Mini Series: Sequel to "Designing Roots"

Part 4: Future potential

Considering land use of arid and semi-arid areas, it is recommendable that areas with fertile soil and good water availability should be used for producing food that is in short supply. Degraded areas with little topsoil and shrubs are often chosen as candidate areas for tree planting. Generally, there is a lot of such degraded land in arid areas. If we can improve vegetation in these degraded areas, pressure on the existing vegetation that remains can be alleviated. Benefits that can be derived from these lands are then more likely to have the potential to be used sustainably. Therefore, we started thinking about how we could make use of the "roots design" experiences in an effort to develop economical tree planting methods suitable for such degraded land.

In arid regions, vast degraded areas are utilized for goat and sheep grazing dependent on very scanty vegetation. In order to plant trees, one normally cultivates seedlings in nurseries and the seedlings obviously need water. In addition, in the beginning, there need to be protective measures against animals as well as provision for watering. This necessitates procuring wells and wire netting and these considerations prevent tree planting from spreading widely. Therefore, we are experimenting with ways to plant trees in a way that uses the least work and money, without using nurseries, wire netting or wells. We tried providing a minimum of water to seeds for 2-3 weeks to help seedlings settle and root in the ground and used bricks and dry branches to protect them. With this method, it is necessary to manage the roots comprehensively both above and below the ground, making the best use of brief rainy seasons. In practice, we plant seedlings with many lateral roots in the dry season and by feeding water deep underground we nurture and consolidate these deep roots. In this way, seedlings are prepared for effective utilization of rain in the rainy season. It is also important to keep a good balance between leaves and the root system by cutting off some branches and leaves to reduce water loss through transpiration so that the seedlings can survive the dry season without additional watering. The philosophy "designing roots," which started with nursing long-root seedlings, has been nurtured through a system of trial and has provided us with extremely important tips when it comes to planting trees in areas with bad conditions such as degraded lands.

Soil bricks and a seedling

Protecting a seedling with brick fencing

Protecting a seedling from livestock with small withered branches

Once vegetation increases in degraded lands and shows natural self-regeneration we haven't just planted trees. We have "planted water"! Desertification can be considered as a situation where the amount of water that passes and stays underground becomes smaller both in the quantity of circulation between air and land surface, and in length of time of soil retention. It is considered that we can prevent desertification and restore degraded areas by increasing underground water retention and reticulation thereby slowing down the speed of water passing through the natural system. The objective of tree planting in this environment is not to generate income from forest products nor CO_2 absorption. It is for the use of people in their daily lives and making an improvement in the surrounding environment brought about by recovered vegetation. Given this, we believe that it is critical that trees are planted in a way local people can easily do without assistance. We would like to end this mini-series, with the hope that the concept of "designing roots" will be used effectively in areas facing desertification and land degradation, and that we will see an increased vegetation recovery in the future.

Natural regeneration of vegetation