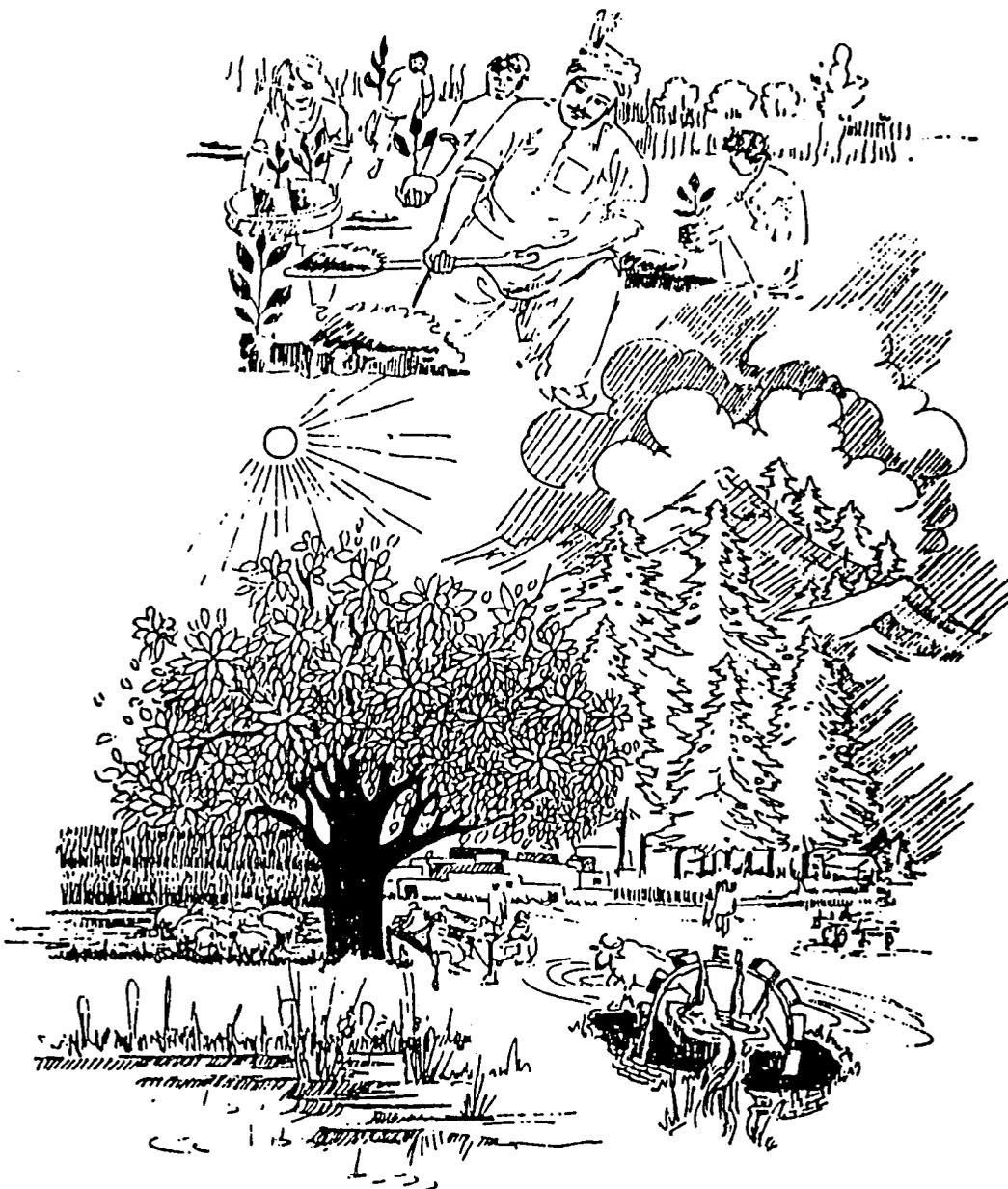




FORESTRY PLANNING & DEVELOPMENT PROJECT

Government of Pakistan-USAID

TREE PLANTING



Technical Note No. 3

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Winrock International

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TREE PLANTING

TECHNICAL NOTE NO. 3

By

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In Pakistan tree planting campaigns have been a regular feature over the last forty years. During every planting week/season the forest departments have distributed millions of tree seedling to the people. Quite a number of the plants, however, failed to survive or grow because of the people's lack of adequate knowledge with respect to the proper site preparation, matching choice of species, planting techniques and after care. This brochure deals, in brief, with these important aspects of successful tree planting. It is hoped that the guidelines provided in it will help the people grown and manage tree crops with greater success.

SITE PREPARATION

Usually little attention is paid to proper and timely site preparation. Land where trees will be planted should be prepared well in advance so that plants when obtained from the nursery do not have to wait for days before they are put in the ground. Following points should be kept in view for adequate site preparation

- Clear the land of all stones, pebbles, grass, weeds, and shrubs taking out the roots as deep as possible;
- Make pits according to the size and kind of planting stock to easily accommodate the root system; large enough pits for balled plants.
- If the top soil is good, set it aside for back filling after removing pebbles, stones, grass etc.;
- If the land is sloping, dig trenches along contours in staggered form to collect runoff, or make terraces;
- In swampy areas, prepare mounds or dig deep trenches;
- For direct seeding make shallow furrows or prepare berms on the trenches.

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- Sow and plough back Sesbanea (Jantar) for one year before planting in saline soils.

CHOICE OF SPECIES

It is a common fallacy that a tree will grow anywhere or every where. When selecting a tree for your land, you should look around and see which trees are thriving locally. These trees, as a rule should be the first choice because they have already shown there adaptability to local factors and should generally perform better. The choice of species is critical to success. In this connection, the following points should be considered:

- Suitability of climate, particularly with regard to the minimum annual rainfall and its seasonal distribution;
- Suitability of soil
- Height of mature tree
- Crown shape and size
- Rooting habit
- Span of life
- Wind-firmness, particularly in shallow soils and the desert
- Value as fuel, fodder and cash crop
- Rate of growth and subsequent after care
- Susceptibility to insects, diseases, parasites, etc.
- Market requirements.

