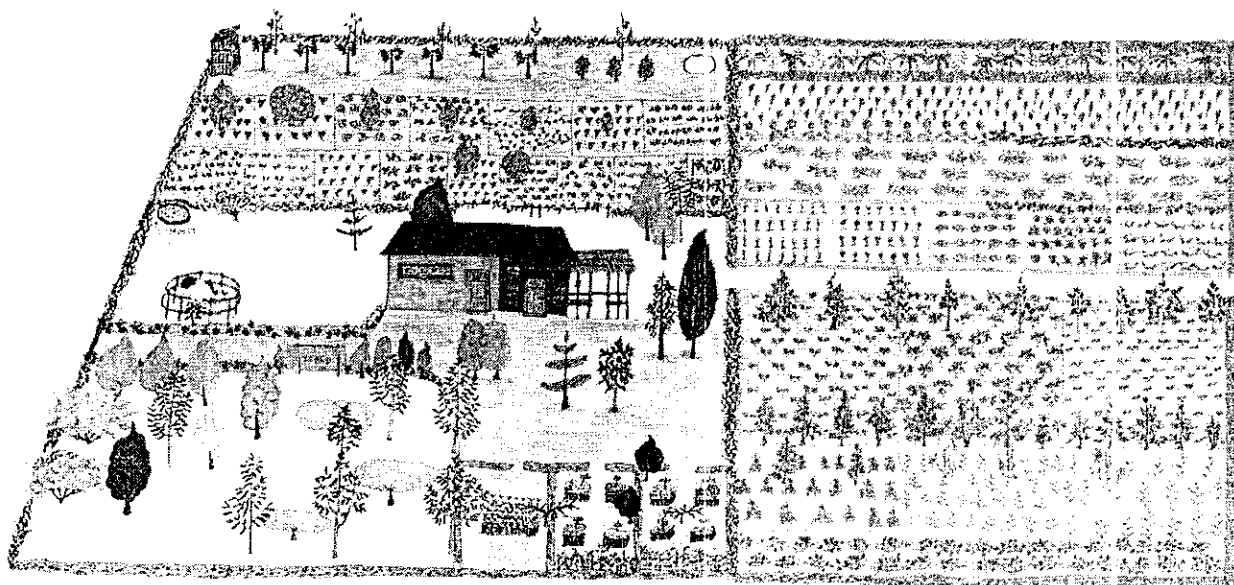


A Study Guide for
Farm Forestry Field Schools



Compiled by **Jane N. Ndeti**
Shinji Ogawa
J. M. Kimondo
P. M. Kariuki

FARM FOREST TRIAL 1 (a): MELIA VOLKENSII / OTHER POTENTIAL TIMBER SPECIES PLANTING IN AGRICULTURAL CROP LAND

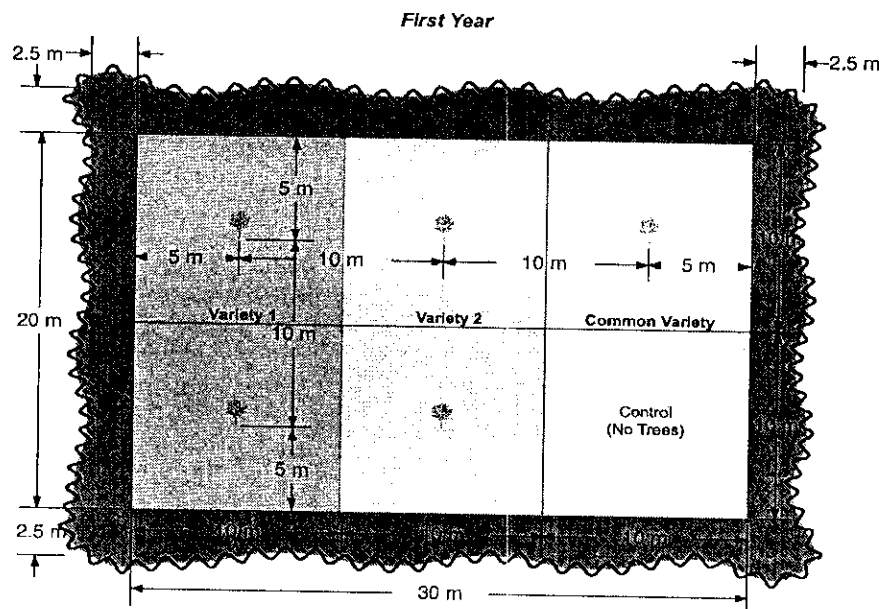
In this trial you will test the effect of overall increase in income from a unit area of land by introducing high value timber tree species in our agricultural farming system. First you shall compare the yield of three different varieties of maize /sorghum / millet. Then you shall compare the yield of the best variety of maize/sorghum/ millet in a plot with trees and another without trees in the second and subsequent years.

Materials: Implements for land preparation and cultivation, supply three varieties of maize /sorghum / millet seeds and pigeon peas seeds, seedlings of *Melia volkensii* and other identified potential timber species, tape measure, ruler, sticks, string, note books and pencil.

