

JANUARY - MARCH 2016

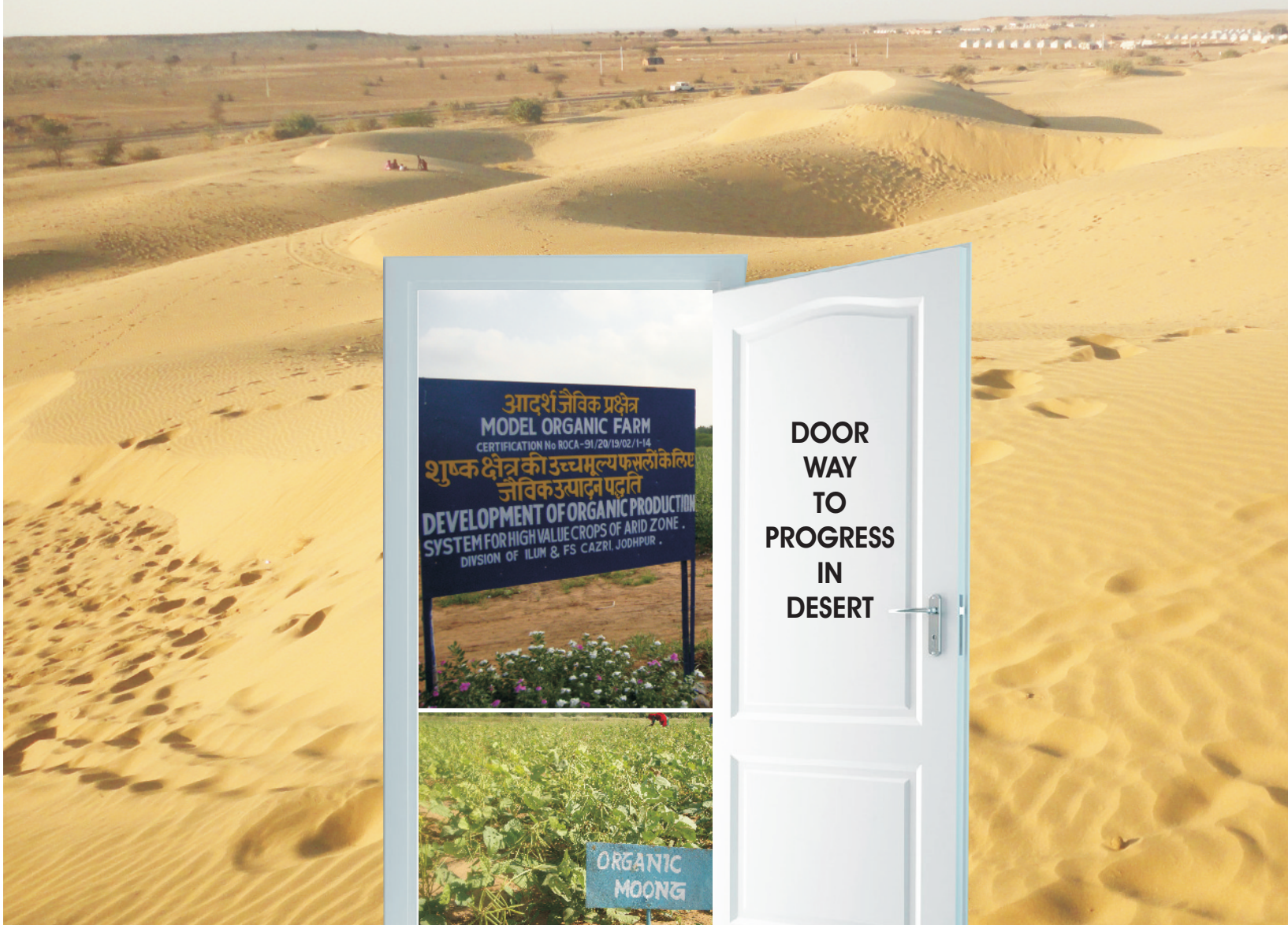
Volume 18 (1)

# DESERT ENVIRONMENT NEWSLETTER

ENVIS Centre on Combating Desertification  
ICAR-CAZRI

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# Know Your Desert

## Desert Plant Diversity: Life under your feet (Biological Soil Crusts)

In arid and semi-arid regions throughout the world, vegetation cover is often sparse and only open spaces below canopy are usually covered by highly specialized community of cyanobacteria, mosses, and lichens termed as Biological soil crusts (BSCs).

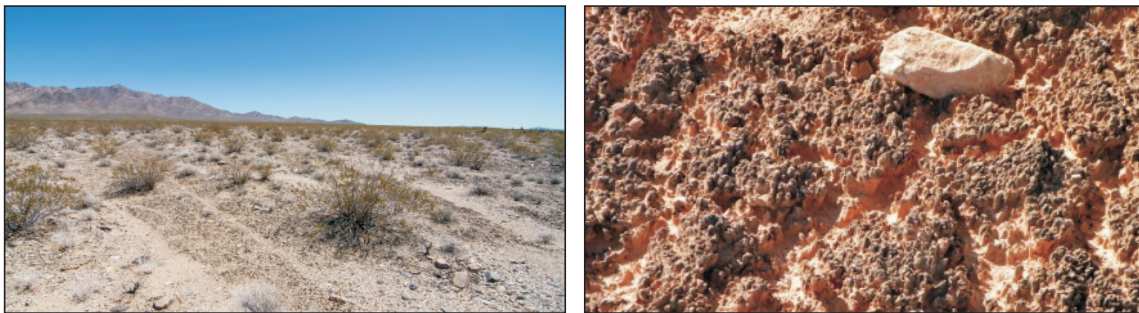
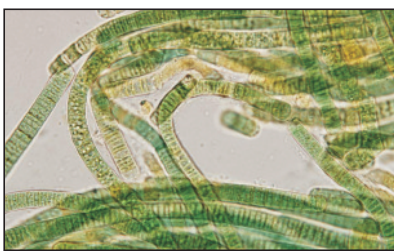