Height of the tree, crown shape and size and rooting habits are important when trees are grown in agricultural fields. A list of species considered suitable for different ecological zones is given below:

Northern Hilly Tract

Ailanthus (Ailanthus glandulosa), Akhrot (Juglans regia), Banakhore (Aesculus indica), Deodar (Cedrus deodara), Eucalyptus (Eucalyptus bicostata), Fir (Abies pindrow), Kail (Pinus wallichiana), Poplars (P. alba, P. ciliata, P. x-auramericana, P. nigra, P. alba), Robinia (Robinia pseudo-acacia), Pines (Pinus halepensis, Pinus roxburghii).

Sub-mountain range

Ailanthus (Ailanthus glandulosa), Amlok (Diospyros lotus), Aritha (Sapindus mukorossi), Bahera (Terminalia belerica), Batangi (Pyrus pashia), Drawa (Cedrela serrata), Jantar (Sesbania aegyptica), Kachnar (Bauhinia variegata), Poplar (Populus spp.), Robinia (Robinia pseudoacacia), Sisal (Agave cantala, Agave sisalana), Shisham (Dalbergia sissoo), Toon (Cedrela toona); Willow (Salix Species).

Western Hilly Areas

Allepo pine (Pinus halepensis), Chalghoza (Pinus gerardiana) Ash (Fraxinus spp.), Elaegnus umbellate, Mazri (Nannorrhops ritchieana), Toot (Morus Alba), (Populus nigra, P. euramericana, P. deltoides), Willow (Salix spp).

Indus Plain (North)

Amaltas (Cassia fistula), Andrikni (Bishofia javanica), Amla (Embllica officinalis), Arjan (Terminnalis arjuna), Ber (Zizyphus mauritiana), Dhak (Butea monsperma), Eucalyptus (Euc. citriodora, E. camaldulensis, E. tereticornis), Ipil Ipil (Leucaena glauca, L. leucocephala), Jama (Syzygium cumini), Babul/Kikar (Acacia arabica), Paper milberry (Broussonetia papyrifera), Phulai (Acacia nilotica), Pipal (Ficus religiosa), Poplar (Populus euphratica, P. deltoides), Shisham (Dalbergia sissoo), sufed Siris (Albizzia procera), Siris (Albizzia lebbeck), Sonhangana (Moringa pterygosperma), Toot (Morus alba), Simil (Salmalia malabarica).

Indus Plain (South)

Am (Mangifera indica), Amaltas (Cassia fistula), Amal (Embllica officinalis), Arjan (Terminnalis arjuna), Aritha (Sapindus mukorossi), Babul (Acacia nilotica), Bhan (Populus euphratica), Bakain (Melia azadarach), Ber (Zizyphus mauritiana), Eucalyptus (E. citriodora, E. camaldulensis, E. tereticornis), Imli (Tamarindus indica), Ipil Ipil (Leucana glauca), Jaman (Syzygium cumini), Jangle Jaleba (Pithecolobium dulce) Jantar (Sesbania aegyptica), Kachnar (Bauhinia variegata), Neem (Azadirachta indica), Pakar (Ficus infectoria), simal (Bombax cieba) Shisham (Dalbergia sissoo), kala Siris (Albizzia lebbeck), Sufed Siris (A. procera) Sonhangana (Moringa pterygosperma), Toot (Morus alba), Willow (Salix spp.).

Desert areas

Davri (Acacia jacquemontii), Jangle Jaleba (Pithecolobium dulce), Khmbat (Acacia senegal), Lahura (Tecoma undulata), Mala (Zizyphus nummularia), Rehru (Tecoma undulata).

In order to obtain the maximum benefits from the tree growth, it is necessary that trees should be planted in a manner to which they are best suited. Species suitable for various purposes are given below:

- o Live fences: Opuntia, Ipil Ipil, Jantar, Mehndi, Phulai, Sisal, Sanatha, Marva, Gardenia, Durranta, Caesalpinia, Ligustrum.
- o Timber and Fuel: Ailanthus, Akhrot, Babul or Kikar, Bakain, Fir, Chir, Dhak, Deodar, Eucalyptus, Imli, Kail, Neem, Poplar, Shisham, Sharol, Simal, Siris, Toot etc.
- o Fodder Trees: Arjan, Babul or Kikar, Beri, Kachnar, Khair, Mulberry, Sonhanjana, Grewia, Jangle Jaleba, Sirin, Shisham. etc.
- o Fruit Trees: Am, Amlok, Amla, Bahera, Batangi, Jaman, Ber, Lasura, Imli, Chalghoza.
- o For Kallar (Saline) Soils: Jantar, Babul or Kikar, Bahan, Farash, Eucalyptus camaldulensis, E. microtheca, Nim, Parkinsonia, Date palm, Acacia cyanophylla, Sesbania spp. Acacia ampliceps.
- o For Waterlogged areas: Andrikni, Arjan, Bakain, Jaman, Willow, Eucalyptus microtheca, Euc. camaldulensis, E. robusta, Date palm.

PLANTING MATERIAL

Next in importance is the planting material. It is primarily of two categories, the seed and the plants.

Seed: Direct sowing of seed of various species such as Kikar/ Babul, Ber, Phulai, Sanatha, Bakain, Ipil Ipil, Walnut, offers good results. The cost is less, and the seed can be sown by broadcast method, in lines, on trench berms, patches, pits or mounds. The seed can be collected locally from the well formed, straight, healthy and vigorous trees or from the forest department or farm trees. It would be useful to pretreat the seed; except walnut, keeping it in a container filled with cowdung for a week expedites germination. Treatment with boiling water - putting the seed in boiling water and allowing it to cool down before use - promotes germination. Normally, the soil should cover the seed as thick as the size of the seed. It is necessary to save it from birds. A smearing with kerosene oil will keep away the rodents, insects and birds. Seed will not germinate if sufficient moisture is not available. Even if it does germinate it may not be able to establish itself due to lack of moisture. It means that water harvesting, and watering are helpful in getting the plantations established.

