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ICAR-CAZRI

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From the desk of chairman

Dear Readers,

The excessive amount of salts in soil adversely affects growth and development of plants. Soil salinity/alkalinity is a major form of land degradation throughout the world, particularly in arid and semi-arid regions. In India 6.73 million hectares of lands are salt-affected and efficient utilization and management of these lands are key for sustainable agricultural production. A variety of techniques, i.e., physical, chemical and biological have been developed for reclamation of salt-affected soils. However, chemical and mechanical remediations are very costly. Utilizing the halophytes (plant having higher salt tolerance), and salt tolerant landraces of commercial crops are also viable alternatives for sustainable utilization of salt-affected lands. The present issue focuses on the management of salt-affected soils of hot arid regions covering saline depressions (Playa lakes in western Rajasthan), amelioration techniques of sodic soil, economic significances of halophytes (halophytic plant of Kachchh region as source of fodder), commercial products of halophytic origin (Saji- a key ingredient for making papad) , suitable landraces of wheat (Karchia wheat) for salt-affected environment, along with first-hand information of the scientific institute (ICAR-CSSRI, RRS, Bharuch) devoted for management of salt-affected soil and water. I hope this issue will benefit all those personnel and organization sharing a stake in research and development of salt affected lands in arid and semi-arid regions.

(O.P. Yadav)

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Know Your Desert

Playa Lakes in Western Rajasthan

Playa lakes or saline depressions or ranns are an important geomorphic features of the world's arid regions. In the Thar Desert of India or western part of Rajasthan, these features occur in 565 sq km area out of which about 66% playa area lies within the desert districts of Barmer, Jaisalmer, Bikaner, Jodhpur and Churu. In this region, "inland ranns or saline depressions" are very often referred as Playa lakes. Topographically, these are low lands that get inundated and turn into ephemeral water body during rains but gradually desiccate during dry seasons forming thick layers of salt encrustation. Several studies have described them as essentially the dry lake remnant of a former base level of erosion which may be presently active. However, studies do not indicate any marine connection to their origin. This suggests that aridity may be one of the important factors for the evolution of such landforms. In western Rajasthan, playas occur under two situations; (1) large number of smaller saline depressions which generally occur within a dune system or amidst sandy terrain (Sambhar, Didwana, Tal Chhapar, Pachpadra, Thob, Bap and Lunkaransar) and (2) within a rocky terrain (Pohar-Hadda-Deuga-Kanod-Mohangarh in Jaisalmer and also the Mitha Rann, Kanodwala Rann and Khararíwala Rann) in their vicinity. In most of the situations, as can be viewed through satellite FCCs, there is a NE-SW trend of their longer axis except at Sambhar lake where it is E-W oriented. Micro-topographical observations show occurrence of centripetal drainage pattern of ephemeral type surrounding the saline depression. The smaller playas are commonly formed due to deflation of sand bodies. Other mechanisms like salt accumulation at the confluence of buried former streams, wind scouring of limestone surfaces by sand grains, subsequent formation of deflation basins (as evidenced in Jaisalmer district), and water and salt accumulation in tectonically disturbed valleys as well as tectonic causes have also been identified as the causes of Rann formation in the Thar Desert. One of the best examples of the model depicting process of segmentation of palaeo-channels and formation of inland lakes (Fig 1. a-d) can be seen in Mohangarh-Lanela-Kanaud sector in Jaisalmer and at Pachpadra salt basins in Barmer where one can view presence of several such lakes along the buried river courses in this region.

In total, 15 to 20 intermittently dry and wet saline lakes varying from a few tens of m^2 to a few thousands of km^2 have developed under both situations. Most of these saline lakes are filled up with sediments and are only ephemeral at present. The Sambhar is the largest playa in Thar Desert, followed by that at Bap and Pachpadra. These playas display a wide range of variability in morphology, hydrology and sedimentology and have received enormous attention due to their significance as indicators of climate change and Palaeo-hydrological reconstruction. Studies have found alternate

Fig. 1 a. Location : Hadda, Jaisalmer, Google earth image, February 2011 Water in the playa and centripetal drainage

