GROWING CLOVES AS AN INTERCROP

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Cloves are traditionally grown in Kandy, Pilimathalawa, Katugastota and Matale areas. Sincerecently, coconut land owners have shown a very keen interest in planting cloves as an intercrop with coconut primarily because of the high prices cloves fetch. In most coconut lands in the wet zone, cloves could be established. Cloves as an intercrop is already seen in areas like Polgahawela, Rambukkana, Mawathagama, Ratgama, Baddegama, Hakmana and Matara.

Establishment of cloves as an intercrop does not cause decline in coconut yield. Another advantage is that cloves can be intercropped together with banana. The coconut stand provides the shade required by cloves.

Areas suitable for growing cloves

Coconut lands in the wet zone with well distributed rainfall should be selected. On this basis, coconut lands in Colombo, Gampaha, Kegalle, Kalutara, Galle and Matara districts and areas like Mawathagama, Alawwa and Polgahawela in the Kurunegala district are suitable.

Selection of suitable coconut lands

(a) **Soil** - Sandy or clayey soil is not suitable. Loamy soil with organic matter is very suitable. As clove plants have a well distributed deep root system to tide over drought period, there should be a deep soil without a hard pan such as cabook. The soil should be well drained.

(b) **Coconut plantation**

Coconut palms should be from 10-45 years of age. Lands with poor shade and lands where under planting is to be started are not suitable for growing cloves.

(c) **Slope of the land**

In highly slopy lands, the uppermost area is not suitable for planting cloves as there will be moisture stress during drought periods. At the same time, the lower section of the slope is also not suitable due to the possibility of water-logging. Strong winds can have adverse effects on clove trees. Therefore lands that will be not subjected to strong winds should be selected.

(d) **Availability of water**

Clove plants cannot tolerate droughts of more than 1½ months. If the drought exceeds this period supplementary irrigation is necessary. A convenient method of irrigation is by using a clay pot (pitcher irrigation). Therefore, while selecting lands for planting cloves, it is necessary to ensure that there is a source of water for irrigation.

Supply of seedlings

If there are high yielding clove trees in the land or in the area, the growers can produce their own seed-

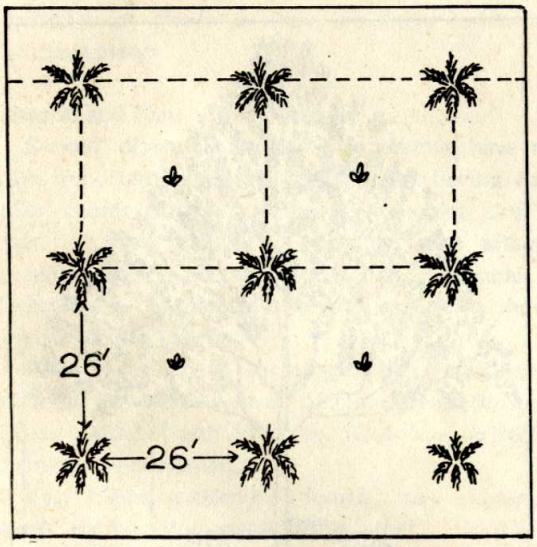
lings from seeds collected from such trees. Seedlings could also be obtained from nurseries managed by the Minor Export Crops Department or from private nurseries approved by the Minor Export Crops Department. The size of the seedling selected for planting is very important. If small seedlings are planted, casualties will be higher. The seedlings should be about 2 ft (60 cm) and the primary bud should have branched. if small seedlings are taken, they should first be transferred to polybags (1 ft) filled with rich soil, and kept in the nursery until they reach the required size.

The price of a seedling of the correct size for planting is about Rs.8-10/=.

