

Soil

Contribution to the International Year of Soils 2015

No soil no landscapes

International Year of Soils (IYS) 2015 was declared by the 68th United Nations General Assembly. The Food and Agriculture Organisation of the United Nations has been nominated to implement the IYS 2015, within the framework of the Global Soil Partnership and in collaboration with Governments and the secretariat of the United Nations Convention to Combat Desertification. The scientists of the Dubai based International Center for Biosaline Agriculture (ICBA) represent UAE on Global Soil Partnership (GSP) and over the years have contributed to various activities of the GSP. In recognition to the importance of healthy soils for healthy life this article is dedicated to the IYS2015.

The IYS 2015 aims to increase awareness and understanding of the importance of soil for food security and essential ecosystem functions including landscaping

Soil is made up of sand, silt and clay and has many different colours depending upon where you are on world soil globe. The most recognised soil function is the medium for plant growth. Plants and crops are dependent on soil for the supply of water and nutrients, anchorage of plants and as a medium in which to grow. Soil is a fundamental component of our landscape. Healthy and aesthetically looking good landscapes underpin soil properties on which these landscapes are established. Therefore it is essential to have healthy soils under the landscapes to ensure sustainable use and development of any landscape. Maintenance of landscapes to have environmental services and to provide clean and healthy environment to the residents is a real challenge, as many landscapes are threatened to biotic and abiotic factors like salinity, erosion, hot environment, contamination etc.

The planet earth is shrinking for soil services
Due to increasing population growth, unsustainable land uses, desertification, urbanisation and biofuel production the arable lands are shrinking and land specifically available to us per capita is continually dropping. Currently, each human being has only 0.22 hectare to his or her disposal; in 1960, that figure was 0.5 hectare. In addition 24 billion tons of fertile soil is lost due to erosion, that is 3.4 tons per person per year, costing 70US\$ per inhabitant, worldwide costing 419 billion dollars which is an astronomical amount. With business as usual by 2050 human will require two earth planets, this is very alarming situation to continue feeding current (7.3 billion) and two billion extra people by 2050.

Healthy soils are essential for healthy life, however soils are shrinking for food and ecosystem services

Why landscapes are essential in urban development?

To compensate the pressure of growing population urban development is essential and consequently the cities are growing rapidly and new ones are developed too. For example in Europe an area as large as city of Berlin is transformed to urban area every year. In these areas biodiversity is lost as well as loss of rare native plants, the soils become sealed where nothing can grow, overtime increase green house gasses and no carbon sequestration. In addition globally every year 13 million hectares of forests are cut down. Such losses can only be compensated when urban development projects include urban landscaping entities where the lost biodiversity can be compensated. Such urban landscaping provides many services to the

residents and also cleans the environment through climate change mitigation.

Healthy landscapes can cut green house gasses and increase carbon sequestration.
Soils stores more than 4000 billion tons of carbon, the forests stores 360 billion tons of carbon as woody mass, and atmosphere more than 800 billion tons in the form of carbon dioxide. This can be explained by the fact that if urban development do not include healthy landscaping the soils originally sequestering carbon are now set carbon free, and hence such activities are not environmentally friendly, the necessary result is an aggravation of climate change (rise in green house gasses and atmospheric temperature). In order to achieve this important service from urban landscaping, these landscaping must be set up on healthy soils and the soil quality is maintained throughout and monitored to assure they are providing healthy eco-services.

Healthy soils are pre-requisite for healthy urban landscaping, UAE perspectives.

Let us be first agreeing on the fact that without soil landscaping cannot be established, if this is true then we have no doubt in phrasing out.

If this phrase is widely accepted, then we have to assure that these landscapes are established on healthy soils, using less water, these are cost effective, sustainable and providing services for healthy life

No soil no landscapes

In the UAE, red sandy soils are used as base material for urban landscaping. Sandy soils are plagued with very low water and nutrient holding capacities, which results in frequent irrigation and nutrient application, high leaching, nutrient losses and groundwater pollution. Furthermore, in the UAE the high temperatures combined with infrequent and scanty rainfall calls for new ways to conserve water, improve soil properties and prevent



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40 CM	44 CM	4 KG	Yes	2 x 10 watt	No
60 CM	66 CM	10 KG	Yes	2 x 11 watt	Yes
90 CM	99 CM	24 KG	Yes	2 x 18 watt	Yes
100 CM	110 CM	28 KG	Yes	2 x 23 watt	Yes

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Soil

nutrient loss. One of the best ways towards improving landscaping services is to focus on improving soil health through innovative ways such as but not necessarily limited to “climate smart technologies”. Thus it is imperative to improve properties of sandy soils in terms of moisture and nutrient retention, leading to efficient use of water resources and preventing ground water pollution. Such an improvement is only possible when the sandy soils are amended with inorganic and organic materials to improve soil quality for plant growth and water saving. At ICBA we have proved through green house and field trials that the addition of suitable quantities of organic (compost, biochar) and inorganic (zeolite based) amendments, soil qualities can be improved leading to significant water saving and reducing maintenance costs.