Plants: In most cases, there are distinct advantages in planting saplings raised in a nursery. Depending upon choice of species the following types of nursery stock is usually available:

Type of planting stock	Examples	Remarks
Entire bare rooted plants:	Poplar, Willow, Paper Mulberry, Bakain, Mulberry, Quetta pine, Chinar, Siris etc. and a large number of shrubs like Lagerstroemia, Hibiscus, Buddlea, Jasminum.	Raised from cuttings/seed and kept in the nursery 1-2 years can be planted only when leafless and dormant in late winter early spring.
Root-shoot cuttings/ stumps:	Shisham, Mulberry, Siris, Semul, Bakain, etc.	Produced from 6-12 months old seedling. About the thickness of a thumb, 25-30 cm in length.
Branch cuttings:	Poplar, willow, Japanese mulberry, Farash, Erythrina and a number of shrubs like Jasminum, Hibiscus, Nerium etc.	Cuttings 20-30 cm. in length and 1 cm dia are made from tree branches or entire plants in the nursery. When planted in soil, they strike roots.
Balled plants:	Chinar, Walnut, Pines, Cypress, Magnolia.	When large plants are removed to be transplanted, these are dug out with roots and ball of earth. The earth balls are wrapped up in thick paper or jute cloth for long distance carriage.
Pot/tube plants:	Eucalyptus, Heterophragma, Jacaranda, Kikar, Bischofia, Bauhinia, Millettia, Gulmohar, etc. and many others.	Seed is sown in the nursery where from after germination it is pricked into polythene tubes or clay pots. After about 6 to 12 months, plants are ready for out planting.

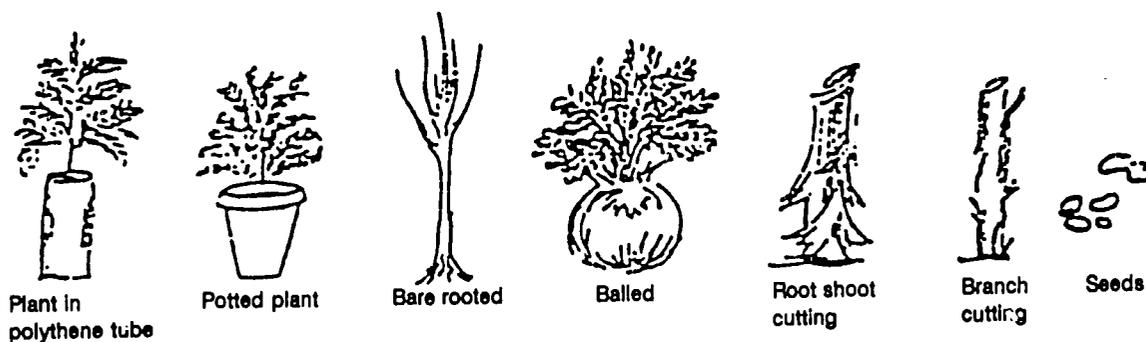


FIG. 1 TYPES OF PLANTING STOCKS

DIFFERENT WAYS OF ESTABLISHING TREES

Direct seeding: Seed can be sown by broadcast method or by dribbling in lines, or trench berms, in trenches filled back with loose soil in patches, pits or on mounds. When seed is to be broadcast, it is essential that the site is well prepared and ploughed up thoroughly for easy germination and retention of moisture. The seed has to be

ploughed up thoroughly for easy germination and retention of moisture. The seed has to be covered with soil using a country made "Sohaga" - wooden plank.

Planting: Plants may be put in the ground in several ways. They may be planted in pits with or without balls of earth or if small, simply inserted in the holes made by driving a stake into the ground or into a notch or slit made with a single blow of hoe. In dry zones they may be planted in trenches or on ridges along the contours. In damp and swampy grounds these may be planted on mounds and ridges.

Pit Planting

Pit planting is the most generally used and is a successful and fairly cheap method of planting. The size of the pit depends on the size of the plants. It is necessary to make the pits sufficiently large to readily take in the ball of earth; or if the trees are planted with naked roots, the pits are of such a size that the roots of each plant may be placed in the pits in their natural position without the root system getting cramped. In the case of small tubed plants, about 20 cm. deep pits are enough. For balled plants of 1.5 to 2 m. height, 50 cm deep pits with nearly the same diameter are required. Where the plants are put in with the ball of earth, care should be taken that surrounding soil is well pressed in, otherwise the ball on contracting will leave the roots exposed in crevices between the two surfaces. When plants raised in polythene bags or earthen pots are planted, the polythene bags and the pots must be cut/broken or removed before planting. If the area is rocky, planting will be staggered wherever there is suitable place and good soil between the rocks.