Procedure:

Year 1

1. Select a piece of land measuring 35m by 25m with relatively uniform soil characteristics on a flat or gently sloping area. This land should be provided by one member of the group.
2. Prepare the land by clearing of bushes and shrubs before the rain season starts. The land should also be ripped using oxen plough to increase infiltration of rain water.
3. Select and stake out with sticks the rest of the plot (30m by 20m) in small six plots of 10m by 10m or the commonly used tree spacing by farmers before the rains start as shown in the layout below:



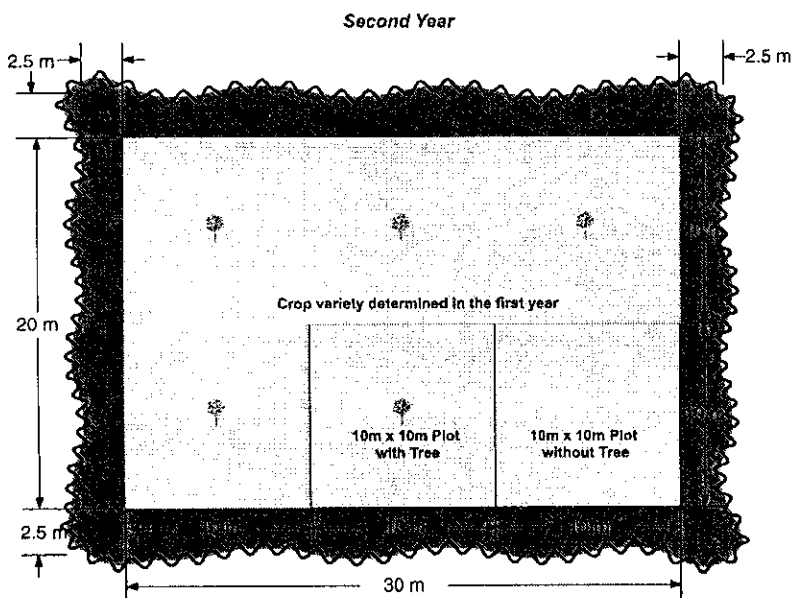
4. Dig tree planting holes measuring at least 30cm by 30cm wide and 30cm deep and at a spacing of 10m by 10m.
5. Before the onset of the rains, identify where seedlings of *Melia volkensii* and the other identified potential timber species are available, purchase and deliver them near the planting site
6. Sow three different varieties including the common one of maize / sorghum / millet in each

small plot of 10m by 10m at the same spacing and density as recommended by agriculturists for the area.

7. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period
8. After the onset of the rains, plant the tree seedlings of *Melia volkensii* or the other identified potential timber species in the five small plots (one plot should be left to act as control) as early as possible so that they can take advantage of the rains for a long period
9. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation
10. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, crop length, number of life and dead leaves and record the number of cobs of at least three maize plants of each variety within the plot of 20m by 10m. Observe pest and disease both in trees and crops.
11. When the crops are ready, the group should meet and agree on the day to harvest.
12. From each of the six plots of 10m by 10m **harvest carefully** each plot alone, measure the yields from each of the sub plots.

Year 2

13. Prepare the land before the rain season starts. The land should also be ripped using oxen plough. Extreme care should be taken to ensure that the young trees are not damaged.
14. Select and mark one plot of 10m by 10m with a tree in the middle and remark the 10m by 10m plot without trees as shown in the lay out below:



15. Plant the best variety of maize /sorghum / millet as identified in the first year in the whole plot of 30m by 20m for the second cycle.
16. Plant pigeon peas in the strip of 2.5m surrounding the plot.
17. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation.
18. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree

damage, tree height, crop length, number of live and dead leaves and record the number of cobs of at least five maize plants of each plot of 10m by 10m with trees and the other without trees. Observe pest and disease both in trees and crops.

19. When crops are ready for harvesting, harvest, **measure carefully** the yield and compare the yields from selected and marked 10m by 10m plot with tree and the other without trees.
20. Do the costs benefit analysis to evaluate the advantages and disadvantages of growing tree species together with agricultural crops? .

Questions to discuss

- Was there a crop yield difference between the three different maize varieties in the small sub plots of 10m by 10m?
- What measures has the group put in place to ensure harvesting is done by the whole group?
- Was there difference in crop yield in the 10m by 10m plot with trees and the other without trees?
- Were there any advantages and disadvantages of intercropping trees with food crop noticed probably in the second year?
- What were some the problems encountered in the establishment and management of the trees in the farm land?

FARM FOREST TRIAL 1 (b): MELIA VOLKENSII / OTHER POTENTIAL TIMBER SPECIES PLANTING IN AGRICULTURAL CROP LAND USING FERTILIZER / MANURE

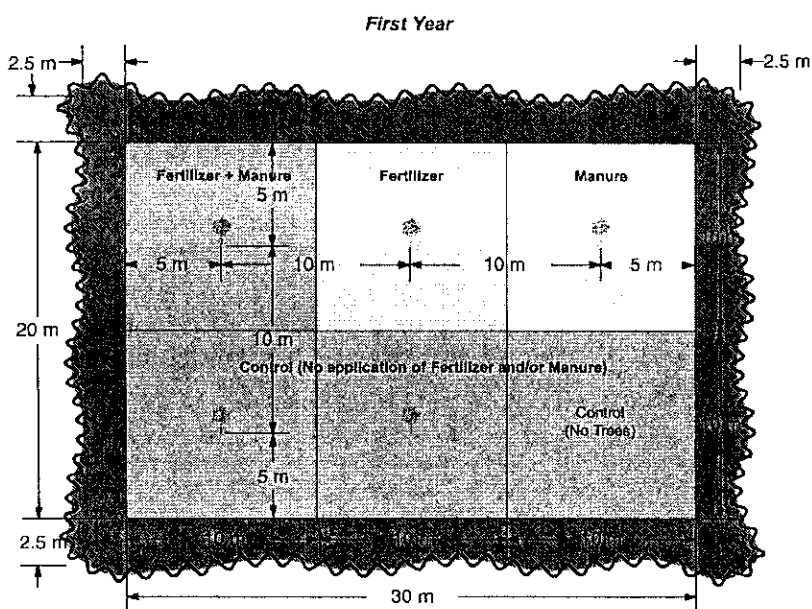
In this trial you will test the effect of overall increase in income from a unit area of land by introducing high value timber tree species in our agricultural farming system. First you shall compare the yield of maize /sorghum / millet using manure and fertilizer. Then you shall compare the yield of maize/sorghum/ millet in a plot with trees and another without trees in the second and subsequent years.

