Erosion control and vegetation restoration

Ilmenite Project Madagascar

Hydromulch (Pty) Ltd has been involved in a major sand fixing, erosion control and slope stabilisation undertaking along newly constructed roads at the Rio Tinto/QMM Ilmenite Project at Fort Dauphin in Madagascar. Wind blown sand was a major issue and a decision was made to use barrier netting and Vetiver Grass hedgerows as erosion control protection on the slopes of the excavated Eholoa dune areas, prior to hydroseeding with local grass species. Rehabilitation activities during the construction phase are part of QMM’s environmental obligation to the Malagasy government.

In conjunction with QMM Environmental, which has been interacting with the local communities in the mining area for a number of years, Hydromulch initiated a Vetiver sourcing and growing programme with members of neighbouring communities.

The mining will take place in an area of coastal plain which is lightly undulated, where the ilmenite deposit is located at three sites, Mandena, Petriky and St Luce, which cover a total of 6 000ha. Ilmenite is used primarily in the paint industry and will be obtained from the processing plant to the harbour were less than 90m in height. The sides of the haul road is 5,5ha in extent, with the cut slope 160m in height and the fill 90m in height. The sides of the haul road, as the lifting of the sand particles decapitated the young plants. The wind snaps poles it is so strong and it has been known to blow for up to 40 continuous days sometimes gusting in excess of 30 knots. The decision was made to use the species Vetiver zizanioides (recently reclassified as Chrysopogon zizanioides) for its abilities in sand fixing, erosion control and slope stabilisation – and to create a sheltered microclimate in the harsh terrain for the establishment of hydrosedeed indigenous grass species and hand-planted pioneering dune species, which will allow natural succession to take place over the course of time,” said Raley Noffke of Hydromulch.

This Vetiver species is well-established in the hilly conditions of Madagascar where it was introduced probably more than a hundred years ago to combat soil erosion. The plant is sterile and non-invasive and remains intact for decades if it is not shaded out by other species. It has strong erect stems which can withstand strong surface water flow. Noffke explains that it rapidly develops a dense micro-fine root capillary system that binds loose soils effectively and can reach as far down into the soil as 2-3m within 12 to 18 months.

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It was estimated that the erosion control and vegetation reinstallation programme as a whole would require about two million Vetiver plants and Hydromulch, in conjunction with QMM Environmental, initiated a Vetiver sourcing and growing programme utilising family groups in neighbouring communities. Nöffke commented that fifteen communities were approached initially during December 2006 and this had expanded to 35 by August 2008. Vetiver plants are abundant in Madagascar and are found growing along the perimeters of fields and rice paddies and in rural pasturelands, where it is reputed that they were originally imported and planted by missionaries and latterly farmers, for erosion control. Nutzke has seen plants with clump sizes that indicate they could be over 60 years old. He commented that another use made of the young Vetiver plants was as grazing for domestic animals - the juvenile plants are palatable. He made the point that no Vetiver plants were imported into the country for the project.

Some of the families involved in the project sourced parent material from their farming locations close to the rehabilitation sites and were paid for the material, while others were given slips of the parent material to grow on in community nurseries of their own making. Hydromulch briefed the villagers on the correct cropping and trimming procedures and demonstrated sustainable harvesting methods - removing material without damaging the parent plant. They were also encouraged to identify and collect viable strong material and often travelled great distances to source suitable material. Potting bags and Vetiver planting material in the form of slips were delivered to the communities that had chosen the propagation route. The growers filled the bags with a suitable growing medium and planted the slips. Open ground nurseries were also encouraged, so that the growers could establish a stock for future demand. Along with the potting bags, the growers received fertiliser sticks, spades, rakes, plastic watering cans and wheelbarrows. The families were paid for the initial planting process, with a second payment being made once the plants were satisfactorily established with well-developed root systems. According to Nöffke, establishment takes between three and six weeks during which time regular watering is needed. The communities selected for the propagation process were close to reliable water sources. Some communities are involved in the post-establishment maintenance of the plants and are being paid accordingly. Once established, the plants were collected by Hydromulch ready for planting out into the harsh roadside environment.

The communities or families in the various villages are subsistence farmers that grow mainly rice, while those on the coast are fishermen. In the Mangaky Village, ‘Andre’s community’ has propagated over 230 000 Vetiver plants to date and, in the same village, the Auguste family has propagated in excess of 250 000 plants. In the Mangarivotra Village, the ‘Antahova Community’ will soon reach their target of 80 000 plants, while Maria Agnes’s family has propagated in excess of 200 000 plants. These are some of the 35 groups involved in this programme, supplying the on-site holding nursery with stock. A total of over two million Vetiver plants has been used for erosion control on the project. The community-based programme has already generated in excess of US$ 150 000 for the respective communities, during the construction phase of the Ilmenite Project.

The local farmers have invested their returns in buildings and stock. Farmer Auguste built a large robust house with the income he received, while Madame Marie Agnes built a secure house for herself and her grandchildren from the income generated through Vetiver propagation. Andre David Mahalogny from the Mangaky district purchased six Zebu cattle with the proceeds of his Vetiver nursery. The money he earned, Farmer Arthur carried out the traditional restoration ceremony at his father’s grave, while Farmer Temon’ey educates his children with the payment received for the 240 000 Vetiver plants grown by his family. ** Article compiled by Carol Knoll. Photographs by Roly Nöffke of Hydromulch

**Community based Vetiver propagation programme**

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