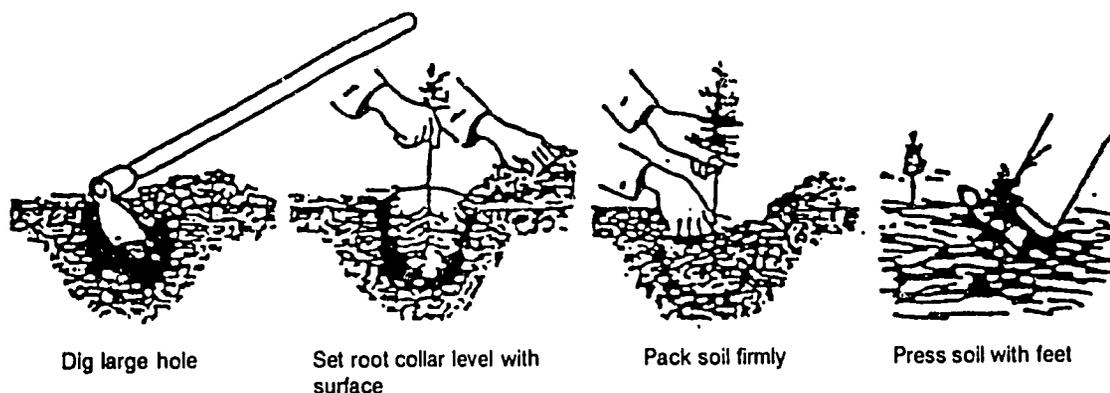


FIG. 2 PIT PLANTING

Furrow, Trench or Ridge Planting

In dry situations, particularly on sloping ground, trenches instead of pits may be dug. The trenches can catch the rain water falling on the surface to the subsequent advantage of the plants. In foothills, 30 to 60 cm. high ridges along the contours are very helpful in catching the rain water. Usually a combination of trenches and ridges is used. Planting or sowing is done in the base of such ridges. (Figs 3-8).

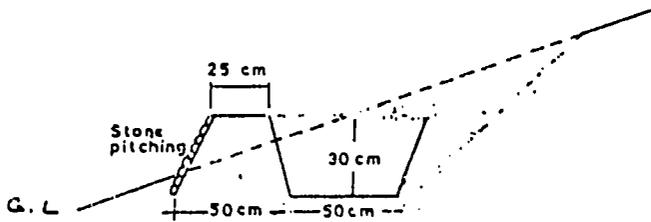


Fig. 3 TRENCH ALONG CONTOUR

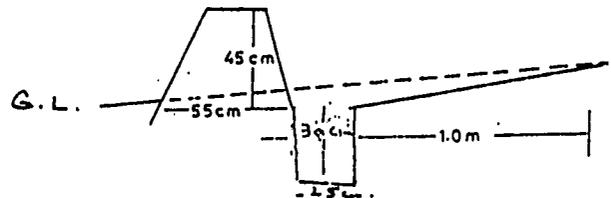


Fig. 4 TRENCH WITH TROUGH

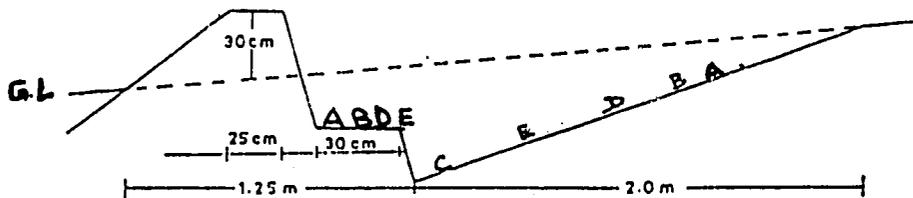


Fig. 5 SECTION OF CONTOUR RIDGE WITH TROUGH

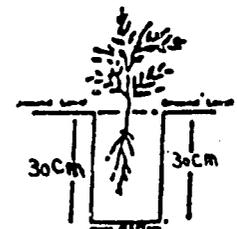


Fig. 6 TRENCH ONLY

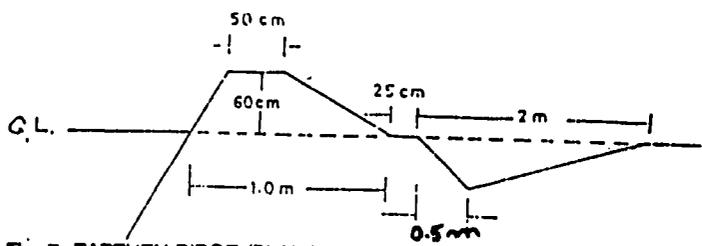


Fig. 7 EARTHEN RIDGE (BUND)

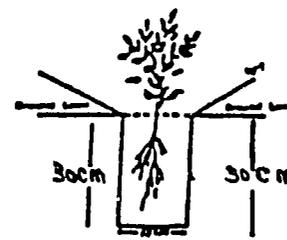


Fig. 8 TROUGH CUM TRENCH

It is often desirable to plant broken ground, a part of which may be of an extremely porous nature, by digging trenches. The trench should follow the contour of the ground. Dug out earth should be thrown on the lower side to raise it. In any case the ground, if treated in this manner, will become covered with grass and its water holding capacity improved. Sanatha, phulai and castor will grow very well if sown directly along the trenches.

Hole and Notch Planting

Hole and notch plantings are useful in moist, loose and sandy soils. The common method is to have a pointed T-shaped iron rod to

about 60 cm length to make the holes (Fig. 9). A root-shoot cutting is then taken and inserted in this hole keeping the collar at level with the ground. It is then thoroughly pressed from all sides making it compact. It has to be watered immediately after-wards. Notches can be made either with a mattock or a vahola. The seeds can be dibbled or plants planted in the notch made like that. However, the notch should be deep enough so that neither the roots are naked nor it is easy to pull out the plants (Fig. 10).