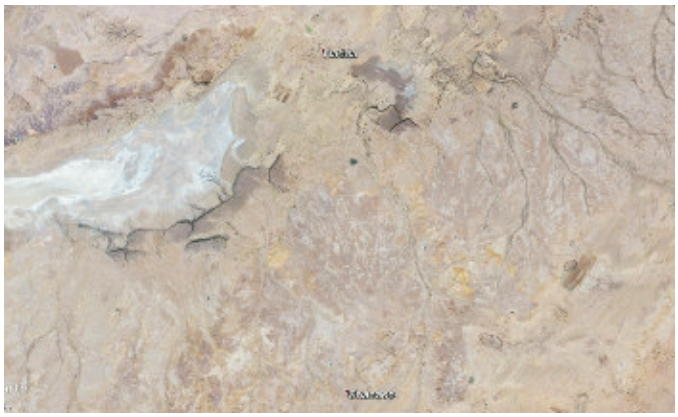

Fig.1 b. Location : Hadda, Jaisalmer, Google earth image, November 2012 Dry playa and salt encrustation

Fig. 1 c. Deuga-Mohangarh playa
Saline surface as viewed on the satellite images
(IRS-L4, MX) , May 2012

Fig. 1 d. Playa surface at Pokaran, Jaisalmer

layers of silt-clay and sand dominated layers, as well as by gypsum-rich layers in the rann surface. Playa surfaces also undergo changes which are mainly short term characters mainly associated with seasonal and annual variations in the availability of surface and sub-surface water. These changes are evident from satellite images of different seasons. Other factors, like redistribution of water, salt efflorescence, sediment flow or accumulation, changes in vegetation cover, aeolian activity and the fluvial process are also instrumental in the change in playa character. Playas are economically important as salts, chemicals and mined from the salt pans at Sambhar, Nawa, Kuchaman, Didwana and Tal Chhapar in Nagaur district; Bap, Kaparda and Dedia in Jodhpur district; Pachpadra, Thob and Samooja in Barmer district and Lunkaransar in Bikaner district.

P. C. Moharana
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Know Your Desert Plants

Urochondra setulosa

The genus *Urochondra* (Family: Poaceae) having only one known species *Urochondra setulosa* (Trin) C.E. Hubbard, is one of the important true halophytic species known to survive in high salinity (Fig. 2). It grows on coastal sand dunes, banks of salt-water creeks marshes and saline flats. The plant is native of northeastern Africa and southwestern Asia (Saudia Arabia, Oman, Yaman), northwestern India and Pakistan. The plant is a tufted, pubescent short rhizomatous erect perennial grass with 15-90 cm height. Leaf-blades are 6.0-17.5 x 0.5-0.8 cm, covulete, acute; sheaths 7-9 cm long terete. The leaf-blade has ribbed surface with pungent apex. Inflorescence is a dense, cylindrical panicle 9.5-0.5 cm straw coloured. spikelets are homomorphic and solitary. Generally it grows in pure stands, however, it can be found in communities associated with other halophytic species like *Cressa cretica*, *Suaeda fruticosa*, *S. nudiflora*.

As the salinity and temperature are two important parameters of the salt marsh and salt desert environment, they significantly affect halophyte seed germination. Researchers reported that seeds of some halophytes retain their ability to germinate even after long exposure to hypersaline conditions. However, some reports suggests that salinity, temperature and their interaction significantly ($P<0.05$) affected the germination of *Urochondra setulosa* seeds and the

Fig. 2. *Urochondra setulosa*

seed germination decreased with an increase in salinity and reported to be maximal at 20-30°C temperature regime, while both the highest and lowest temperatures inhibited germination. Maximum inhibition of germination is reported at the lower temperature regime (10-20°C).

U. setulosa has characteristic features like leaf and culm with salt deposition at maturity. In Kachchh region of Gujarat, it is grazed by livestock which indicate its suitability as forage in saline areas. This species require much attention due to its high degree of salt tolerance and potential as a forage species in extreme saline soils. It can also be utilized in sand dune stabilization in coastal regions.

J.P. Singh and Dipankar Saha
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Technological options

Halophytes in Ranns of Kachchh: Adaptation strategies under extreme salinity and its implications on fodder availability

Kachchh, the second largest district of the country has more than 53% of the total geographical area under Ranns (saline marshy lands). The soil salinity in this regions ranges from 3.2 to 32 dS/m, and sodicity from 8.0 to 10.0. Animal husbandry is the major source of livelihood for the local inhabitants. Due to peculiarities of ecological settings and huge population of livestock, the region remained fodder deficient. Heavy grazing pressure degrades the plant resource diversity of the region. Apart from inherent salinity, a significant portion of recently cultivated agricultural land has also become saline. High salinity induces both ionic and osmotic stresses, which cause mortality to plants. The salinity and salts hinder germination, retards initial growth, and results in poor yield or crop failure. Halophytes are plants that are able to survive in extremely saline environment through various mechanisms that include ion compartmentalisation, salt exclusion, production of metabolites etc. These halophytes have great potential to be used as fodder resources, source of oils and source of salt tolerant genes for agricultural crops.

