



**Vetiver
plantation in
coal mine
impacted
soil at
ChamCham**



Soil analysis : Analysis of physico-chemical properties of the soil is mandatory prior to cultivation. This can be done by using Soil Analysis Kit or by performing in laboratory for accuracy of the result.

Propagation : Vetiver can be propagated through slips of 7 - 8 months mature crop. The top of the slips are cut 25 - 30 cm above ground before planting to prune transpiration loss, thus giving a better chance for survival of the slips, the clumps are dugged and splitted into slips. The roots are chopped before planting leaving 4-5 cm length and then planted in pits, 6 - 8 cm deep made with a pointed stick. Immediately after planting it is necessary to tighten up the soil.

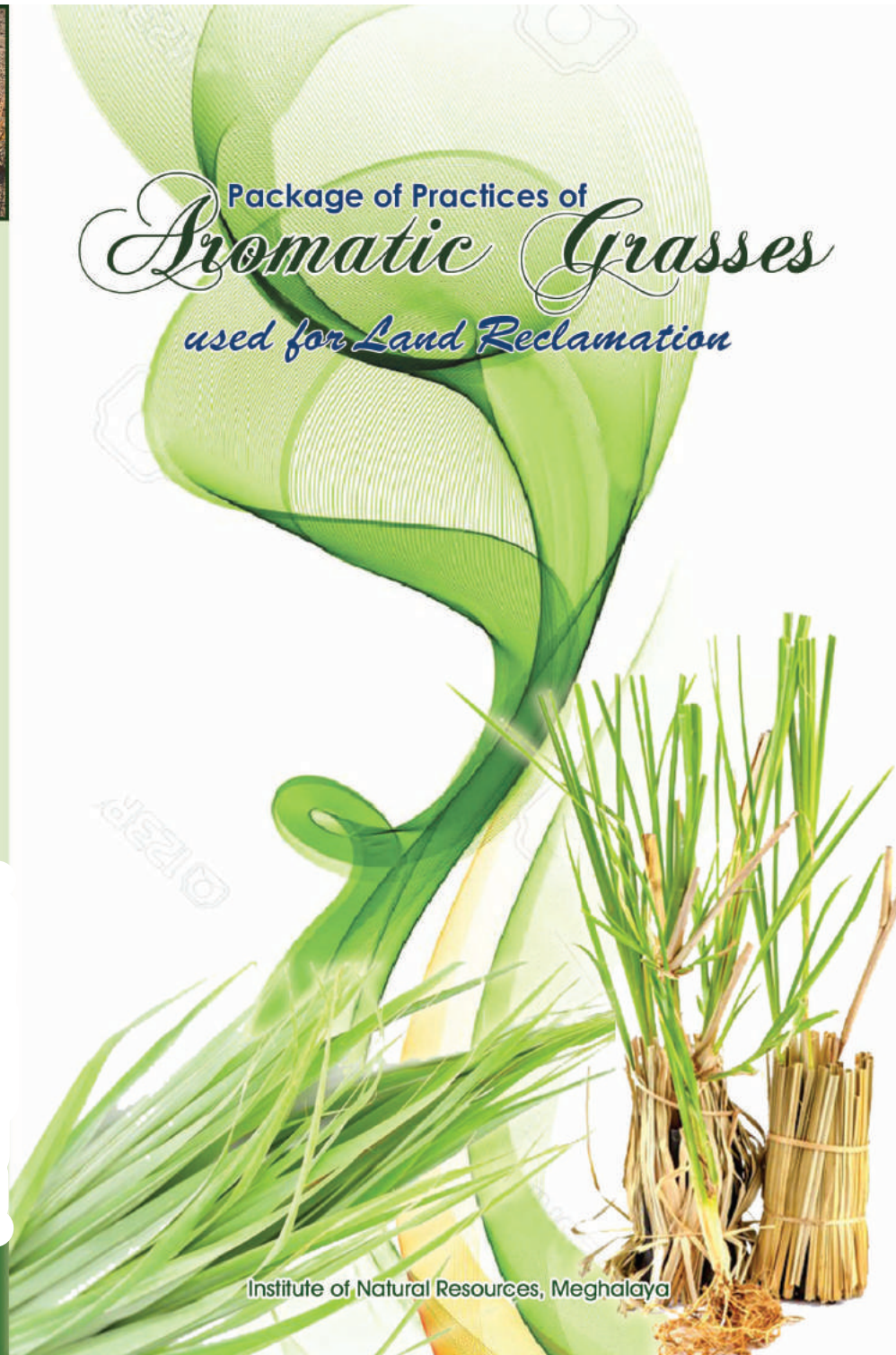
Planting : Slips of vetiver can be planted anytime between February and October but April - June considered most ideal time for planting. For rainfed area 45 cm plant to plant and 60 cm row to row spacing should be maintained. 50000 slips are required to plant on one hectare area.