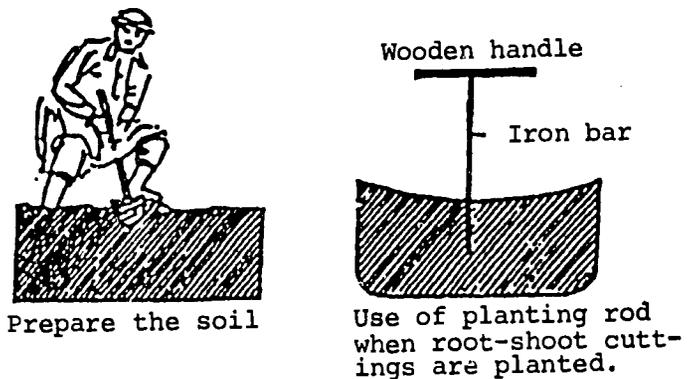


Fig. 9 PLANTING WITH IRON ROD

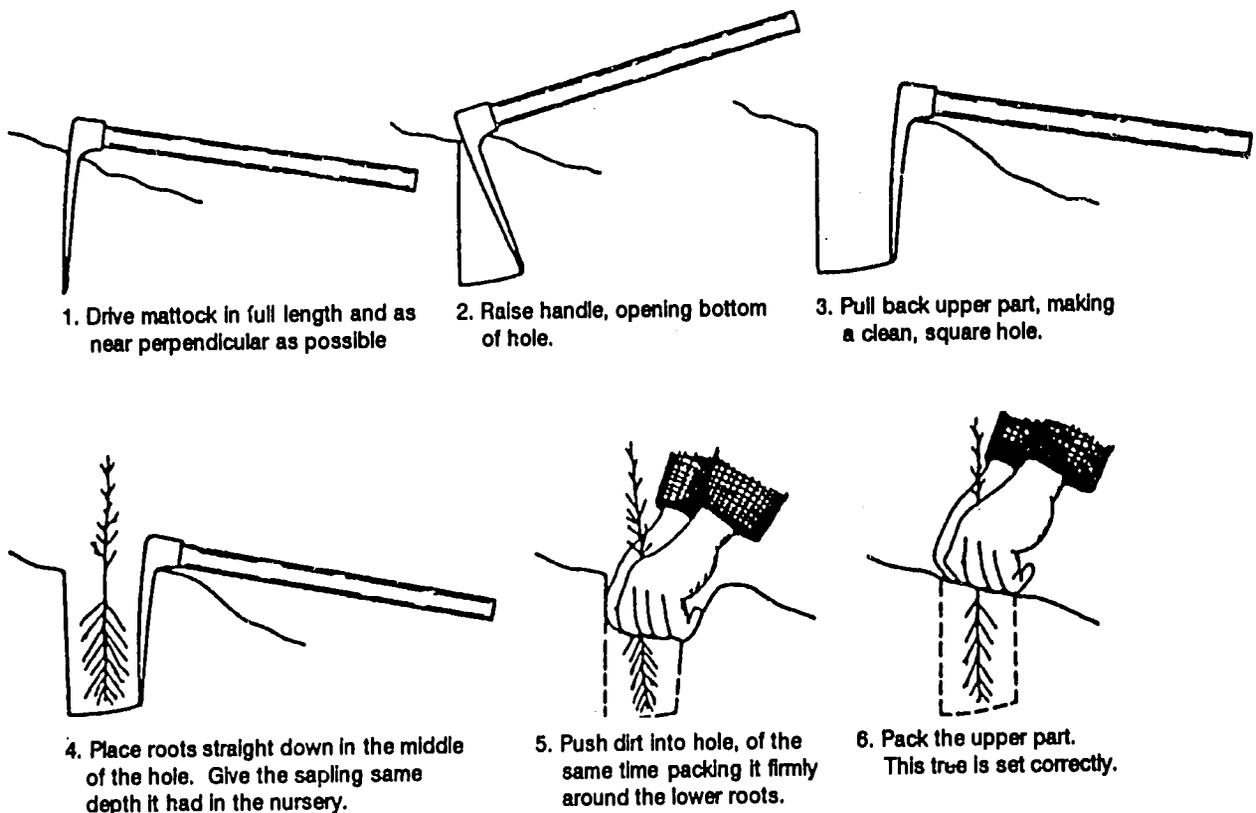
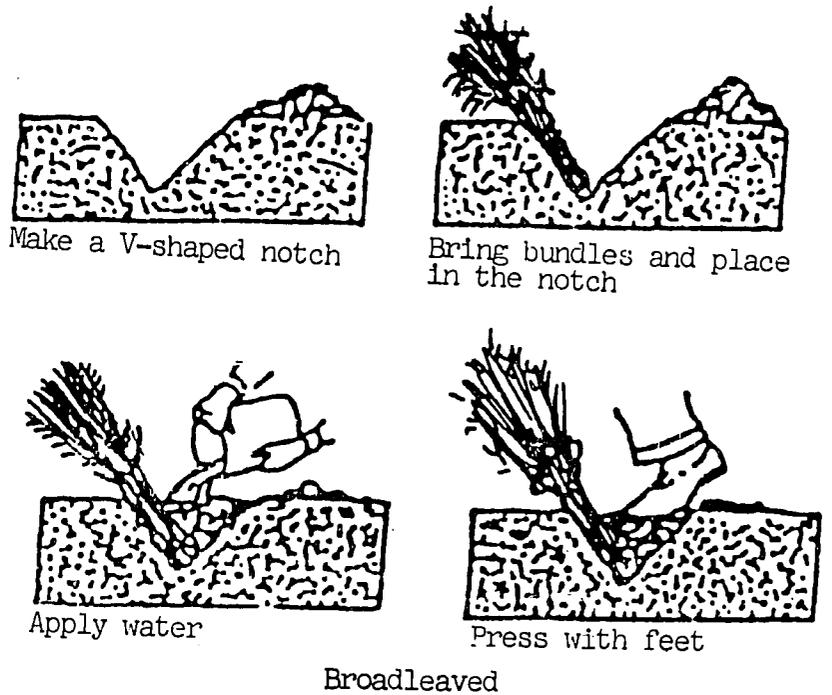


Fig. 10 PLANTING WITH SMALL MATTOCK (VAHOLA)

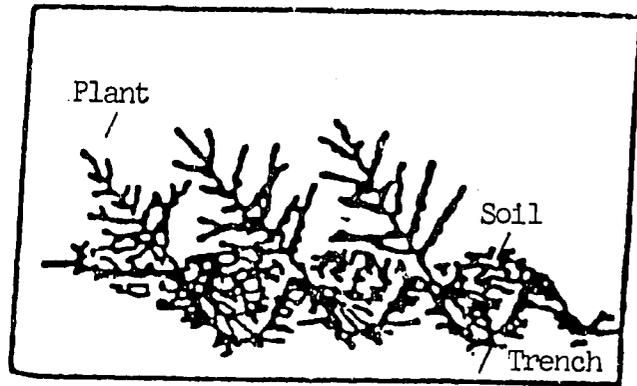
PLANTING PRECAUTIONS

Following rules must be observed to ensure successful establishment of the plants:

All soil preparation and digging of holes should be completed before the plants are obtained. This reduces the length of time the trees need to be out of ground. A large number of casualties are caused due to the simple reason that the plants get dried up before planting either in transit or delay on the part of the planter. If the plants do arrive before time they ought to be kept under shade or in case bare rooted, they should be heeled up in the dug up soil as indicated in the figure 8 below.



