



## Agroforestry Facts Neem



<b>Botanical Name</b>	<b><i>Azadirachta indica</i> A.Juss.</b>
Name in English	Neem
Name in Kannada	Bevu
Family	Meliaceae
Seeds Collection	Only fruits at the yellow green colour stage are pricked from the branches. The collected fruits are de-pulped immediately. Soaking in cold water for a few hours helps in removing pulp. Storing neem seed for 5 months at 40% natural moisture content at 16 degrees centigrade is possible. For short storage the seeds are closed in polythene bags and exposed to air once in a week to keep them viable. Long term storage of Neem seeds for more than 10 years is done at 4% moisture content and -20-degree Centigrade temperature. Storage of seed in earthen pot containing wet sand (30% moisture) helps to retain viability up to 60% at the end of 3 months. On an average 5000 seeds weigh one kilogram.
Seeds Processing & Treatment	No pre-treatment required
Nursery	Germination rate of Neem varies between 15% (stored seeds) and 85% (fresh seeds). Hence, to ensure higher viability of the seeds, their immediate sowing in nursery is recommended. Pre-soaking the seed for 24



	<p>hours in cold water and removal of the endocarp or cutting of the seed coat at the round end with a sharp knife also increase its germination capacity. Sowing of seeds in nursery beds made up of fine river sand is done in drills 15 c/m apart. Seeds are sown 2.5 cm deep at distance of 2 to 5 cm in the lines and lightly covered with earth to safeguard against birds and insects which often eat radicles of the germinated seeds on the surface. The beds are sparingly watered to prevent caking. Alternatively, seeds can be sown directly into pots. Germination occurs in 1/2 weeks' time. Once the hypocotyl is erect the seedling is transplanted into the containers. Seeds are sown 3 / 4 months before planting date. Potting mix comprises of 50% sandy loam, 40% river sand and 10% compost by volume. Seedlings are pricked out at 15 cm x 15 cm when about 2 months old. They do not require any shade. Soil working and weeding are very beneficial. In frosty localities plants are protected by means of screen. When the seedlings are 7 to 10 cm tall with tap root about 15 cm long, these are transplanted with balls of earth around them. In dry areas, it is necessary to plant larger seedlings of at least 45 cm height since smaller ones are unable to tide over the drought period. This is the reason why seedlings are kept in the nursery beds for another year before planting in the next range. Neem can be easily raised through direct sowing, entire / polybags seedlings or root-shoot cuttings. For degraded areas direct sowing is more successful. Entire / polybags seedlings or root-shoot cuttings are more relevant for agro-forestry / silvi pasture and road side avenue plantations. Direct sowing is done either by dibbling in bushes, broadcast sowing, line sowing, sowing on mounds or ridges, sowing in trenches in sunken beds in circular saucers or by aerial sowing. The choice varies with edaphic, climatic, biotic and economic conditions of the site. Planting in pits is carried out by using 20 to 45 cm tall seedlings. Taller ones promise better survival. Planting of stumps prepared from a year-old seedling in crowbar holes also gives good results.</p>
Plantation Management	<p>For raising a block plantation under farm forestry, a closer spacing of 5mx5m accommodating 400 trees per ha may be followed. This may vary from field to field and also depending upon the objective. The wider spacing of 7mx7m accommodating about 200 trees per</p>