Mulching and Application of Bio inoculum : Mulching and application of bio inoculum is done immediately after planting. This method helps to retain soil moisture content, augment soil microbial activities and also helps to suppress weeds growth. Bio inoculum can be applied every three months to enhance microbial population.

Weeding : Weeding is required at the initial stage of planting i.e 60-70 days after planting to prevent competition for nutrients and moisture.

Trimming : Trimming of the upper ground biomass is essential as this helps in the vigorous growth of the roots. The trimmed leaves can be used as mulching for retaining soil moisture. Trimming can be done after 4-5 months after first planting and continue after every three to four months.

Package of Practices of *Aromatic Grasses* used for Land Reclamation



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Land degradation is one of the major global issue because of its adverse impact on agronomic productivity, the environment, and its effect on food security and quality of life. Anthropogenic activities like mining, quarrying and deforestation are the main driving factors that directly linked to deterioration of land in many countries. Efforts have been made worldwide to restore degraded land using different conventional method which is mostly costly and caused other environmental problems. One of the most cost effective and eco-friendly methods to reclaim degraded land is by introducing different aromatic grasses such as Lemon grass, Citronella, Palmarosa, Vetiver, etc. Aromatic grasses not also provide sustainable stabilization of highly acidic mine waste soil, but also considered as one of the potential and excellent candidates for phytoextraction and phytostabilization and have more potential than shrubs and trees due to their better adaptability to stress environment and higher biomass production. For instance, Vetiver and Citronella are plants that have high tolerance to heavy metals stress and are used as an alternative method for rehabilitation of iron ore mine - soil. As these crops helps in the process of phyremediation/phytoreclamation of degraded soil, following are the package of practices customised for local condition in Meghalaya.

Citronella

Land preparation : Land should be prepared 3 days prior to cultivation or can be prepared at the time of cultivation. If the land slope is below 20%, the whole plot should be plough and if it is more than 20%, it is advisable to plough only the intended area where the plants are to be planted so as to prevent soil erosion. Ploughing can be done manually or using a power tiller.

Soil analysis : Analysis of physico-chemical properties of the soil is mandatory prior to cultivation. This can be done by using Soil Analysis Kit or by performing in laboratory for accuracy of the result.

Planting : The slips are planted at a spacing of 50x40 or 60x30 cm line to line and plant to plant. One slip can be planted in each pit. However two to three slips planted in each pit enhances the growth rate of the crop. The slips should be taken from healthy, vigorous and young



Citronella plantation in coal mine impacted soil at Narwan

clump and should be planted soon after the clumps have been dug up and the slips have been separated out. If the planting is delayed, the slips may partially dry up resulting in poor plant population. Soil moisture should be maintained till the crop establishes. 66000 slips are required to plant on one hectare area.

Mulching and Application of Bio inoculum : Mulching and application of bio inoculum is done immediately after planting. This method helps to retain soil moisture content, augment soil microbial activities and also helps to suppress weeds growth. Bio inoculum can be applied every three months to enhance microbial population.

Weeding : The Citronella plants are susceptible to weeds competition during the first month after plantation. This problem is more severe in rainy season. The plants should be kept weed free for 60-75 days for good growth.

Trimming : First trimming can be done after 4-5 months after planting and in subsequent second or third year, after 3 months interval. Harvesting is done 6"-8" above the ground level. Trimming is done by sickle and cut at 15 cm above the ground. Cutting close to the ground results into mortality of the plant.

Vetiver

Common Name : Khus, Vetiver (*Vetiveria zizanoides* L, Family : Poaceae).

Climate and Soil : For the purpose of soil reclamation, vetiver can be planted in all types of climate.

Land preparation : Land should be prepared 3 days prior to cultivation or can be prepared at the time of cultivation. If the land slope is below 20%, the whole plot should be plough and if it is more than 20%, it is advisable to plough only the intended area where the plants are to be planted so as to prevent soil erosion. Ploughing can be done manually or using a power tiller.