Broadleaved



Conifers

Fig. 11 HEELING OF BROAD LEAVED DECIDUOUS PLANTS AND CONIFERS

The trees which are selected for planting should be healthy and well balanced with well developed roots and plenty of root hair. Crooked, malformed and diseased plants should be discarded (Fig. 12). Local nursery plants give better success as compared to those which are brought from long distances. Native species are preferable to exotics but exotics of proven adaptation may be tried.

When planted, the collar - junction of the root and shoot portions of the plant - should be in level with the ground surface. Neither the shoot portion should go inside the soil nor the root be seen above ground as shown in fig. 13.

Only one plant is to be planted in one pit. However, to protect the plant, live hedge of Impomea carnea or Jantar may be planted around it till it is out of reach of the cattle.

- Replacing of failures should be attended to in good time, preferably in the same planting season.
- Immediate watering after planting is very important. Irrigation is essential for the plant to survive, grow and form into a healthy and vigorous individual. However, if luckily it rains, one may be saved of this responsibility for some time.
- It is better to plant on cloudy/ rainy day and even when it is raining. Do not plant between 12 noon to 4:00 p.m. to avoid summer heat.

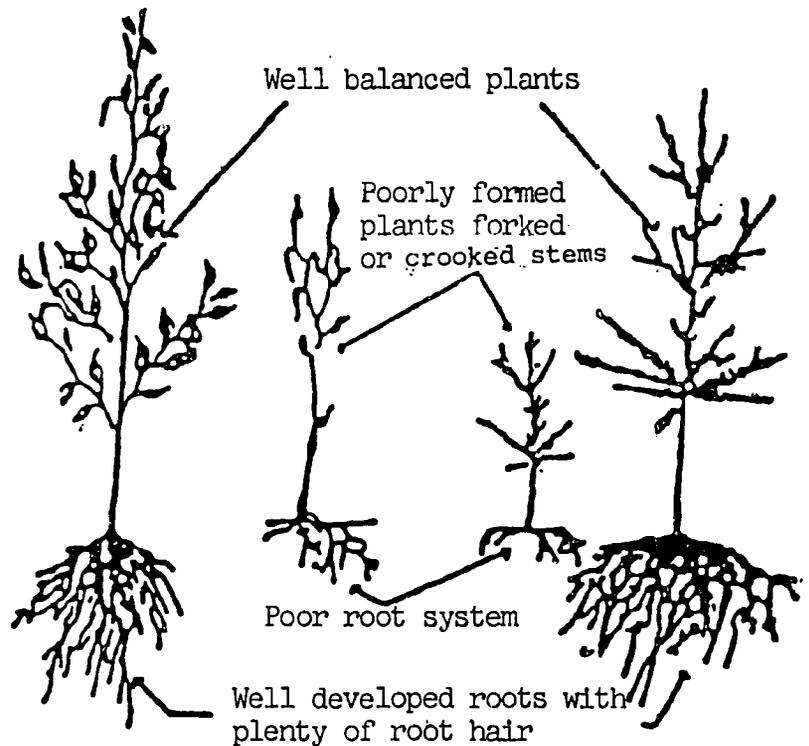


Fig. 12 GOOD/ POOR PLANTS FOR PLANTING

PLANTING IN DIFFICULT SITES

It is quite easy to do planting in areas where soil is good, water is available and protection is no problem. But there are certain sites like sandy soil, hard clay soil, waterlogged areas, broken and eroded soils etc. where special measures are required before and after planting.

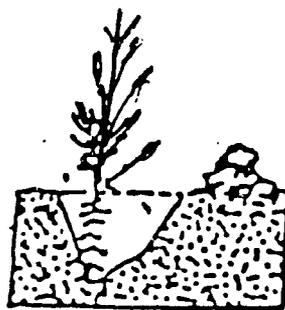
Sandy Soils

In such areas the soil mainly consists of pure loose sand which keeps on shifting and buries the plants under it. When wind storms come, hollows are formed around the plants resulting in their desiccation or uprooting. The root shoot cutting planted in sand has no future. It is only the entire plant which can do well here. Best planting season for sandy soil and sand dunes is monsoon as the plants are able to take advantage of the moisture conserved in the sand. The key to success in planting these areas is the size of the plant. If it is possible to plant large plants, 45 to 50 cm deep, survival is greatly improved as the root is able to tap the water in the deeper layers of the sand dunes. Very successful results have been achieved by planting potted plants of frash/ khagal (*Tamarix aphylla*) in the desert of Thal. Successful planting of Phog (*Calligonum polygoniodes*) cuttings has been done with winter rains when there are no wind storms.

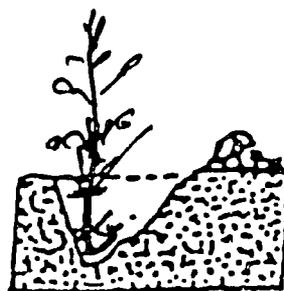
Hard Clay Soil

The clayey soils which have very heavy preponderance of clay particles are found in areas near the foothills of Salt Range, in Balochistan, and in patches throughout the Indus plain. When

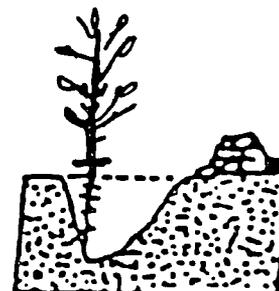
wet, they are spongy and, after drying, become hard like stone. They are often found to have impenetrable layers of calcium carbonate, known as "Kankar" pan. For planting in these areas 50 to 80 cm deep pits have to be dug and filled with light soil to be brought in from surrounding areas. Species like frash, tecoma, babul and bakain have been found to do well in such soils.