Planting in the field

(a) Marking and preparing planting holes

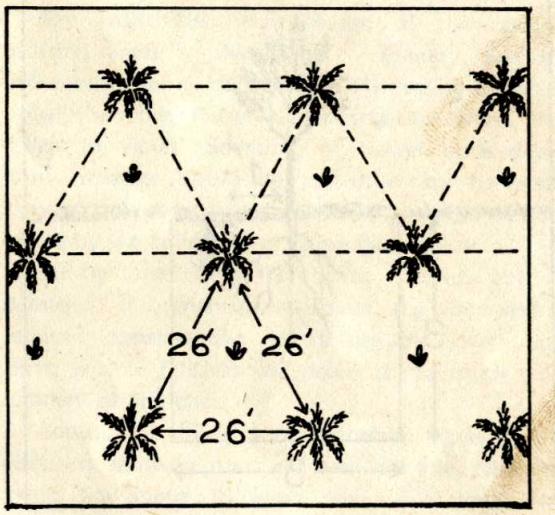
In lands where coconut is planted to the square system, a clove seedling could be established in the centre of the planting square. In coconut plantations with a spacing of 26ft x 26ft (8m x 8m), 64 clove plants/ ac could be accommodated on this basis (160 clove plants per hectare). In coconut lands planted to the triangular system it is possible to plant a clove seedling in the centre of the triangle (as shown in the diagram).



In square planting of coconut

Though two clove seedlings are sometimes planted in a coconut square, this cannot be recommended since clove grows into a large tree.

The planting holes should be 3ft x 3ft x 3ft (1m x 1m x 1m) in size.



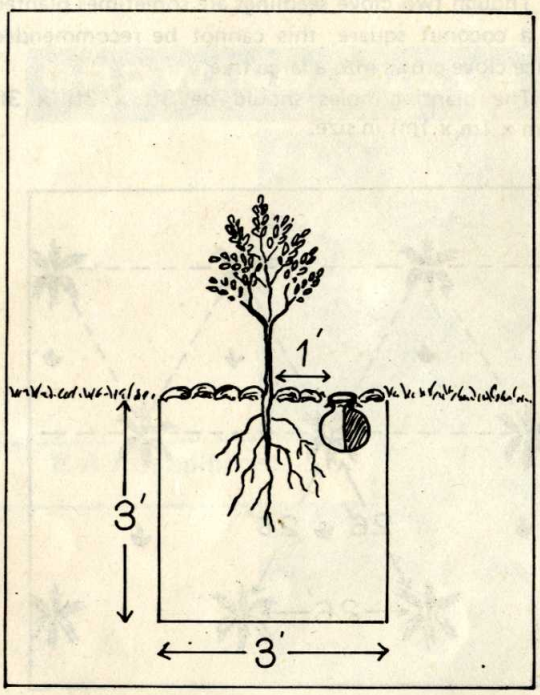
In triangular planting of coconut

(b) Planting

Seedlings should be planted with the commencement of the monsoon. A layer of coconut husks should be placed in the planting hole with the inner side facing upwards. The planting holes should then be filled with a mixture of well decomposed cowdung or some other organic manure, 2½ lb (1 kg) each of dolomite and rock phosphate and surface soil. Prior to planting, the polythene bag should be removed and then the seedling should be planted without bending the tap root.

(c) Watering

If drought sets during the early period after planting it is very essential to water the seedlings. For this, hand watering or pitcher irrigation system could be adopted. (See the diagram). In pitcher irrigation system, one clay pot should be buried near each planting hole about 1½ft (30-45 cm) away from the seedling. In order to economise water use, the sides excepting that facing the seedling should be painted with tar.



Pitcher irrigation system

(d) **Mulching**

Soon after planting, few layers of coconut husks should be laid round the seedlings as a mulch. In order to protect the seedlings from intense sun light, two pieces of coconut fronds should be planted in the east-west direction.

The shade necessary for clove could be had by planting banana. Trials have shown that cloves can be established successfully when planted with bananas. For this system bananas should be planted about 6 months before clove planting. Two rows of bananas could be established within two rows of coconut. The spacing between the rows of bananas is 10 ft (3 m) while the spacing between two banana plants is 12ft (4 m). Banana crop thus established should be fertilized as recommended. In addition to this, the dry banana leaves should be used as a mulch round the clove trees. As the clove trees grow, the banana crop will have to be thinned. Clove could be easily established in lands where bananas are already established.

In addition,leguminous cover crops such as *Pueraria javanica* and *Calapogonium mucunoides* should be established for conservation of soil and moisture.

(e) **Filling vacancies**

Vacancies resulting due to death of clove seedlings (due to drought or pest damage) should be filled with the commencement of the next monsoon in order to get a uniform clove stand.