Materials: Implements for land preparation and cultivation, supply of preferred variety of maize/sorghum/ millet and pigeon peas seeds, locally available organic manure, chemical fertilizer, seedlings of *Melia volkensii* and other identified potential timber species, tape measure, ruler, sticks, string, note books and pencil.

Procedure:

Year 1

1. Select a piece of land measuring 35m by 25m with relatively uniform soil characteristics on a flat or gently sloping area. This land should be provided by one member of the group.
2. Prepare the land by clearing of bushes and shrubs before the rain season starts. The land should also be ripped using oxen plough to increase infiltration of rain water.
3. Select and stake out with sticks the rest of the plot (30m by 20m) in small six plots of 10m by 10m or the commonly used tree spacing by farmers before the rains start as shown in the layout below:



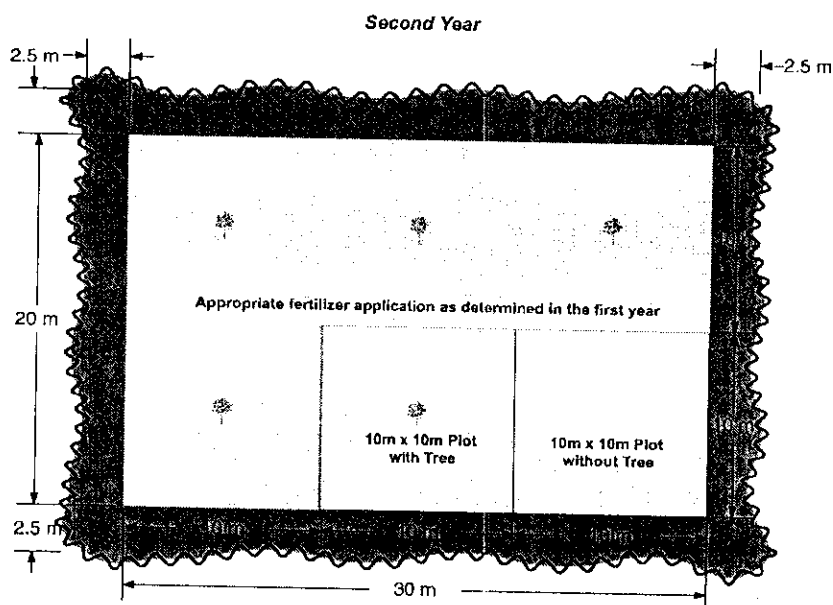
4. Dig tree planting holes measuring at least 30cm by 30cm wide and 30cm deep and at a spacing of 10m by 10m.
5. Before the onset of the rains, identify where seedlings of *Melia volkensii* and the other identified potential timber species are available, purchase and deliver them near the

planting site

6. Sow the most preferred variety of maize / sorghum/ millet in each small plot of 10m by 10m at the same spacing and density as recommended by agriculturists for the area. During planting apply fertilizer in one plot (2 teaspoon full per planting hole), another plot (two handfuls of manure per planting hole), both fertilizer and manure in a third plot while the other three plots shall be left as control as shown in the layout above.
7. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period
8. After the onset of the rains, plant the tree seedlings of *Melia volkensii* or the other identified potential timber species in the five small plots (one plot should be left to act as control) as early as possible so that they can take advantage of the rains for a long period
9. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation
10. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, crop length, number of life and dead leaves and record the number of corns/ heads of at least three plants in each variety within the plot of 10m by 10m. Observe pest and disease both in trees and crops.
11. When the crops are ready, the group should meet and agree on the day to harvest.
12. From each of the six plots of 10m by 10m **harvest carefully** each plot alone. measure the yields from each of the sub plots.

Year 2

13. Prepare the land before the rain season starts. The land should also be ripped using oxen plough. Extreme care should be taken to ensure that the young trees are not damaged.
14. Select and mark one plot of 10m by 10m with a tree in the middle and remark the 10m by 10m plot without trees as shown in the layout below:



15. Plant the most preferred variety of maize /sorghum / millet in the whole plot of 30m by 20m for the second cycle using appropriate fertilizer/ manure as determined in year 1.
16. Plant pigeon peas in the strip of 2.5m surrounding the plot.
17. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation.
18. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, crop length, number of life and dead leaves and record the number of cobs/ heads of at least five plants in each plot of 10m by 10m with trees and the other without trees. Observe pest and disease both in trees and crops.
19. When crops are ready for harvesting, harvest, **measure carefully** the yield and compare the yields from selected and marked 10m by 10m plot with tree and the other without trees.
20. Do the costs benefit analysis to evaluate the advantages and disadvantages of growing tree species together with agricultural crops?

Questions to discuss

- Was there a crop yield difference between maize/ sorghum/ millet in the different sub plots with fertilizer, manure, mixture of fertilizer and manure and the control?
- What measures has the group put in place to ensure harvesting is done by the whole group?
- Were there any advantages and disadvantages of using fertilizer or manure on the crop yields in the first?
- Was there difference in crop yield in the 10m by 10m plot with trees and the other without trees?
- Were there any advantages and disadvantages of intercropping trees with food crop noticed probably in the second year?
- What were some the problems encountered in the establishment and management of the trees in the farm land?