The major halophyte species identified at Ranns of Kachchh were *Suaeda nudiflora*, *Aeluropus lagopoides*, *Urochondra setulosa*, (Fig. 3) *Cressa cretica*, *Cyperus* spp., *Tamarix troupii* (syn *T. gallica*), *Salvadora persica*, *Salvadora oleoides* and *Prosopis juliflora*. Studies were conducted to identify morphological and anatomical features of halophytes under salinity. As salinity increased, trichomes developed in *Cressa cretica*, number of pointed trichomes increased in *U. setulosa*; thickened epidermis observed in *A. lagopoides* and *U. setulosa*, and stomatal density increased in *S. nudiflora*.

Dicot species had highest Na^+/K^+ ratio compared to monocots. In *C. cretica*, higher Na^+/K^+ ratio was noticed in leaves followed by shoots and roots, indicating accumulation of sodium in preference to potassium in the leaves compared to roots. These plants also respond to salinity by manipulating anti-oxidants and osmolytes. The osmoprotectant glycine betaine linearly increased in *U. setulosa* with increase in salinity (0.0127 to 0.2755 mg/g). In *A. lagopoides* the content of superoxide dismutase (SOD) linearly increased with salinity (0.3715 to 0.8408 mg/g).

The studies on nutritional quality of halophytes revealed wide variation in proximate composition in different halophyte species. The forage quality was the highest at vegetative stage, and decreases as plants mature. The organic matter (OM) content of halophytes ranged from 58.4% (*Suaeda nudiflora*) to 90.4% (*Sporobolus marginatus*). The crude protein

Fig. 3 Halophyte Species: *Aeluropus lagopoides, Suaeda nudiflora Urochondra setulosa, Sporobolus marginatus*

content of halophytes ranged from 4.7% (*S. marginatus*) to 19.2 % (*S. nudiflora*). Occurrence of moderate to high amounts of crude protein, seems fair enough to meet the protein requirements of grazing livestock. The halophyte forages contained high levels of ash and silica contents also, which could limit intake and digestibility of halophytes as forages. The Na and P contents in most of the halophyte forages are more than the recommended dietary level for cattle. Among the halophytes, *Cressa cretica*, *Suaeda nudiflora*, *Salvadora* and *Salicornia* species could be potential source of crude protein and minerals for livestock fed on low quality roughages. However, energy supplements are necessary to compensate the nutrient requirements of livestock.

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Amelioration and Management of Light Textured Sodic Soils in Western Rajasthan

Globally 100 million hectare soils are affected with salts of which 50 per cent are considered under saline-sodic category. Soil degradation caused by salinization and sodification is of great concern in the modern world because it reduces potential productivity of agricultural lands. In general occurrence of soil sodicity is a common feature of arid and semi-arid regions. The contributing factors for the formation of such soils in these regions include high evaporation, low and uneven rainfall, undulated topography, presence of salt layer at shallow depth in the soil and poor quality ground water rich in carbonates and bicarbonates, which is an important source of irrigation. The area under salt-affected soils in India is estimated to be 6.73 mha spread over a number of states across different climatic regions. The projections indicate that the affected area likely to increase due to secondary salinization in irrigation commands, use of poor quality ground waters for irrigation in arid and semi arid regions, sea water intrusion and country will have 13.0 million hectare area affected by salinity and alkalinity by 2025.

Fig. 4 a. Wheat in control field (without gypsum)

Fig. 4 b. Wheat in gypsum treated field (50% of soil GR)

Large-scale drive for modernization of agriculture since the 1970s has expanded irrigation facilities far and wide, especially through the Indira Gandhi Canal and other canal systems in the northern and western parts of Rajasthan, but also through energized wells that has spread gradually from the eastern margin along the Aravalli Ranges to the central and western parts of the state. Presently, 40.7% of the total irrigated area is served through groundwater wells, but about 68 and 16% of groundwater of the region is of poor and marginal respectively in quality and only16 % of groundwater is of good quality. These ground waters contain high (up to 20 me/l) residual sodium carbonate (RSC), as well as salinity (occasionally up to 14 dS/m). According to one study soils irrigated with water containing RSC >2.5 me/l can cause sodicity problem in the soils but studies in arid western Rajasthan have suggested that water containing RSC up to 5 me/l can be used for irrigation without any adverse effect on soils and crops. Continuous irrigation with high RSC water has gradually turned some areas more saline and sodic, and therefore, more problematic and degraded. Consequently, such soils have also developed other problems like increase in soil pH, hardness in the soil surface, hindrance in water infiltration and low nutrient uptake by plants, leading to a fall in crop productivity from such lands impacting the socio-economic status of the stakeholders.

