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Succulent plants as land-creator

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On global environment, one of the most important problems is desertification. Deserts and desertifying arid regions account for more than two billion ha., 15 % of the Earth's land surface. The tropical areas have an effect on global warming.

Needless to say, it is important to green these regions for preventing the impoverishment of the soil. To achieve its purpose, it is necessary to use drought-resistant plants. What kind of species grow in the arid regions?

Succulents generally belong to a hardy group of plants and are peculiarly resistant to dryness. Succulent plants, to one degree or another, usually from juicy leaves, stems or roots by developing water-storing tissue. 50 succulent families consist of some 10, 000 species in the world.

Some succulent species form wood in the dry land. In Madagascar dry land, *Alluaudia procera* are the dominant species, which are useful for making houses, under the circumstance in which an annual rainfall is less than 500mm. This succulent can easily grow even from the cuttings of the main branches. The inhabitants use only trunks as wood, but other main branches can not be made into timber. Then many branches can be utilized as the cutting for reforesting the dry land.

The Baobab has strange-shaped thick trunks and is seen in the dry regions or in arid savannas of Africa, Madagascar and Australia. The Baobab looks like a tree, but its wood is a kind of the succulent. The trunks as well as

the branches are soft and spongy. They contain a high percentage of water: 60%. When chewed, they relieve the thirst. Elephants and cattle as well as humans eat them at need.

The bark yields excellent fibers. It is used for making ropes and other woven articles. Young leaves are cooked as a green vegetable. The seeds are also edible and oil can be extracted from them. The white powdery pulp surrounding the seeds is rich in vitamin C and is edible.

There are about ten species of the Baobab, most of which are found in Madagascar. The inhabitants call it BRENALA, which means the mother of the forest. It is the symbol of the dry land.

In Europe, succulent plants consists Sedum and Sempervivum. They are cold-and drought-resistant. But they are not so resistant to the heat nor to the steamy heat.

In Japan, it is so rainy and muggy in June that it is very hard for the European species of Sedum to grow outdoors in summer.

On the other hand, Sedum species from East Asia are resistant to the cold and the drought as well as the steamy heat.

The temperature in summer has greatly changed in large cities of Japan. On the roofs of the buildings in Tokyo, the temperature rises to some 60 degrees. It might be necessary to cover the roofs in order to protect the large cities against the hot waves. Tokyo Metropolitan Office established a guideline for greening the 20% of the new buildings this April. The roofs of multistory-buildings are hard places for the plants to grow, because it is dry and cold in winter, and fiercely hot in summer. Moreover, it is very windy in the season of typhoons. To be successful in greening the roofs

Sedum mexicanum, *S. sarmentosum*, *S. kamtschaticum* and some other *Sedum* species are suitable. *Sedum mexicanum* is especially attractive in May when it comes into full bloom and its light-green ground cover turns into yellow as if it were a carpet.

Among some succulent plants, salt-resistance is important and worthy of notice. In West Australia, disafforestation now causes the extension of the saline areas. Rain flows down to the lowlands and deliquesces the underground salt.

Disphyma clavellatum is a kind of succulent of *Mesembryanthemums*, which grows in sandy places or salty marshes like mats with beautiful flowers. The *Chenopodiaceae* family consist of succulents, such as *Salicornia*, *Maireana*, *Kochia*, *Tecticornia* in saline areas.

Salicornia species are annual and cold-resistant, and easy to grow from the seeds. They contain much mineral similar to that of seawater. Therefore, fresh *Salicornia* is edible as salty salad, which is good for the health.

Some Japanese company sells the powdered *Salicornia* as a health food, a mineral supplement.

Those succulents mentioned above will be helpful to greening the impoverished soil and the heat-islanded cities in the 21st century.

Succulents will be valuable as land-creator.