Pest and disease simulation of the agroforestry option:

1. PESTS AND DISEASES PREVENTION (2)

- Powdery mildew (Zo guardedatarathi): Affected: flowers and green fruit, then gradually fall down. Use pesticide with active ingredient Benomyl according to using instructions (for example, Marshal 25WP). Spray when flowering or periodically once per 10-15 days when disease occurs.

- Corn borers, corn earworm (Ostrinia nubilalis): Affected: young kernels. Use pesticide with active ingredient Clothianidin according to using instructions (for example, Benotigi 5WP). Spray when flowering or periodically once per 2-3 weeks.

2. MAIZE

- Black rot (Phytophthora maydis): Affected: young leaves, young shoots and root. Use pesticide with active ingredient Metalaxyl according to using instructions (for example, Benotigi 5WP). Spray when flowering or periodically once per 2-3 weeks.

- Sheath blight (Monosporium oryzae): Remove leaves when disease occurs.

3. MANGO

- Mango anthracnose (Glomerella cingulata): Affected: young leaves, young shoots and fruits. Use pesticide with active ingredient Mancozeb according to using instructions (for example, Champion 37.5 SC, Viben C 50 WP, spray on entire tree, once per 1.5 months, stop spraying when flowering and pre-harvest 20 days). Do proper pruning and fruit pruning; Possible to use Ridomil Gold 68WG according to using instructions (for example, Fentra 25DC, Bella 70EC). Spray 2-3 times, each time 5-7 days.

- Mango fruit fly (Ceratitis cosyra): Pre-treatment of mango by making an incision and laying down 30 g of 50% sodium fluoride, then 10 kg of sugar and 10 kg of water. Pre-treat the mango that is 10 kg for 3 days before application.

- Mango leafhoppers (Idioscopus clypealis): Preventing by harvesting at the right time (for example, the mango leafhoppers are not present on mango when the leaves are 45-50 days old in the dry season). Harvesting frequency depends on the number of cattle of each household, however, avoid late harvest to minimize nutrition losing in stem and leaves when the mango is hardened.

- Mango fruit flies (Ceratitis cosyra): Using pesticide with active ingredient Etofenprox or Fipronil according to using instructions (for example, Marshal 25WP, Trebon 10EC, Bassa 50EC; Spray 2-3 times, each time 5-7 days).

- Mango stem borers (belonging to Cerambycidae family): Inject lime water or pesticides on mango stem. Prevention by applying dense lime water mixture on tree base, using light to trap mature adult. Some common pests and diseases of mango tree are:

   - Mango anthracnose: Occurs from October to January, attack tree leaves, young leaves and flower stalks. Result to stunted plants and slow growth.
   - Corn borers: Injection lime water mixture on tree base.
   - Mango leafhoppers: Prevention by using trap lamp; spray using pesticide with active ingredient Etofenprox or Fipronil according to using instructions (for example, Marshal 25WP, Trebon 10EC, Bassa 50EC; Spray 2-3 times, each time 5-7 days).

- Mango for fruits in Acacia - Mango - Maize - Forage grass option at Yen Bai province: mango and maize harvest 20 days; Do proper pruning and fruit pruning; Possible to use Ridomil Gold 68WG according to using instructions (for example, Fentra 25DC, Bella 70EC). Spray on entire tree, once per 1.5 months, stop spraying when flowering and pre-harvest 20 days. Do proper pruning and fruit pruning. Preventing by using trap lamp; spray using 50% sodium fluoride and 50% water mix.

- Black sooty mold (Cronartium ribicola): Attaches young leaves, young shoots and inflorescences. Causes progressive decline to 15 million in the 20th year, the agroforestry option could get profits of more than 30 million per ha per year then increase progressively and peaks in the 7th year onwards.

- Mango leafhoppers (Idioscopus clypealis): Occurs from October to January, attack tree leaves, young leaves and flower stalks. Result to stunted plants and slow growth.

- Corn borers: Injection lime water mixture on tree base.

- Mango leafhoppers: Prevention by using trap lamp; spray using pesticide with active ingredient Etofenprox or Fipronil according to using instructions (for example, Marshal 25WP, Trebon 10EC, Bassa 50EC; Spray 2-3 times, each time 5-7 days).
**INTRODUCTION**

Mango (Mangifera indica L.) belongs to the cashew family. Mango trees prefer an average temperature about 24-26°C, with minimum annual rainfall is 1000 - 1200 mm. They flourish in humid conditions, can adapt to various soil types including sandy soil or gravel soil, with pH ranging from 5.5 to 0.5. In Viet Nam, there are about 100 mango varieties distributed along country, some popular mango name in this area, Truth CA, Cash Tien, Yen Chau, Tuing, G14, G2. This fruit is suitable for cultivation in areas with high temperature and high light intensity, can be grown for a long time with attractive appearance and high yields. The mango fruit weighs (1.5 kg per fruit), attractive colors and small seeds.

