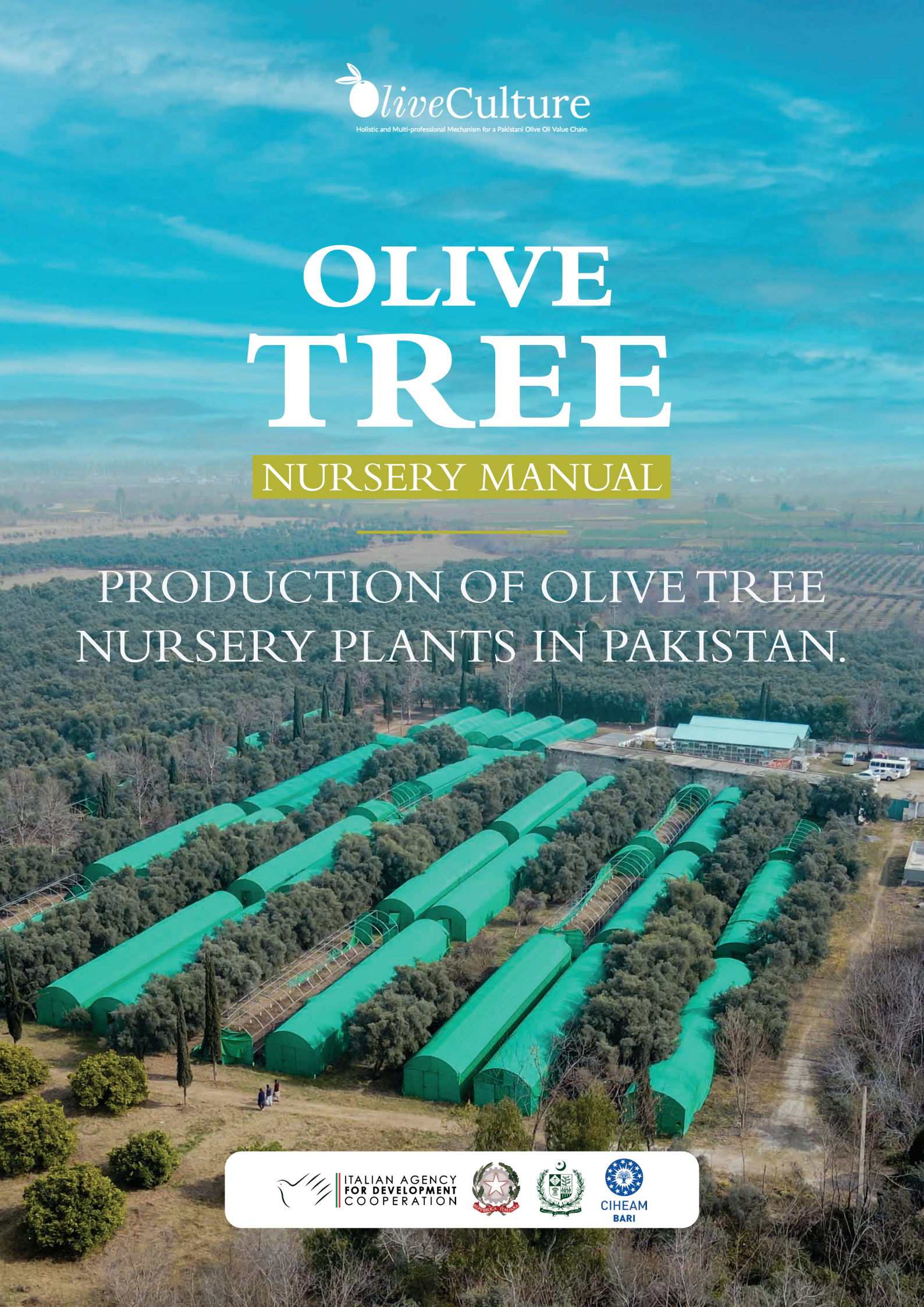
OliveCulture

Holistic and Multi-professional Mechanism for a Pakistani Olive Oil Value Chain

OLIVE TREE

NURSERY MANUAL

PRODUCTION OF OLIVE TREE NURSERY PLANTS IN PAKISTAN.



