

- Adds valuable nutrients such as N, P, K, Ca, and Mg to the soil. *Gliricidia* plants grown on 700-m long bunds can provide about 30 kg N ha⁻¹ yr⁻¹ under rainfed systems with 700–800 mm annual rainfall.
- Reduces environmental risks associated with chemical fertilizers. Use of *Gliricidia* as green manure minimizes the usage of chemical fertilizers that are very expensive and also environmentally unfriendly.
- Acts as a barrier and filter to the rainwater running down the surface of a slope. *Gliricidia* roots stabilize lands with high slopes.



Chopped loppings used as green manure



Plants grown as hedge or vegetative barrier

Additional uses

- Plants are grown as live fence (hedge).
- Stems are used as fuelwood.

- Plants serve as support for other plant species.
- A mixture of ground leaves or bark and cooked seeds of *Gliricidia* is used as poisonous bait for rats.
- Leaves are used as insecticide and insect repellent.

Benefits to farmers

- Enhancement of soil productivity.
- Increase in crop yields.

Benefits to environment

- Improved soil quality.
- Reduced soil erosion.
- Reduced pollution as the use of chemical fertilizers is minimized.

Benefits to national economy

- Sustainable agricultural productivity.
- Reduced reliance on fossil fuels for producing fertilizers.
- Increased carbon sequestration.

Farmers should be encouraged to grow *Gliricidia* on farm bunds and borders of fields. Use of *Gliricidia* as green manure in crop production systems provides a sustainable means of maintaining soil fertility along with inorganic sources of nutrients.



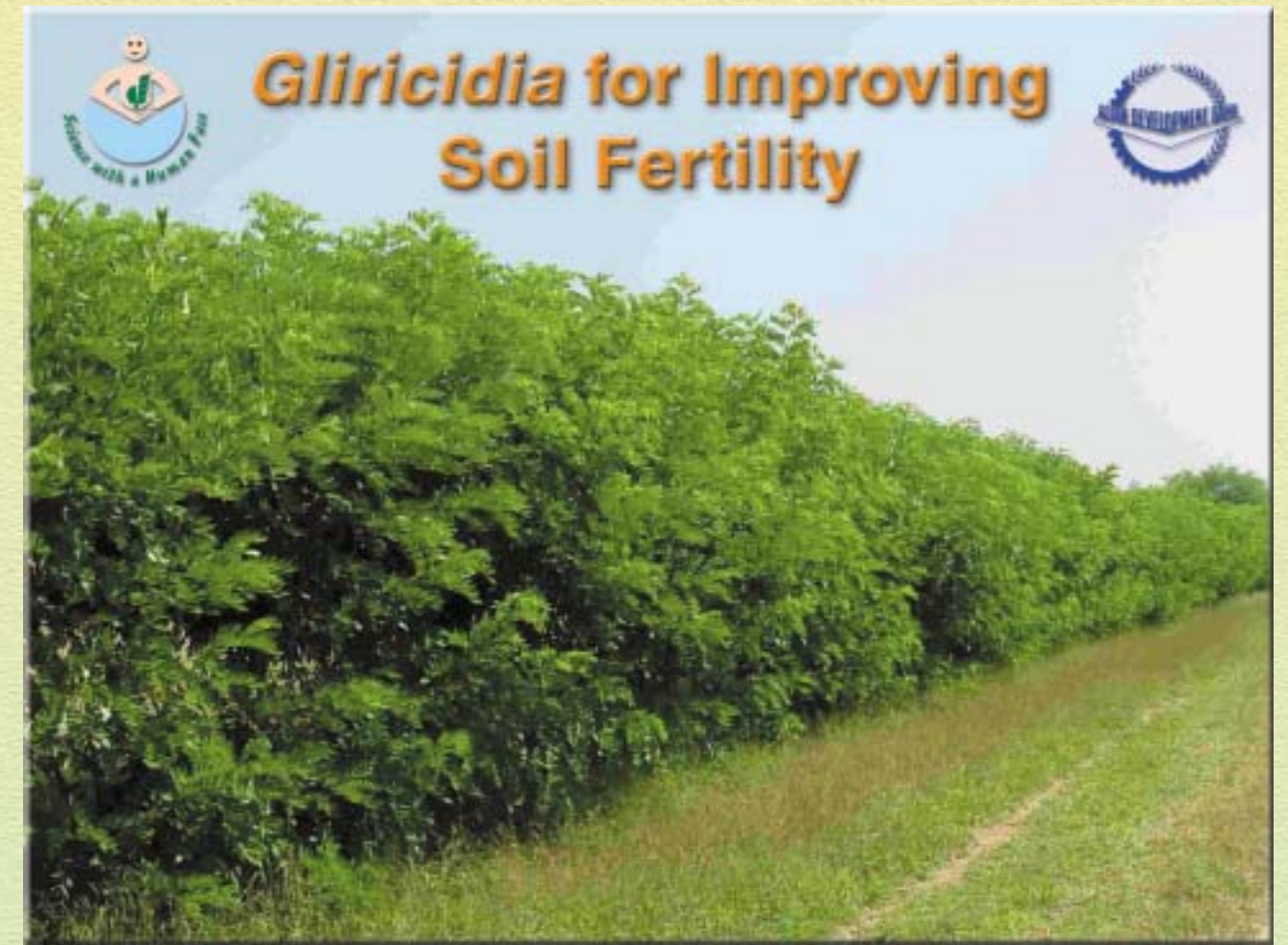
Gliricidia plants grown on border of chickpea field