	<p>hectare may be on the broader side where Agroforestry can also be practised.</p> <p>Strip weeding of young plantations has a positive effect on health and survival. Two weedings are sufficient in the first year and one weeding during the second year. First mechanical thinning in the case of transplanted seedlings is done at the age of 5 years. In arid region Neem planted along the canals are watered for the first 5-7 years.</p> <p>The rate of growth of Neem in plantation varies with the quality of soil. It is fairly rapid up to the age of 5 years after which it slows down. The plant attains a height of 4 m at 5 years and 10 m at 25 years. The mean annual girth increment is 2.3-3.0 cm. More rapid growth is attained under favourable conditions. In Karnataka naturally grown Neem trees of 10 years' age give an average height of 6.58 m and girth of 68.1 cm. In alkaline soils of U.P., Neem attains an average height of 170 cm at the end of first season and 264 cm at second season. Seven-month-old root suckers give the average height of 65.7 cm. Because of its international importance, there have been many provenance trials at several places. In 1993, the first international consultation on Neem was held in Bangkok where a panel was formed to aid and co-ordinate the work for genetic improvement of Neem.</p>
Model/Spacing	<p>The cost of cultivation will depend upon the extent of the area to be planted. The cost of cultivation for one hectare at spacing of 5m x 5m i.e. 400 plants/ha has been worked out at Rs. 20,700 / ha</p>
Pests, diseases and Management	<p>Tip borer (<i>Laspeyresia koenigiana</i>), Tea mosquito bug (<i>Heliopeltis antonii</i>) affect seedlings and young plants. <i>Pulvinaria maxima</i> is a scale insect now regarded as key pest &amp; <i>Heliiothrips haemorrhoidalis</i> a potential pest of neem. Neem seedlings get severely affected by damping off <i>Rhizoctonia</i> leaf web blight, leaf spot &amp; blights induced by <i>Colletotrichum</i>, <i>Alternaria</i> &amp; <i>Pseudocercospora</i>.</p>
Plant Rotation	<p>Rotation period varies from 15 – 35 years</p>
Yield	<p>A conservative yield of 5,6,10,15, 20 kg/tree respectively from 5<sup>th</sup> year onwards. Yield generally stabilizes from 9<sup>th</sup> year. Irrigating the young stock, keeping the field clear from competing weeds &amp; soil loosening have been reported to produce good results in neem. Neem seed price is projected to be Rs.10000 / ton in the near future. So, it is high time to exploit the potential of this hitherto neglected tree &amp; to manage</p>



	<p>neem for higher economic returns to farmers. It has been estimated that 10 yr old tree can yield a timber of 5-6 cft / tree.</p> <p>Highest oil content has been reported from Banswara region of Rajasthan (43.2%), while the lowest oil yield of 32.4% has been reported from Jaisalmer region.</p> <p>Fruit yield is 5-20 kg per tree per year in the initial years. A mature tree produces 35-50 kg fruit/year. Oil yield varies from 40-43% of seed on dry weight basis. It has been observed that as rainfall in an area increases oil content also increases. Among the International provenances tested, Bangladesh provenance has yielded maximum oil content (48.6%).</p>
Uses	<p>The tree component in the agroforestry systems is preferred to be of local use, easily marketable with good economic value. Although Neem is not considered as the best tree species under agroforestry systems nevertheless, in many parts of India it has been found to be suitable as agroforestry species. In semi-arid conditions at Indian Grassland and Fodder Research Institute, Jhansi, Neem along with other tree species increased the productivity of a silvicultural system up to 8.5 tonne / hectare. It has been reported that the fodder production can be increased from 0.5 to 3.6 tonne / hectare in arid zone of Thar Desert by growing suitable grasses and legumes along with Neem and several other tree species.</p> <p>Neem is a large ever green tree 15 to 20 M. high with semi-straight and straight trunk 30 to 80 cm in diameter and spreading branches forming a broad crown. It has a long life of 100 years. Neem tree has several economic advantages over other multi-purpose tree species grown in India. Although the main use of the tree is for production of seeds for extracting oil, the tree can be harvested for timber after 35 to 40 years of planting. The sap wood of Neem is greyish white and heart wood is red to reddish brown resembling Mahogany. The wood is aromatic moderately heavy with uneven grains, durable and not easily attacked by insects. Timber is medium refractory and seasons well even when sawn wet. It is easy to work with the timber but does not take good polish. Wood is used for building houses, as posts, beams, door / window frames, furniture, carts, axles, yorks, ship and boat building, helms &amp; oars, oil mills, cigar boxes, carved images, toys and agricultural implements.</p>



Buyers /Industries	Industries involved in production pesticide, biofuel and fertiliser. Plywood industry also interested to buy the timber.
Harvesting	Neem starts bearing fruits after 5 years and comes to full bearing at the age of 10-12 years
Economic Returns	Rs. 9,00,000/- per ha from harvesting of timber. Seeds fetches Rs. 40,000/- ha annually. Rs. 2,80,000/- by selling extracted oil annually. It takes at least 10-12 years
Current Market Rate	Seed Rs. 5/Kg