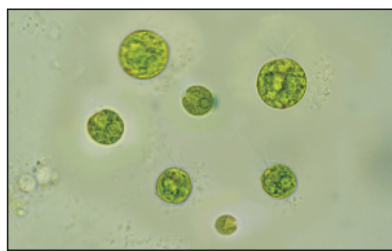
Figure 1: (a) Biological Soil Crust-A View

(b) A Closer Look towards BSCs

Crusts are predominantly composed of cyanobacteria (formerly called blue-green algae), green and brown algae, mosses and lichens. Liverworts, fungi and bacteria are also present. In hot deserts, such as the Sonoran and others, the cyanobacteria are more common. Some more acidic soils are dominated by green algae. Shifts between green algal and cyanobacterial dominance have been attributed to changes in pH, with the decreasing alkalinity favoring green algae. More stable crusts are dominated by lichens and/or mosses. The organism that dominates the crust is partly determined by microclimate and may also represent different successional stages in crust development (Fig. 1a & 1b). The various morphological groups for biological soil crust components with examples of common taxa or groups are depicted below (Fig. 2). Indian part of Thar Desert also has presence of BSCs.



Cyanobacteria (*Microcoleus vaginatus*)



Coccoids algae



Short moss (*Bryum* spp.)



Short moss (*Bryum* spp.)



*Ceratodon purpureus*



Tall moss (*Tortula ruralis*)

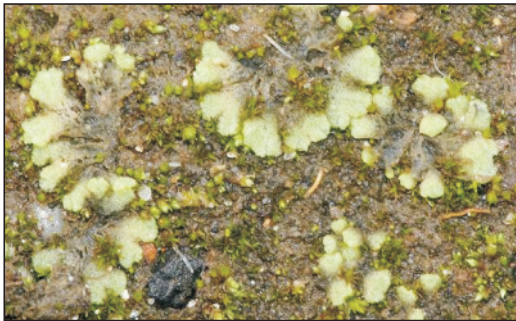
Liverwort (*Riccia* spp.)Crustose lichens (*Lecanora muralis*)Gelatinous lichens (*Collema cocophorum*)Squamulose lichen (*Psora decipiens*)Foliose lichen (*Peltigera occidentalis*)Fruticose lichen (*Aspicilia hispida*)

Fig. 2 Different Biological Soil Crust Components

### Roles in ecosystem functions

Crusts play an important role in the environment. Because they are concentrated in the top 1 to 4 mm of soil, they primarily affect processes that occur at soil-air interface. These include soil stability and erosion, atmospheric nitrogen-fixation, nutrient contributions to plants, soil-plant-water relations, infiltration, seedling germination and plant growth.

### Envisaging researches on BSCs in Indian Desert

Understanding the species composition and general distribution of soil crusts in different habitats is of utmost importance in their role in carbon fixation in order to quantify their ecosystem services. Concerted and coordinated efforts among different scientific sub-disciplines will hopefully show the way forward.

Dipankar Saha and C. B. Pandey

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## ENVIS CAZRI Website

**ENVIS Centre on Combating Desertification**  
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**Statistical Database**

- Land Utilization
- Rainfall Distribution
- Livestock
- Minerals

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The main object of the Institute Central Arid Zone Research Institute (CAZRI).....[More >>](#)

**Combating Desertification:**

- The role of the UN Convention to Combat Desertification
- Programmes on Combating Desertification

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**Events**

- In Focus
- Recent Events
- ENVIS CAZRI Events
- Event Calander 2015-16

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**Knowledge Product**

- Presentation on Water Management in Arid Regions
- Combating Desertification and Land Degradation

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**Technologies**

- CAZRI Technologies
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- Other Technologies

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- DEN Newsletter
- DEN Abstracts
- New Den Abstracts

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**Query Response**

- Query Response

**Activities & Reports**

- ENVIS CAZRI Celebrated World Day to Combat Desertification 17<sup>th</sup> June 2016
- Report World Environment Day 4<sup>th</sup> June 2016
- ENVIS CAZRI Celebrating ..

**News**

- NEWS

**Recent Articles**

- Article on Bael to make society-economically empowered
- THAR MADHU: a new Madhu variety
- Thar NeelKanth: A new bael Variety

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### Following Statistical Databases of Rajasthan (Arid Zone) can be accessed in CAZRI-ENVIS Website

- Crops- Area, Production and Productivity
- Rainfall Distribution
- Human Population - Rural, Urban
- Livestock - Cattle, Buffalo, Sheep, Goat, Camel, Poultry
- Working Human Population
- Density of Human Population
- Sex Ratio
- Irrigation by Canal, Tank, Wells, Tubewells
- Agricultural Equipments - Animal Cart, Electrical Pump set, Oil Engine Pump Set, Plough, Tractor
- Fertilizer Consumption
- Landuse Pattern - Forest, Barren and Uncultivated land, Cultivated waste land, Current Fallow, Net Area Sown, Non Agriculture Use, Old Fallow, Pasture and Grazing, Trees and Groves
- Electricity Consumption - Industrial, Commercial, Domestic and Residential Uses
- Temperature
- Humidity
- Mineral Production

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