2 rows of the legume crop. In other places this is known as the back to back configuration. In Kenya this arrangement is also popularly known as the Mbili system. Advantages are that the system allows more light to reach the lower legume crop and thus reduces shading on the legume intercrop. This system has been used successfully in Malawi and South Africa for maize/groundnut and sorghum/ legume intercrops and proved to be worthwhile.

(4) Strip cropping arrangements

Strip crops also work very much in the same way as double-row systems but in this case one may have 4 or 6 rows of legume alternating with 4 or 6 rows of cereal (Figure 5.2). The advantage is again increased light penetration to the short legume particularly if the crop rows are oriented in an east west direction.

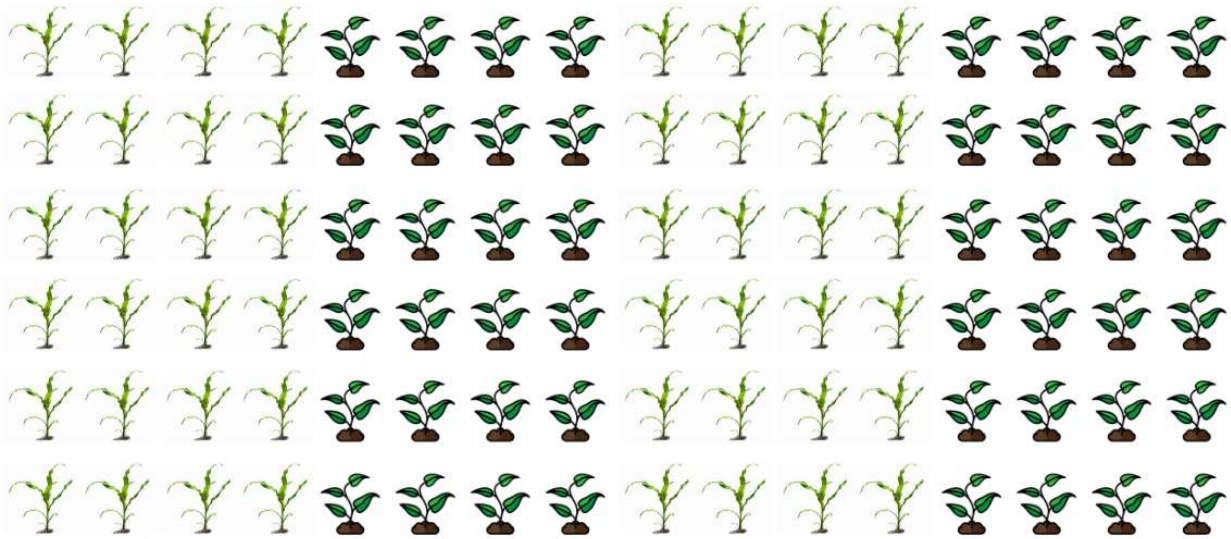

Figure 6.2 A typical strip cropping arrangement with 4 rows of maize and 4 rows of beans

All in all, the important issue about planting configurations is that planting density employed for each of the component crops should match the average rainfall received in the area as well as the fertility status of the soil. In general, farmers are advised not to compromise the plant density of the cereal main crop which is the staple food.

(5) Relay intercropping

Relay intercropping is the practice of planting the legume intercrop a couple of weeks after the maize or cereal crop. For example, climbing legumes such as mucuna or velvet bean, are well known for strangling the maize crop to the extent that the maize yield gets compromised. To avoid this, such legumes are only planted much later in the season to enable the cereal crop to make a head start before the legume kicks in. As soon as the maize starts dying after maturity, the legume crop then reaches its peak and can continue to grow either on residual moisture or on terminal showers that fall towards the end of the main cropping season. Legume crops often relayed with maize include mucuna, climbing beans, *Tephrosia vogelli*, and *Crotalaria gramiana*. The suggested in-row and between row spacings for different legumes planted under the different plant configurations are presented in table 5.1 below.

Table 5.1 Recommended plant configuration arrangements for different legumes intercropped with maize

Legume intercropped with maize	**Alternate rows**	**Double rows**	**Strip cropping 4 rows maize/ 4 rows legume**	**Relay Cropping**
Cowpea	80-90cm x 10cm	40-45cm x 10 cm	45cm x10 cm	80-90cm x 10cm
Common beans	80-90cm x 15cm/75 x 10 cm	40-45cm x 15 cm	45cm x15 cm	80-90cm x 10cm
Groundnut	80-90cm x 30cm	40-45cm x30 cm	45cm x30cm	N/A
Soyabeans	80-90cm x 5cm	30-40cm x5cm	40-45cm x5cm	N/A
Pigeonpea	80-90 cm x 100cm	N./A	N/A	80-90 cm x 100cm
Mucuna	80-90cm x 30cm	40-45cm x30cm	45cm x 30cm	80-90cm x 30cm

Planting depths and when to plant in rainfed systems

If planting by hand it is important to ensure the following

(a) Ensure the seed (legume or cereal) is planted at a depth of between 5 and 10cm.
(b) Cover the seed with soil and press it firmly with your feet or hand to ensure the soil has good contact with the seed.
(c) In rainfed systems, planting should only be carried out when the soil is wet at least in the top 20cm depth. To achieve this, one needs at least 30 mm of rainfall being received in 2-3 consecutive days. After receiving this amount of rain planting should be carried out within 3 days of receiving the rain or else the soil becomes too dry for germination to take place successfully. Heavier or clay soils generally require more rain to get fully wet compared to sandy or light textured soils.
(d) Soaking the seed by immersing in water overnight to ensure the seed germinates quickly after planting but ensure you only soak enough seed to be planted in the following morning. The seed may rot or get damaged if soaked for longer than a day.