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The Plant

Gliricidia sepium (Jacq.) Steud. (syn. *Gliricidia maculata* H.B.K.) is a fast growing, tropical, leguminous tree. It is one of the commonest and best-known multipurpose trees in many parts of Central America, Mexico, West Africa, West Indies, South Asia, and tropical Americas. The tree is used for timber, firewood, hedges, medicinal purpose, charcoal, live fences, plantation shade, poles, soil stabilization, and as green manure. The toxic property of the seeds and bark has given rise to the generic epithet (*gliricidia* = mouse killer). *Gliricidia sepium* adapts very well in a wide range of soils ranging from eroded acidic (pH 4.5–6.2) soils, fertile sandy soils, heavy clay, calcareous limestone, and alkaline soils. *Gliricidia* tolerates fire and the trees quickly re-sprout with the onset of rains.

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Soils in the tropics are low in organic matter and have low nutrient supplying capacity. Soil organic matter plays an important role in crop production. Continuous application of organic matter as farm compost, farmyard manure, and plant residues is needed to maintain or increase soil organic matter content. However, short supply of organic manures and competitive uses of farm residues as feed and fuel make it difficult to apply these to soil at desired levels. Green leaf manuring is one of the important farming practices for increasing organic matter content in the soil. In highly degraded soils, especially in the tropics, soils lack sufficient amount of nitrogen (N). Green leaf manure plants such as *Gliricidia* can play an important role in tropical farming systems for increasing the soil fertility. Growing *Gliricidia* plants on farm bunds serves dual purpose of producing green leaf manure rich in N, under field conditions and also helps in conserving soil through reduced soil erosion.

Characteristics of *Gliricidia*

- *Gliricidia* is a woody, green leaf manure tree about 12 m in height.
- The foliage can be used as green manure (natural fertilizer).
- *Gliricidia* is a root nodulating, N-fixing, and multipurpose legume.
- It grows fast and is tolerant to pruning.
- It can thrive in dry, moist, acidic soils or even poor degraded, infertile soils under rainfed conditions.
- The leaves contain nutrients: N (2.4%), phosphorus (P) (0.1%), potassium (K) (1.8%), calcium (Ca), and magnesium (Mg).
- *Gliricidia* adds plant nutrients and organic matter to the soil and increases crop productivity on infertile and degraded soils.

Cultivation and Management Practices

Propagation

Gliricidia can be propagated through stem cuttings or seed.

Stem cutting or stake method

Gliricidia cuttings are taken from stems of at least one-year-old plants. These should be from brownish-green mature branches and should measure 2–6 cm in diameter and 30–100 cm in



Stem cuttings

length. The stem cutting is normally cut obliquely at both ends, discarding the younger tips and the base is inserted 20–50 cm into the soil. The cuttings should be planted on bunds in the rainy season immediately after these are cut from the stems. The plants grow quickly from cuttings. Propagation from stakes is simple but suitable mainly for situations where only a few trees are to be established. For hedges, cuttings are planted closely at 50 cm spacing. The hedges can be periodically pruned to provide fodder, green manure, firewood, or stakes for new fences.

Seed propagation

Gliricidia seeds are soaked in water for 8–10 h, preferably overnight. The soaked seeds are sown in small polythene bags filled with a mixture of red soil, sand, and farmyard manure (1:1:1) and watered regularly. Generally, 3- to 4-month-old seedlings can be planted on bunds in the rainy season. Seed propagation method is more convenient for establishing a large number of plants.



Seeds: (a) Before soaking; (b) After soaking



Polythene bags containing soil



Sowing seeds in polythene bags

length. The stem cutting is normally cut obliquely at both ends, discarding the younger tips and the base is inserted 20–50 cm into the soil. The cuttings should be planted on bunds in the rainy season immediately after these are cut

Planting

Gliricidia stem cuttings or 3- to 4-month-old seedlings can be planted on bunds at 50 cm spacing during the rainy season. For steep slopes, closer plant spacings of < 20 cm is recommended for better soil erosion control. *Gliricidia* plants from stem cuttings grow faster than those grown from seeds.



Plants grown from seeds in polythene bags

Pruning

One year after planting, harvesting can be started by lopping the plants at 75 cm above the ground. For good management, plants should be pruned at appropriate time. Pruning should be done at



Pruning of stems



Stems pruned at 75 cm above ground

least thrice during the year; i.e., in June (before sowing of the rainy season crop), in November (before sowing of the post-rainy season crop), and in March (before sowing of the summer crop).

Chopping

Gliricidia loppings are cut into small pieces. The chopped material is applied to the soil surface as mulch or incorporated into the soil as green manure.



Chopped loppings



Soil application of chopped material

Benefits of *Gliricidia*

Role in soil management

- Increases organic matter content in the soil.
- Improves soil physical properties.
- Restores and improves the soil fertility.
- Increases crop yields.
- Allows the water to infiltrate into the soil more quickly rather than run off the surface.
- Increases water-holding capacity of the soil.
- Reduces soil erosion.
- Increases nutrient availability in the soil due to production of carbon dioxide and organic acids during decomposition of the plant material.