FARM FOREST TRIAL 2: WOODLOT FOR TIMBER WITH AGRICULTURAL CROPS

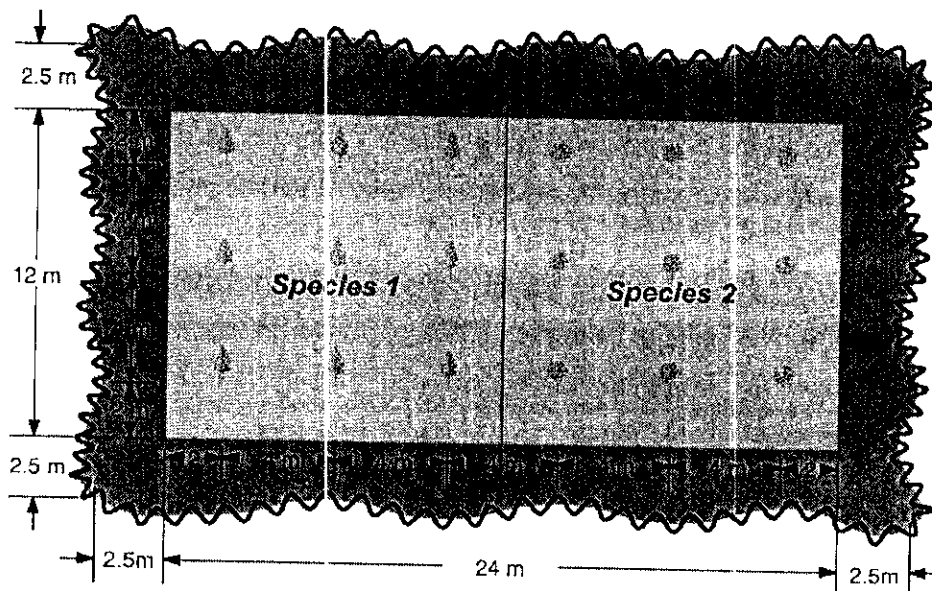
In this trial you will compare the performance of two timber species planted with agricultural crops at a moderate spacing and also the crop yields during the first one or two years.

Materials: Implements for land preparation and cultivation, supply of maize / sorghum / millet and pigeon peas seeds, seedlings of species 1 or species 2 as chosen by the group, sticks, tape measure, ruler, string, note books and pencil

Procedure:

Year 1

1. Select a piece of land measuring 29m by 17m with relatively uniform soil characteristics on a flat or gently sloping area. This land should be provided by one member of the group.
2. Prepare the land by clearing of bushes and shrubs before the rain season starts. The land should also be ripped using oxen plough to increase infiltration of rain water.
3. Divide the plot in to two equal plots of 12m by 12m.
4. Stake out the two plots at a spacing of 4m by 4m before the rains start as shown in the layout below:



5. Dig tree planting holes measuring at least 30cm by 30cm wide and 30cm deep.
6. Before the onset of the rains, identify where seedlings of the selected species are available, purchase and deliver them near the planting site
7. In both plots sow the common maize / sorghum / millet varieties using the same spacing and density as recommended by the agriculturists for the area.
8. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period
9. After the onset of the rains, plant the tree seedlings of the two selected species as early as possible so that they can take advantage of the rains for a long period
10. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation

11. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, crop length, number of life and dead leaves and record the number of cobs of at least five maize plants in each plot of 12m by 12m. Observe pest and disease both in trees and crops.
12. When the crops are ready, the group should meet and agree on the day to harvest.
13. From each of the two plots of 12m by 12m **harvest carefully** each plot alone, measure the yields from each of plot and compare the yields.
14. Compare the survival and height of the two tree species selected

Year 2

15. Remark and prepare the two plots of 12m by 12m before the rain season starts. The land should also be ripped using oxen plough. Extreme care should be taken to ensure that the young trees are not damaged.
16. Plant the same maize/ sorghum / millet varieties as in year one at the recommended spacing.
17. Plant pigeon peas in the strip of 2.5m surrounding the plot.
18. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation
19. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, crop length, number of life and dead leaves and record the number of cobs of at least five maize plants in each plot of 12m by 12m. Observe pest and disease both in trees and crops.
20. When the crops are ready for harvesting, harvest each plot alone, **measure carefully** and compare the yields from both plots.
21. Do the costs benefit analysis to evaluate the advantages and disadvantages of growing tree species together with agricultural crops.

Questions to discuss

- Was there a crop yield difference between the two different plots?
- Was there difference in tree height and survival between the two selected species in year one and year two?
- Were there any advantages and disadvantages of intercropping each tree species with food crops?
- What were some the problems encountered in the establishment and management of the woodlot?

FARM FOREST TRIAL 3(a): WOODLOT FOR POLES AND FIREWOOD

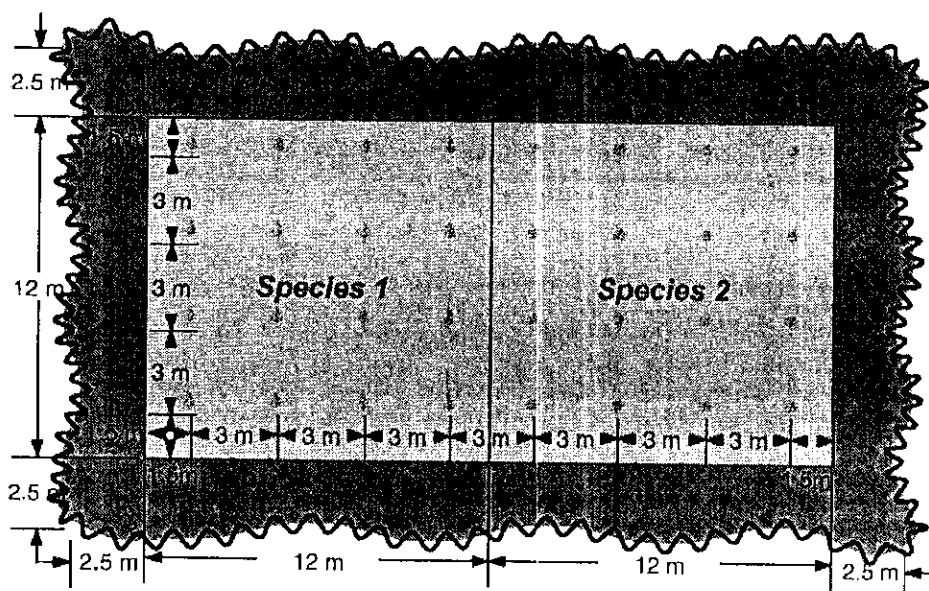
In this trial you will compare the performance of two wood fuel species planted with agricultural crops at a close spacing and also the crop yields during the first one year.