Correct: At the same depth or 1 cm deeper than seedling grown in the nursery.



Incorrect: Too deep and roots bent.



Incorrect: Too shallow and roots exposed.

Fig. 13 CORRECT AND INCORRECT DEPTH OF PLANTING

Kallar (salt infested) Soils

The soils in Indus valley are characteristically alluvial but have deposits of salts in varying degree. Either the salt is in the deeper layers and comes up with application of water, or it is often seen spreading over vast stretches on the surface. Here again deep pits have to be dug and the salt infested soil replaced with better quality soil from surrounding areas. Babul, eucalypts, bakain and frash can do well here, provided these remain well supplied with canal water. As a first step, annual jantar (Sesbania aculeata) can be sown, and ploughed back to improve the soil. Tree planting can follow after a year or two.

Sand Torrents and River Banks

Reclamation of torrent ruined land which can be made productive again by simple type of afforestation is the responsibility of the community rather than individuals. Once reclaimed, it has its beneficial effects for all the people living in that area. The method is simply to check the flow of flood gradually by confining it to a slightly narrow path by means of "Herring bone" plantations of plants such as nara (Arundo donax) and kana grass (Saccharum munja) fairly thickly in the sand (Fig. 14). If the edges of the torrents are kept fully protected the remainder or the reclaimed area can be planted with shisham or sown with khair or babul. Even big posts of some species which can take root can be planted. For example, upto one meter long stakes of pipal (Ficus

religiosa)
 frash, willow
 and poplar have
 given good re-
 sults. Agave
 (Keora) is a
 useful plant
 for consoli-
 dating the new-
 ly collected
 silt. It is
 easy to grow
 and is very
 hardy. Cutt-
 ings of Walaiti
 Ak (Ipomaea
carnea), are
 very useful for
 re v e t t i n g
 stream banks.

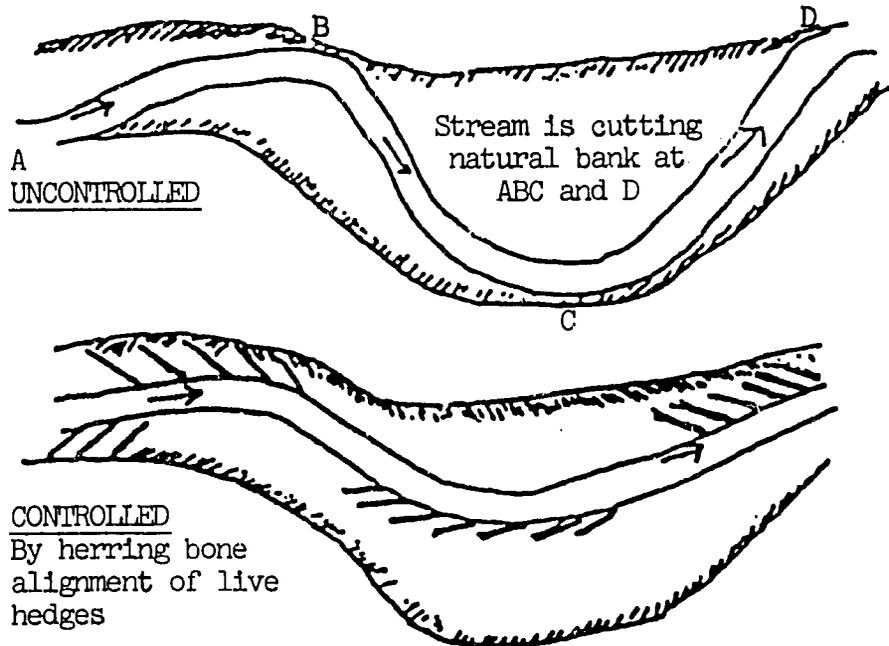


Fig. 14 TORRENT BED RECLAMATION (GORRIE)

Rocky Areas

All areas (with rock out crop or with-out) with underlying impervious rocks and less than 8 cm of soil are included in this category. Here, 60 cm. wide contour trenches will have to be dug upto the depth of 30 to 60 cm. The dug up material will be piled on the lower side as a continuous ridge leaving a berm of 15 cm. The trench will be interrupted at intervals of 6.0 m, with uncut wedges.

Gullied Areas

In most cases antierosion measures and soil working for sowing and planting can be combined

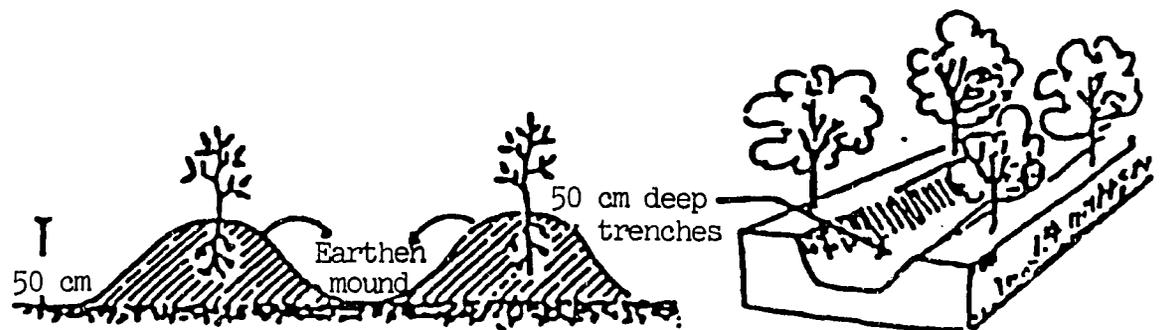


Fig. 15 PLANTING ON A SWAMPY SITE

Protective work in the form of anti erosion measures will be taken first before starting soil working for sowing and planting. For gully plugging and other anti erosion works it will be useful to get the help of the trained staff of the Soil Conservation or Forest Department as construction of check dams, earthen bunds and

gully plugging techniques will be involved and will be better supervised by technical people, at least for the first one or two years.