Urban landscaping to offer educational services

The landscape developers must take special care to ensure that the urban landscapes also serve as a place where the visitors especially “the youth” are able to learn the values of plants, especially when clusters of native plants from different habitats are included. Other educational entities could be the addition of aflaj system (old way of water transportation), plants growing in different ways (open field and greenhouse hydroponics, soil less, aeroponics etc), demonstration of modern irrigation systems (surface and sub-surface drip, sprinkler, bubbler etc) for efficient use of water resources, boulders from different mountains of UAE and creation of seven circle of different colour sands as UAE heritage.

ICBA educates youth through exterior and interior educational exhibits

The exterior exhibits are displayed in the educational landscape design including different types of plants (shrubs, trees, grasses etc), an Aflaj system, hues of UAE portray naturally different sand colours depending upon their unique composition. This can be seen in the seven sands colour concept that these are being a colour code for each emirate as shown on a souvenir frame which usually tourists look for in the UAE. The storyline of the exterior exhibits is above ground.

Internationally there is growing movement calling for increased awareness about the importance of soils and the critical role they play in securing food and providing ecosystem services

The interior exhibits are showcased in the unique soil museum at ICBA. The storyline for the museum is underground that is the way how we plan to educate the youth. Soil



One of the seven sand circles showing red sand – exterior exhibit at educational landscape at ICBA



Interior exhibit at soil museum displaying soil monoliths



Interior exhibit showing diversity of soil features

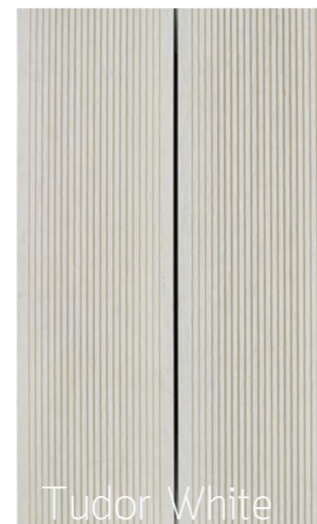
museum presents diversity of interior exhibits such as, soil investigation equipment exhibit provide hands-on knowledge about essential soil investigation tools and equipment (manual as well as digital) used for on-site soil investigation including auguring, cutting, sampling and testing, sand dune simulator, water infiltration simulation, soil monoliths of key soils from UAE in their near original environment. The interior exhibits cover different themes (soil and climate change, soil and desertification, soil and agriculture, soil and food security, soil and environment etc). The museum is currently under redesigning for official launching at the occasion of celebration of the International Year of Soils 2015 in the last quarter of this year.

COMPOSITE DECKING Sovereign Range

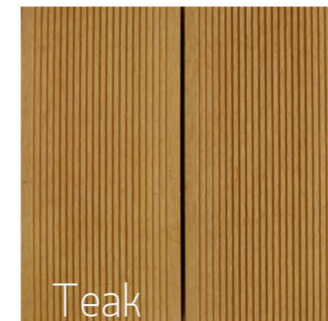


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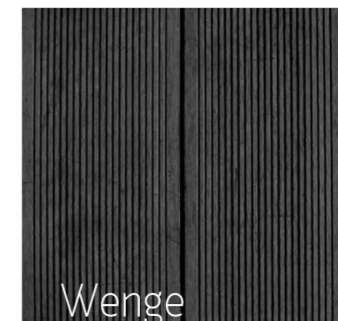
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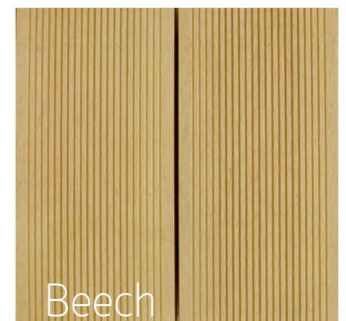
Tudor White



Teak



Wenge



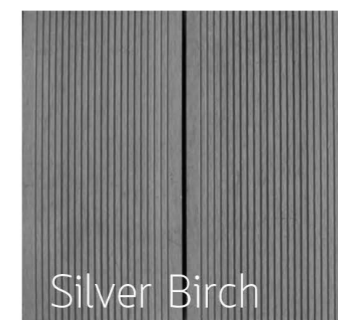
Beech



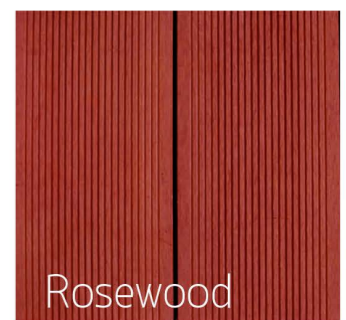
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