Materials:

Implements for land preparation and cultivation, supply of pigeon peas and beans / green grams seeds, seedlings of species 1 and species 2 as chosen by the group, sticks, string, tape measure, ruler, pencil and note books

Procedure:

1. Select a piece of land measuring 29m by 17m with relatively uniform soil characteristics on a flat or gently sloping area. This land should be provided by one member of the group.
2. Prepare the land by clearing of bushes and shrubs before the rain season starts. The land should also be ripped using oxen plough to increase infiltration of rain water.
3. Divide the plot in to two equal plots of 12m by 12m.
4. Stake out the two plots at a spacing of 3m by 3m before the rains start as shown in the layout below:



5. Dig tree planting holes measuring at least 30cm by 30cm wide and 30cm deep.
6. Before the onset of the rains, identify where seedlings of the selected species are available, purchase and deliver them near the planting site
7. In both plots sow the common beans / green grams varieties at the spacing recommended by the agriculturists in the area.
8. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period
9. After the onset of the rains, plant the tree seedlings of the two selected species as early as possible so that they can take advantage of the rains for a long period
10. Weed the plot according to normal farming practices. Oxen ploughs should be used to

plough the land between crops to improve water infiltration and its subsequent conservation

11. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, record the number of pods and height of at least five beans / green grams plants in each plot. Observe pests and diseases in both trees and crops.
12. When the crops are ready, the group should meet and agree on the day to harvest.
13. From each of the two plots of 12m by 12m **harvest carefully** each plot alone, measure the yields from each of the plot and compare the yields.
14. Compare the survival and height of the two tree species selected

Year 2

15. Remark and prepare the two plots of 12m by 12m before the rain season starts. The land should also be ripped using oxen plough. Extreme care should be taken to ensure that the young trees are not damaged.
16. Plant the common beans / green grams variety as in year one using the recommended spacing.
17. Plant pigeon peas in the strip of 2.5m surrounding the plot.
18. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation
19. At regular intervals during the season, monitor crop and tree growth i.e. tree survival, tree damage, tree height, record the number of pods and height of at least five beans / green grams plants in each plot. Observe pests and diseases in both trees and crops
20. When the crops are ready for harvesting, harvest each plot alone, **measure carefully** and compare the yields from both plots
21. Do the costs benefit analysis to evaluate the advantages and disadvantages of growing tree species together with agricultural crops.

Questions to discuss

- Was there a crop yield difference between the two different plots?
- Was there difference in tree height and survival between species 1 and species 2 after one and two years?
- What were some the problems encountered in the establishment and management of the woodlot?
- Were there any advantages and disadvantages of intercropping each tree species with food crop?

FARM FOREST TRIAL 3(b): WOODLOT FOR POLES AND FIREWOOD

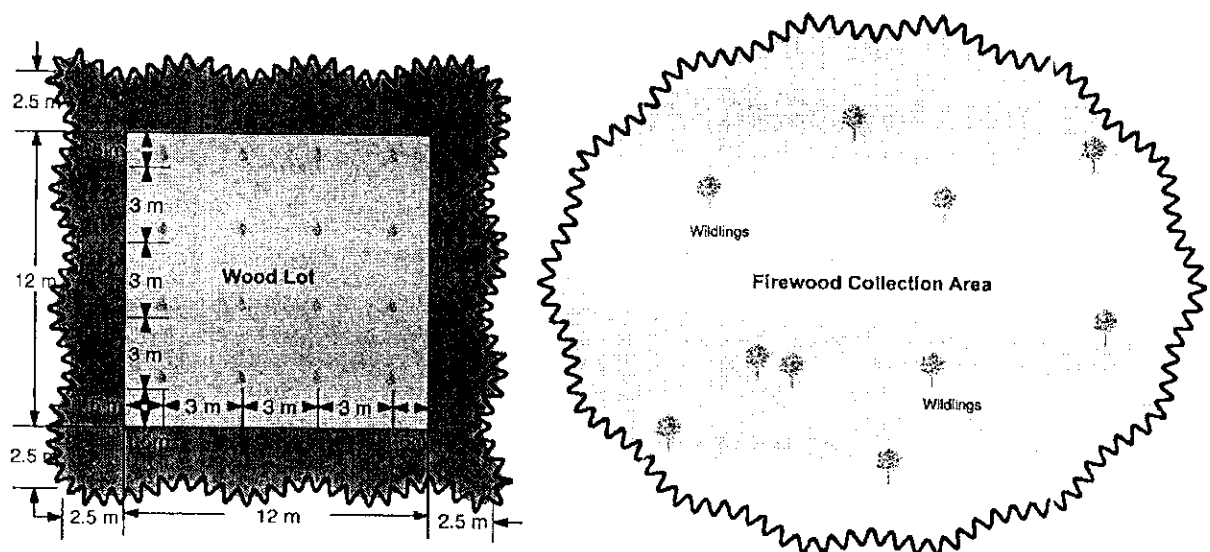
In this trial you will compare the growth of planted wood fuel species in wood lot and native wood fuel species in natural stands of firewood collection area.