ITALIAN AGENCY FOR DEVELOPMENT COOPERATION

CIHEAM BARI

MOTHER BLOCKS

Public agencies must manage mother plant fields; at least 2 plants of the same clone must be kept in a mother plant field for each registered variety. In addition, each plant must be identified with a label and its location must be shown on a field map.

All operations carried out within the fields must be recorded in a field notebook, including agronomic work, phytosanitary treatments, inspections, and especially the harvesting of propagation material to be supplied to multiplication centers. The field must be located in an environment well isolated from olive production and managed with the utmost professionalism.

MULTIPLICATION BLOCKS

Multiplication fields should be made exclusively with plants from mother plant fields. The number of plants per variety depends on market demands. Each row must contain a single variety; if necessary to have more than one variety on the same row, 2 empty locations must be left between varieties, each plant must be labelled, and its location shown on the field map.

All operations carried out within the fields must be recorded in a field notebook, including agronomic work, phytosanitary treatments, inspections, and especially the taking of propagation material.

Pruning and fertilization operations must be optimized for bud production, plants to be used for taking cuttings and scions, and for olive production in the case of plants to be used for seed production.

PROPAGATION OF ROOT-STOCKS FROM SEED

Fruits are harvested at the ripened stage from the trees. Early harvests, made before the drupes veraison, significantly increase seed germinability (Scaramuzzi, 1958; Basso, 1962);

Crush or squeeze them gently so that the pulp is removed. This should be done within a few hours of picking the fruit;

The kernels should then be washed thoroughly with water or better with a 1% caustic soda solution to remove residual oily substances that might hinder water penetration when they are set to germinate;

Dried the seed in a ventilated environment and store in bags or containers of various types, in relatively cool rooms or a refrigerator at a temperature around 4°C until the time of sowing;

Practices of scarification and stratification to increase the germination, chemical treatments with 10% sulfuric acid solutions or 3 to 5% caustic soda can also be applied.

Seed is soaked in water for 20 days before sowing in the beds;

The seedbed consists of a draining layer of about 10 cm, on which is laid a second layer of sandy soil or loam very loose soil of about 30 to 40 cm and possibly an additional layer of 10 cm consisting of sterilized sand to prevent any attacks by parasitic fungi, such as Pithium, Fusarium and Rhizoctonia;

When the seedlings have reached the development of 3 to 5 cm in length and have 5 to 8 leaflets, they are transplanted in 2L phytocell with growth substrate (60% coconut fiber or peat 40% soil/60% soil 40% mature manure or mature compost) and fertilized with nitrogen fertilizers;

OLIVES READY FOR HARVESTING

OLIVE STONING

SEEDING BEDS

GRAFTING

Several grafting techniques can be used to produce olive plants through the use of buds or cuttings.

The most widely used in the nursery is pin grafting, to be done during the periods when the plants are in juice (March-May); in order to have a certain homogeneity of rootstocks ready to be grafted, they must be fertilized with high-nitrogen fertilizer and well-watered.

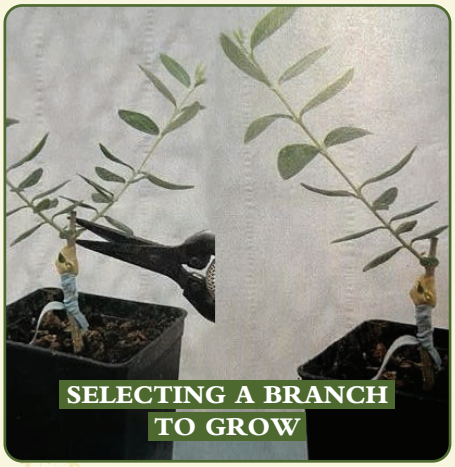
Scions to be grafted should be taken from the pre-multiplication fields, tied in bundles labelled with the references of the plant from which they were harvested; grafted in a short time and stored in a refrigerated room.