**ACACIA**

From the third year onwards, pruning branches at ground level under one second height is necessary. Prune any suckers at ground level and any shoots on the trunk below the graft union. Continue pruning annually after harvesting (in October-November) and before flowering (from February to March). Remove dead, damaged, broken and diseased/ weak twigs, not limited in number and length, only thin away the dense interior branches.

**MAIZE**

Prune off the top of the tree at 60-70 cm from the graft union to promote branching.

Mango for fruits in Acacia - Mango - Maize - Forage grass option

**PRUNING AND CANOPY FORMATION**

1. MAZING

Planting hole: The size of a hole is 60 cm x 60 cm or 80 cm x 80 cm x 80 cm x 80 cm.

**PLANTING TECHNIQUES AND FERTILIZING (1)**

**Mango**

- **Planting hole:** The size of a hole is 60 cm x 60 cm or 80 cm x 80 cm x 80 cm.
- **Fertilizing:**
  - **Basal fertilizer application:** Apply 10-15 kg manure, 1 kg Superphosphate or NPK in the ratio of 5:10:3 (or equivalent).
  - **Top dressing fertilizer application:** (or equivalent), 0.5-1 kg lime powder per hole before planting a month and cover the hole by soil.

2. **ACACIA**

- **Planting hole:** The size of a hole is 40 cm x 40 cm x 40 cm.
- **Basal fertilizer application:** Apply 0.6 kg NPK per hole.

3. **FORAGE GRASS**

- **Planting hole:** The size of a hole is 60 cm x 60 cm x 60 cm or 80 cm x 80 cm x 80 cm.
- **Basal fertilizer application:** Maize is sown in the remaining areas: 6-10 tons manure and 300 kg Superphosphate per ha.

4. **MAIZE**

- **Dig a trench 20-25 cm deep on the contour lines, which is below acacia and mango rows. The forage grass row is very necessary, fast, it therefore will be protected the nutrients and water for grass along the slope.**
- **The forage grass can utilize nutrients and fertilizers from runoff; it is unnecessary to apply fertilizer for grass.**
- **MAIZE**

- **Planting hole:** The size of a hole is 40 cm x 40 cm x 40 cm.
- **Basal fertilizer application:** Apply 0.6 kg NPK per hole.
- **Top dressing fertilizer application:** Annually 0.2 kg NPK per tree.

**DESIGN**

Contour planting is designed in the agroforestry option to minimize soil erosion. A mango row alternates with a acacia row in a distance of 10 m. Distance between mango tree is 4 m and acacia tree is 2 m. Hence, about 125 mango trees and 300 acacia trees could be planted in one ha.

Mango varities distributed along country, some popular mango name in this area, Truth CA, Cash Tien, Yen Chau, Tuing, G14, G2. This fruit is suitable for cultivation in areas with high temperature and high light intensity, can be grown for a long time with attractive appearance and high yields. The mango fruit weighs (1.5 kg per fruit), attractive colors and small seeds.

**TOP DRESSING FERTILIZING (2)**

- **From the third year onwards:** Pruning branches at ground level under one second height is necessary. Remove any suckers at ground level and any shoots on the trunk below the graft union. Continue pruning annually after harvesting (in October-November) and before flowering (from February to March). Remove dead, damaged, broken and diseased/ weak twigs, crossing branches, twigs growing downward, stubs, stubs sprouts and suckers, or thinning if necessary.
- **From the fourth year onwards:** Considering each tree condition and its yield, it is possible to apply one third of Urea amount and half of Potassium; 0.5-1 kg lime powder per hole before planting a month and cover the hole by soil.
- **Top dressing:** Fertilizer is applied in September-October (or equivalent), 0.5-1 kg lime powder per hole before planting a month and cover the hole by soil.

**MAIZE**

- **Planting hole:** The size of a hole is 40 cm x 40 cm x 40 cm.
- **Basal fertilizer application:** Apply 0.6 kg NPK per hole.
- **Top dressing fertilizer application:** Annually 0.2 kg NPK per tree.