Materials:

Implements for land preparation and cultivation, supply of pigeon peas and beans / green grams seeds, seedlings of one favorable wood fuel as chosen by the group, sticks, string, tape measure, ruler, pencil and note books

Procedure:

1. Select a piece of land measuring 17m by 17m with relatively uniform soil characteristics on a flat or gently sloping area. This land should be provided by one of group member.
2. Prepare the land by clearing of bushes and shrubs before the rain season starts. The land should also be ripped using oxen plough to increase infiltration of rain water.
3. Mark the inner plot of 12m by 12m.
4. Stake out the inner plot of 12m by 12m at a spacing of 3m by 3m before the rains start as shown in the layout below:



5. Dig tree planting holes measuring at least 30cm by 30cm wide and 30cm deep.
6. Before the onset of the rains, identify where seedlings of the selected species are available, purchase and deliver them near the planting site.
7. Before the onset of rain go to nearby firewood collecting site. Find the small wildlings (one foot or same size as the seedlings to be planted in the wood lot) of commonly used firewood species and mark by paint at least 10 wildlings very well so you can monitor the growth for some years.
8. In the woodlot sow the favorable beans/green grams varieties at the spacing recommended by the agriculturists in the area.
9. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period
10. After the onset of the rains, plant the tree seedlings in the wood lot as early as possible

so that they can take advantage of the rains for a long period

11. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation
12. At regular intervals during the season, monitor growth of the crop, seedlings and wildlings i.e. seedling survival, seedling damage, seedling height, wildling survival, wildling damage, wildling height, record the number of pods and height of at least five beans/green grams plants in the woodlot. Observe pests and diseases in both trees and crops.
13. When the crops are ready, the group should meet and agree on the day to harvest.
14. From the plot of 12m by 12m harvest carefully, measure the yields from the plot.
15. Compare the survival and height of the trees in the wood lot and wildling in the field.

Year 2

16. Remark and prepare the plot of 12m by 12m and before the rain season starts. The land should also be ripped using oxen plough. Extreme care should be taken to ensure that the young trees are not damaged.
17. Remark the wildling and monitor continuously.
18. Plant the common beans / green grams variety as in year one using the recommended spacing.
19. Plant pigeon peas in the strip of 2.5m surrounding the plot.
20. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation
21. At regular intervals during the season, monitor growth of the crop, seedlings and wildlings i.e. seedling survival, seedling damage, seedling height, wildling survival, wildling damage, wildling height, record the number of pods and height of at least five beans/green grams plants in the woodlot. Observe pests and diseases in both trees and crops.
22. When the crops are ready for harvesting, harvest the plot, measure carefully and compare the yields between year 1 and year 2
23. Compare the survival and height of the trees in the wood lot and wildling in the field
24. Do the costs benefit analysis to evaluate the advantages and disadvantages of growing tree species together with agricultural crops.

Questions to discuss

- Was there a crop yield difference between the first and second year?
- Was there difference in tree height and survival between trees in wood lot and wildling in the field after one and two years?
- What were some of the problems encountered in the establishment and management of the woodlot and in monitoring wildling in the field?
- Were there any advantages and disadvantages of managing woodlot and the trees in the

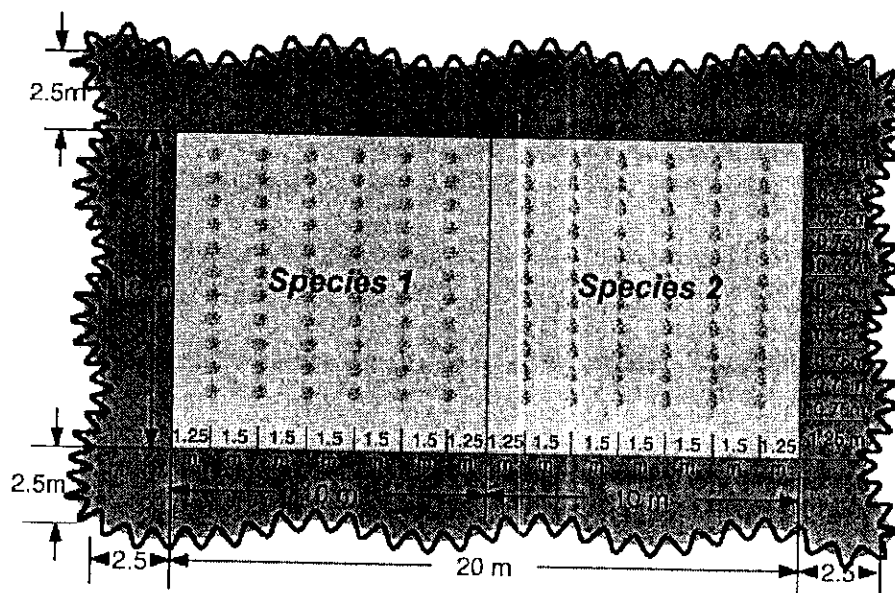
FARM FOREST TRIAL 4: FODDER PLANTING FOR LIVESTOCK

In this trial you shall discover the benefits of growing fodder trees on the farm for feeding livestock. Fodder is green vegetation from trees that is harvested and fed to animals without allowing the animals to feed directly on them. This helps to ensure provision of food to animals during the dry season.

Materials: Implements for land preparation and weeding, supply of seedlings /cuttings of the two selected species and seeds of pigeon peas and beans /green grams, sticks, note books, pencil, ruler and tape measure.

Procedure:

1. Select a field with a relatively uniform soil characteristic on a flat or gently sloping land.
2. The land should be at least 25m by 15m so that two species may be tried on plots of 10m by 10m each.
3. Before the rainy season, clear the land of bushes and shrubs. This should also be ripped using oxen plough to increase infiltration of rain water.
4. Stake the plots for the planting spots at spacing of 1.50m by 0.75m. Dig the holes of 30cm by 30cm by 30 cm for the planting of the fodder tree species seedlings as shown in the layout below:



5. Before the onset of the rains, identify where seedlings of the selected two species are available, purchase and deliver them near the planting site.
6. Plant beans /green grams between the rows of trees in the two plots uniformly using the spacing recommended by agriculturists for the area.
7. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period
8. After the onset of the rains, plant the fodder tree seedlings as early as possible so that they can take advantage of the rains for a long period

9. Weed the plots according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation.
10. At regular intervals during the year, monitor the following in all the plots: i.e. height growth of the planted trees, survival of the trees and the number of branches. Observe pests and diseases in both trees and crops
11. Harvest the crops from all the plots separately and record the yields.
12. When the fodder is ready for harvesting, measure the weight of the fodder harvested in each plot every time in kilograms. Feed the same to specific number of animals and compare with the common animal feeds.
13. Do a cost benefit analysis to evaluate the advantages and disadvantages of growing the two different fodder tree species together with agricultural crops.