Waterlogged Areas

Problem of water logging is quite common not only in the irrigated colonies but also in localities where, in the absence of proper drainage rain water gets trapped. It does not go down due to impervious layers or spongy nature of the soil. Layout of properly aligned drains is the best remedy. Pumping can also help. Bed slope of the drain should be $\frac{1}{4}$ to $1\frac{1}{4}$ per thousand meter. As indicated earlier, mound planting also helps. Plant on top of the mound or berms of the trenches.

SEASON OF PLANTING

Time of planting can have a lasting effect on the plant. In every locality a study of seasonal variations would indicate a suitable season for planting. In fact, the month of February earmarked for spring planting program is quite appropriate for the purpose. There is no harm if planting is continued right through March-April unless it becomes very hot as in the southern zone. The second planting season starts with the onset of monsoon and should continue as long as soil moisture is plentiful. Following guidelines would help achieve better success:

- Treat the seed of babul/ Kikar, Phulai, ber, bakain by soaking in hot water or cowdung before seeding.
- Plant all bare rooted stock such as poplars, willows, walnut, bakain, simal, robinia, mulberry in January-February; i.e. when the buds are dormant and plants are leafless.
- Plant large, balled plants of cypress, walnut, chinara, chir pine, deodar etc. should be planted from December-February; i.e. when these have not yet started growing actively.
- Plant polythene tube stock in spring and monsoon but hot months like May, June and July should be avoided, specially in the plains.

SPACING

In working out the space requirement of trees, it is advisable to draw a rough sketch showing roads, water courses, field boundaries and the existing trees and shrubs etc. Objects which are likely to influence the future growth of the tree should also be marked. Experience has shown that there is an attempt on the part

of quite a few planters to plant too close. Normal distance for big trees with large crowns in the compound should not be less than 10 m or 30x30 feet. When planting along water courses, shisham, mulberry, willow and poplar and babul may be planted 3 m or 10 feet apart. If need be, these can be thinned later on to provide proper growing spaces. Experience has shown that in block plantings, initial spacing of 2x2 m or 6x6 feet gives enough growing space to a tree for 2-3 years. Thinning can be done after that to provide more space. Poplars in conjunction with agricultural crops should be planted at 4x4 m or 14x14 feet to allow free movement of the tractor without damaging the trees. Those with pyramidal crown like black poplar, Eucalyptus citriodora, cypress and silk oak can be planted closer at 2x2 or 3x3 metres.

AFTER-CARE

The false notion that the job of the tree planter is finished as soon as the tree is put into the soil should be expelled. Tending and after-care given to the plant is the most important part of the whole operation. Watering after proper intervals, weeding, hoeing and staking etc. are important operations which follow planting. Measures for protection from stray cattle, sheep and street urchins are highly important. Moreover, sprays of insecticides and fungicides against defoliators, borers, root rots are often necessary.

Hand Watering

If hand watering is required, water can be obtained from country wells, hand pumps, nearby canals etc. For this purpose buckets or drums are necessary. Recently, small hand-driven trolleys have been developed for carriage of water. Country "mashak" which holds about 8 gallons of water is also used with good effect. Each tree should get a "gallon" of water twice a week during the hot weather in the first growing season. Condition of the plant would indicate its requirements.

Flow Irrigation

Canal water supplied by means of water courses is the cheapest and the most satisfactory form of irrigation, particularly when planting has been done in slots, trenches, or pits. It is very important that the water is distributed uniformly over the whole surface. Once a week irrigation of 10 cm depth would be sufficient during the first growing season, except of course during rains. It can be stopped or reduced subsequently. It should not get collected in low places, leaving high grounds unirrigated or partially so. The best time for irrigation is the late afternoon. Sandy and permeable soil will require more water than clayey soil. Tube wells and country wells are also used for flow irrigation. Water can also be diverted or pump lifted from streams for occasional irrigation.

It should, however, be mentioned that over irrigation is as bad as under irrigation. The trees heavily irrigated develop their roots near the surface only and can not tap deeper layers of soil for water. This not only renders them liable to be blown over during wind storms but also they may die if the irrigation is stopped even for a short period.

Weeding

In heavy rainfall areas as well as in irrigated tracts, weeds come up in great profusion. These compete with the plants for water, nutrients, sunshine etc. Sometimes the young plants are completely overwhelmed and almost crippled. It is, therefore, imperative to reduce this competition by repeated weeding and hoeing taking care all the time that the actual plant is not damaged. Approximately three to four weedings in the first year are helpful.

Staking

When large plants are planted they very frequently need some artificial support till they have firmly secured themselves by developing root system at the new site. Newly planted trees are liable to sway during wind and the base forms a sort of socket. For proper growth, the stem has to be rendered quite firm by some sufficiently strong support. The support should always be stouter and taller than the plant and should be tied with a soft rope. While driving the stake into the ground, it has to be ensured that root system of the plant is not injured. Pointed wooden stakes can be used to serve the purpose.

Because staking is expensive and time consuming, it is usually better to select nursery stock which is short and has a stout collar. The tallest seedlings are not always the best seedlings.

Continuous Fencing

When groves or multiple lines of trees are planted it may be useful to enclose them with a continuous fence to protect from stray cattle. It may consist of thorny branches or barbed wire. Branch fence will have to be renewed and the hedge repaired at least once a year. The wire fencing has an advantage of being transferable when no longer needed at one place

Live Hedges

Khair, phulai carnea and Imomoea have been found to be excellent live hedges and are quite practical. Agave (keora) can be used for fencing in continuous lines. Thorny climbers of Caesaplina species planted on the outer boundary are also very useful. They intertwine and form an impenetrable thicket.