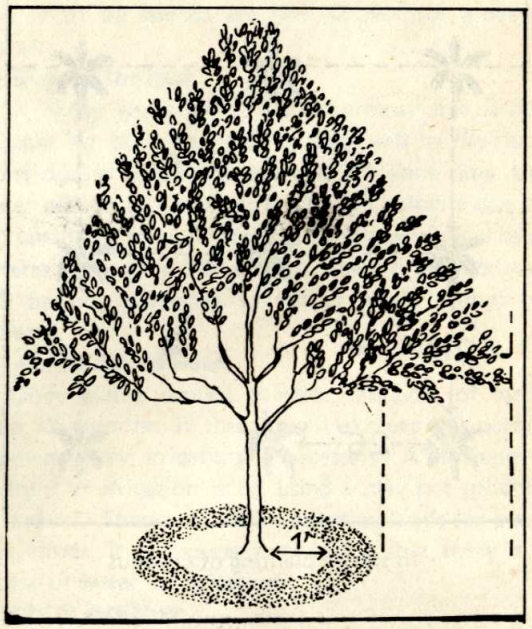
Fertilizer application

Manuring is very important to have a successful clove crop.. Inorganic as well as organic manures could be used for this purpose. In addition to the application of inorganic manures, organic manure will promote the healthy growth of clove trees. The fertilizer mixture recommended for clove as an intercrop is as follows:

Urea	- 2 parts by weight
Saphos phosphate	- 2 parts by weight
Muriate of potash	- 3 parts by weight
Kieserite	- 1/3 parts by weight

Dosage per plant

1st year	- 250 g (½ lb)
2nd year	- 500 g (1 lb)
3rd year	- 750 g (1½ lb)
4th year	- 1000 g (2 lb)
5th year and onwards	- 1250 g (2½ lb)



Fertilizer application

During the first and second years the recommended amount of fertilizer should be applied in four split doses at the rate of two split doses during each monsoon. From the third year onwards the recommended annual dosage per plant should be applied in two split doses during the two monsoons. However unlike most other crops, cloves in the seedling stages in sensitive to fertilizer and it should therefore be applied with great care.

Fertilizer should be applied in a circle 1 foot (30 cm) away from the seedling, upto half the canopy radius.(Vide diagram). After application, the fertilizer should be slightly forked in. It is advisable to apply fertilizer in a moderately wet day.

Weed control

About 3 ft (1.0 m) area from the plant should be clean weeded before fertilizer application. As the clove tree grows, weed growth will be automatically reduced. Weeds in the rest of the land should be slashed. In order to increase the organic matter of the soil and to reduce weed growth, cover crops such as *Calapogonium* and *Pueraria* should be established.

Cattle should not be allowed in coconut lands planted with cloves as they are likely to damage the clove plants.

Diseases and Pests

Serious diseases and pests from clove have not been reported.Occasionally, the stem boring catepillar causes breaking of branches, which dry up later. If such damage is detected, the affected branches should be removed and burnt. If holes are detected on the stem, a systemic insecticide should be poured into them.

Root diseases are encouraged by accumulation of water around the bases of clove trees. Root rot causes sudden death in clove. Water-logging should therefore be prevented.

Leaf blight, caused by a fungus, may appear on leaves during prolonged wet weather. The disease normally does not cause serious damage. If the damage is serious, a copper fungicide should be sprayed on to the leaves.

Harvesting

Clove trees flower about four years after planting. A good crop can be expected after about 10 years. Clove trees established under coconut can last for about 30 years.

The main harvesting season in the coconut growing areas is December to January. But this varies with the rainfall pattern. Harvesting should be done when the flower buds change the colour from green to violet. Shedding of flower buds during rainy weather could be prevented by harvesting them at the proper time. Wastage should be minimized by the collection of fallen flower buds.

During harvesting, branches should not be damaged. If branches are broken, the yield will be reduced considerably. Harvesting of flower buds along with 1-2 leaves will promote the quick development of branches.

About 1 lb (500 g) of processed cloves can be obtained annually from a 7-year old tree. When the plants are about 10 years, the annual production of cloves is about 2½ lb (1kg) per tree.

Processing

Harvested cloves are sun-dried for 4-5 days until they turn dark brown and become hard. When the well-dried cloves are broken a slight sound can be heard. As the moisture at this stage is 8% to 10%, the cloves can be stored conveniently.

In addition to cloves, the flower stalks can be processed separately for sale.

Income

The present market price of cloves is Rs. 250/= per kg. On this basis a clove tree of about 10 years of age grown under coconut can give about Rs.250/= per year.