Questions to discuss

- Is there any difference in yield i.e. weight of material cut of the two species, what do you think was the reason?
- What are the advantages and disadvantages of cutting and carrying the feed to the animals?
- Was there a noticeable health change and milk production among the animals fed on the fodder?
- Was there any species preference among the livestock?
- Were there any problems encountered while introducing the animals to the fodder?

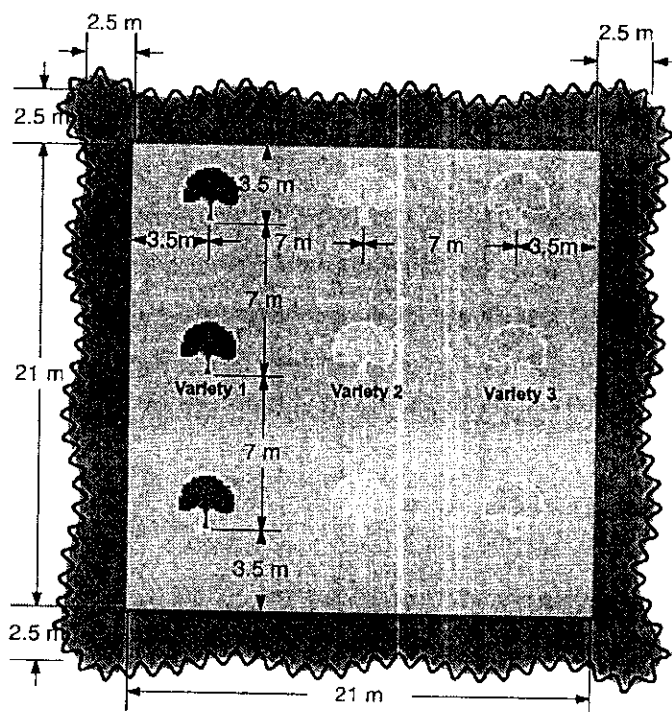
FARM FOREST TRIAL 5: FRUIT TREE ORCHARD

In this trial you shall test the performance of different varieties of mangoes and citrus in terms of size and quality of fruits, the flowering and fruiting time and pest and drought resistance.

Materials: Implements to prepare the land and undertake cultivation, seedlings of different grafted mango varieties, maize /sorghum /millet, pigeon peas and bean/ green grams seeds, notebooks, pencils and measuring tapes.

Procedure:

1. Select a relatively flat field of 26 by 26 metres
2. Before the start of the rains, clear the piece of land bushes and shrubs. This should also be ripped using oxen plough to increase infiltration of rain water.
3. Mark the points of planting at a spacing of 7m by 7m in 21m by 21m plot so that the plot has 9 fruit trees. Dig the holes of 90cm by 90cm by 90 cm for the planting of the fruit tree species seedlings this is only for mangoes for the other fruits use 60cm by 60cm by 60cm as shown in the layout below:



4. In each hole put a third of a 90kg bag of animal manure. Mix it with the top soil to fill the hole.
5. Select three appropriate mango fruit varieties
6. Before the onset of the rains, identify where the selected mango fruit varieties seedlings are available, purchase and deliver them near the planting site.
7. Plant the common maize / sorghum/millet and beans/ green grams variety between the rows of fruit trees using the recommended spacing by agriculturists for the area.
8. Plant pigeon peas in the strip of 2.5m surrounding the plot. This will be done to ensure that the whole plot is protected from animals for a long period.

9. Immediately after the onset of rains, plant the three different mango fruit tree varieties, each in its own row of three trees.
10. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation.
11. At regular intervals, monitor the fruit tree survival, height and count the number of branches and branch lets of the fruit trees, any pest and disease problems and monitor the time of flowering for each fruit tree species.
12. When the crops are ready for harvesting, harvest and record the yields.

Year 2

13. Prepare the plot before the rain season starts. The land should also be ripped using oxen plough. Extreme care should be taken to ensure that the young fruit trees are not damaged.
14. Plant the common maize/ sorghum/ millet and beans /green grams variety as in year one using the recommended spacing.
15. Plant pigeon peas in the strip of 2.5m surrounding the plot.
16. Weed the plot according to normal farming practice. Oxen ploughs should be used to plough the land between crops to improve water infiltration and its subsequent conservation.
17. At regular interval, monitor the fruit tree survival, height and count the number of branches and branch lets of the fruit trees, observe and record any pest and disease problems and monitor the time of flowering and fruiting for each fruit tree variety.
18. When the crops are ready for harvesting, harvest and record the yields.
19. Do the costs benefit analysis to evaluate the advantages and disadvantages of growing tree species together with agricultural crop.

Questions to discuss

- At what time did the different fruit varieties flower and fruit?
- Is there any difference in crop yield in the first and second year? What is the probable cause?
- Which variety among the three performed best?
- What are the advantages and disadvantages of having different varieties of fruit trees?

FARM FOREST TRIAL 6: FRUIT TREE NURSERY

Experiment 1: Seed Pre-treatment 1

In this trial you will try several types of seed pre-treatment of mango seeds to understand advantage of pre-treatment.