Grafting should be done about 5 cm from the collar of approximately 9-18-month-old rootstocks (diameter between 0.5-1.0 cm).

The graft usually involves 2 buds and a cut section that should then be inserted into the rootstock; the 2 leaves at the base of the buds should be cut about halfway through.

The graft is blocked with budding or grafting tape and the cut areas are covered with grafting mastic or wax.

When the new vegetation starts to develop, a single branch should be selected and grown to become the stem of the new plant, with the help of a brace (bamboo stick).


SELECTING A BRANCH TO GROW


OLIVE SCION


OLIVE ROOTSTOCKS


BARK GRAFT "PENNINO"


GRAFTED OLIVE PROTECTED WITH WAX

SELF-ROOTED CUTTINGS

Semi-woody cuttings, unlike woody cuttings, have a better rooting ability and consist of a portion of a shoot or branch with 2-6 leaves inserted at the upper terminal nodes. The presence of the leaves is important because the carbohydrates and hormones (auxins) produced by them, migrating to the base of the cutting, stimulate root formation (rhizogenesis) and initial root development. In addition, the auxins along the translocation pathway inhibit budding. Compared with woody cuttings, another important advantage of semi-woody cutting is the use of relatively small portions (8-15 cm) of branches or shoots, thus allowing for propagation material to produce a large number of rooted cuttings from each mother plant.

Generally, the periods of greatest rooting aptitude for olive trees are those preceding or corresponding to intense vegetative activity, so the taking of cuttings should be done from March to November, excluding the hottest period (summer stasis). However, there is usually a better rooting of cuttings taken in late summer-early autumn (late August-October). In case it is not possible to produce the cuttings in a heat-conditioned facility, the rooting stage should be carried out in autumn-winter, in a basal-heated bench.

Semi-woody cuttings should be prepared in a short time after the branches are harvested from the mother plants.

The cuttings, usually in bundles of about 20, should be dipped (1-2cm) in an alcoholic solution (30%) with IBA (3000 ppm or mg/L) for 5 seconds (if you reduce the concentrations, increase the dipping time);

After passing through the solution with IBA, the cuttings should be placed in a bed of perlite (or another soft substrate such as vermiculite, rockwool, peat and coconut fiber);

The bed can be prepared on a bench with a basal heating system to help with temperature control in the colder months (the optimum temperature is 23-25 °C, although 18-20 °C already gives excellent results); if a heated bench is not available, you should at least prepare the rooting bed by providing a draining structure below the rooting substrate, raised off the ground or otherwise well protected from rainwater, to avoid water stagnation; honeycomb trays can also be used as rooting beds, always placed on a drained structure and enclosed in an environment where humidity can be controlled.

The bench (or seed bed) should be tunnelled with plastic, with a height of about 1 m, throughout the rooting phase, in order to maintain a moisture level at 95%, also, it should be protected from sunlight with a shading net to avoid excessive overheating and reduce brightness, to slow down vegetation and promote rooting;

Use irrigation systems with mist or fog to wet the leaves of the cuttings without flooding the substrates; if the rooting substrate is overwatered, it leads to an increase in the above-ground temperature, and water stagnation, which promotes the development of rot on the buried part of the cutting. In addition, the constant supply of small amounts of water just to wet the leaves keeps the humidity constant and reduces the ambient temperature;

After the rooting stage, transplant the young plants in a 60% peat (or coconut fiber) + 40% soil or 60% soil+40% mature manure or compost substrate. If small pots are used, a second transplanting into pots or phytocells of at least 2L capacity should be done within 6 months. Fertilize the plants with an NPK 30:10:10 fertilizer (1 gr/L to be increased after 2-3 weeks to 1,5 gr/L) + iron and if possible other trace elements.

SEMI-WOODY CUTTINGS AND DETAIL OF BASAL CUT MADE JUST BELOW THE BUDS.

ROOTING BED WITH WATER STAGNATION

EXAMPLES OF ROOTING BEDS WITH BASAL HEATING SYSTEM

ROOTING BED WITH WATER STAGNATION

SPRINKLER IRRIGATION SYSTEMS (MIST OR FOG)

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