Materials: Local mango seeds, 2 water bucket, Secateurs

Procedure:

1. Prepare 3 small seedbeds in same condition.
2. Divide the 60 mango seeds in to three groups of 20 mango seed each
3. Put 20 mango seeds in a net, put in a water bucket and put a big stone so it can not float. Leave them in water for 24 hours
4. Cut off a small section of the mango seed end of another 20 mango seeds, put in another water bucket and put a big stone so it can not float. Leave them in water for 24 hours
5. Sow each group of seeds separately in the three different seed bed
6. Check everyday and water the seed bed when it is dry
7. When it start germinating, record the date and number of germinated seed in each bed as shown in the table below:

| Date | Bed 1 (direct sowing) | Bed 2 (1 day in water) | Bed 3 (Cut & 1 day in water) |
|-------------------|--------------------------|---------------------------|---------------------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Total Germination | | | |
| Total Days | | | |

Question to discuss:

- How many seedlings germinated in each seed bed?
- How many days did it take for the seed to start germinating in each bed?
- How long did take for germination to end in each seed bed?
- A part from the time of germination, is there any difference in the characteristics of seedlings?
- What were the advantages and disadvantage of the different pre- treatments?

Experiment 2: Grafting techniques

In this trial you will try several types of grafting techniques in mango seedlings to understand advantage of each method.

Materials: 10 local mango seedlings (root stock) per person, scions, grafting knife, secateurs, grafting tape

Procedure:

1. Prepare grafting tools and bring 10 mango root stock and scion
2. Select 2 type of grafting techniques and graft 5 seedlings each using same techniques (graft one inch higher than usual height so it could be grafted again in case grafting would not be successful)
3. Observe daily and count the number of success.
4. Re-graft the unsuccessful seedlings using better techniques found in the first trial.

Question to discuss:

- Which method was more difficult and why?
- Which method was more successful and why?
- What were the advantages and disadvantages of both grafting techniques?

FARM FOREST TRIAL 7: TREE NURSERY

Experiment 1: Seed Pre-treatment 1

In this trial you will test several types of seed pre treatments in several species to understand the appropriate pre-treatment for each tree species.

Materials: Seed of some tree species e.g. Grevillea spp., Melia spp, Eucalyptus spp and mangoes which the farmers want to plant

Procedure:

1. Prepare 2 small seedbeds in same condition.
2. Divide the 200 Grevillea seeds into two groups of 100 seeds each
3. Put one group of 100 seeds in a net, put in the water bucket and put a big stone so it can not float. Leave for 24 hours
4. Sow the two groups of seeds in two different seedbeds
5. Check everyday and water the seed bed when it is dry
6. When germination starts, record the date and number of germinating seed in each seed bed

| Date | Bed 1 (direct sowing) | Bed 2 (1day in water) |
|-------------------|-----------------------|-----------------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Total Germination | | |
| Total Days | | |

Question to discuss:

- How many seedlings germinated in each seed bed?
- How many days did it take for the seed to start germinating in each bed?
- How long did it take for germination to end in each seed bed?
- A part from the time of germination, is there any difference in the characteristics of seedlings?
- What were the advantages and disadvantage of the different pre treatments?

Experiment 2: Seed Pre-treatment 2

In this trial you will try to evaluate some indigenous pre treatment technique.

Materials: Melia nuts, hot ash, two buckets, net material

Procedure:

1. Prepare 3 small seedbeds in same condition.
2. Divide the 300 Melia nuts in to three equal groups
3. Put 100 Melia nuts in a net, put in a water bucket and put a big stone so it can not float. Leave for three days (treatment 1- Bed 1))
4. Put another 100 Melia nuts into hot ash and wait for one minute, then put in a water bucket and put a big stone so it can not float. Leave for three days (treatment 2 – Bed 2)
5. The last 100 Melia nuts to pre-treated in an indigenous way as recommended by group members (treatment 3 – Bed 3)
6. Sow the three groups of Melia nuts in different seed beds
7. Check everyday and water the seed bed when it is dry
8. When germination starts record the date and number of germinated seed in each bed as shown in the table below:

| Date | Bed 1 | Bed 2 | Bed 3 |
|-------------------|-------|-------|-------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Total Germination | | | |

Question to discuss:

- How many seedlings are germinated in each bed?
- How many days were it takes to start germinating?
- A part from timing, is there any difference in the characteristics of seedlings?
- What was the advantages and disadvantage of this treatment?

Experiment 3: Application of fertilizer and manure in pot soil

In this trial we are going to evaluate the effectiveness of fertilizer or manure in growth of seedlings

Materials: Soil, sand, manure, fertilizer and poly tubes, half meter rule

Procedure:

1. Fill 100 pots by normal mixture (soil, sand and manure) – treatment 1
2. Fill another 100 pots with a mixture of soil, sand and fertilizer – treatment 2
3. Fill another 100 plot with only soil and sand mixture.- treatment 3
4. Transplant seedlings of the same species and size in to the three different treatments. Arrange each treatment in one block for easy identification.
5. Observe the performance of the seedlings in each treatment every week and record the observation.
6. Measure the height of all the seedlings in each treatment once a week as shown in the table below:

| Date | Normal Manure | | Chemical Fertilizer | | No Manure | |
|------|---------------|-------------|---------------------|-------------|-----------|-------------|
| | Height | Observation | Height | Observation | Height | Observation |
| | | | | | | |
| | | | | | | |
| | | | | | | |
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Question to discuss:

- Which kind of problems have you observed in the three treatments?
- Are there any advantages and disadvantages of using either fertilizer or manure in the potting soil?



Intensified Social Forestry Project in Semi-arid Areas

FOREST DEPARTMENT

P.O. BOX 30513, NAIROBI, 00100 KENYA

TEL: +254-20-3761487

FAX: +254-20-3764723

E-mail: isfp@forestry.go.ke

Web: <http://www.isfp-fd.org>