To offset the deteriorating effect of high RSC water on soils, gypsum is commonly recommended as a soil amendment. Central Arid Zone Research Institute (CAZRI) has developed/ modified technologies to reclaim such type of degraded soils of arid and semi-arid regions of India, especially through the use of gypsum ($CaSO_4$, $2H_2O$) (Fig 4 a, b). The Institute has regularly demonstrated the technology through various programmes in their hinterlands, and has transferred the technology to the State for wider dissemination in the affected areas and to create awareness among the farmers.

Changes in soil parameters

The physico-chemical analysis of the soils indicated high pH (9.3-9.8) in all the farm fields, high sodium absorption ratio (SAR), as also the dominance of sodium among the cations and carbonates and bicarbonates among the anions. The ameliorative effect of gypsum treatments on soils was measured in terms of decreased pH and SAR values and increased crop yield. Soil pH in gypsum-treated plots was found to have decreased by 0.3 to 1.0 unit at the surface (0-15 cm). The SAR values decreased with the levels of gypsum application. Gypsum application @100% of soil gypsum requirement (GR) on an average reduced the SAR by 10.8. Decrease in SAR was also observed in lower depths but at lower magnitude (8.3). Gypsum application @50 % of soil GR decreased the soil SAR values by (8.8). The availability of P, Fe and Zn increased significantly with application of graded levels of gypsum. With application of gypsum at 100 % GR, P, Fe and Zn availability was increased by 25.91, 32.72 and 38.46 % respectively. Application of gypsum at 50 % GR stood second in this regard and increased the availability of P, Fe and Zn by 21.14, 21.77 and 27.41 % respectively in the rhizosphere. Though, application of gypsum at 50 % GR recorded significantly higher values of P, Fe and Zn, it remained statistically inferior to gypsum applied at 100 % GR for all the three nutrients.

Improvement in Crop Yield

Application of gypsum increased the wheat yield at all the farms. Gypsum-treated plots (G3; 100% GR of soil and G2; 50% GR of soil) recorded higher plant population per unit area and yield attributes in terms of tillers/plant, ear length, etc., than the control at all farms, and increased the grain yield by 600-1700 kg/ha with G3 and 400-1600 with G2 (Fig. 4 a & b). Reduced pH, increases nutrient availability and yield attributes contributed to increased grain yield. However, the difference in grain yield between G3 and G2 was statistically at par. The benefit cost ratio (B:C ratio) varied from 1.5:1 to 2.9:1 in G3 and 1.8:1 to 3.5:1 in G2.

Mahesh Kumar
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Know Your Institutions

ICAR-CSSRI, RRS, Bharuch (Gujarat)

The ICAR-Central Soil Salinity Research Institute, Karnal established its Regional Research Station in the year 1989 (then at Anand, Gujarat) to conduct research on reclamation and management of salt affected Vertisols and associated soils and use of poor quality waters in agriculture. The Station has fully functional laboratories for soil, water and plant analyses and a research farm for conducting field trials. The Station has been working on evolving technologies for addressing the issues pertaining to management of salinity of soils and ground waters and also using industrial wastes in agriculture.

Mandate

1. To undertake basic and applied research on-
   - Survey and characterization of salt affected Vertisols and associated soils and poor quality waters;
   - Generating cost-effective technologies for the management of salt affected Vertisols;
   - Evolving strategies for efficient use of salty waters for crop production;
2. To impart training to the farmers and other user-agencies; and
3. To provide consultancy in the management of salt affected Vertisols.

Current Thrust Areas

- Identification and characterization of salt affected Vertisols and associated soils and their management
- Use of marginal quality waters/industrial wastes for crop production
- Evaluation of arable crops for tolerance to salt stress;
- Drainage in salt affected Vertisols
- Maximization of farm productivity using INM and cropping system
- Technology dissemination.

Major Achievements

Soil-site suitability classification for different crops on salt affected black soils has been done and identified the constraints/parameters limiting optimum crop production.

Secondary salinisation in canal command and management: Salts accumulated in surface layer when saline tube well water was used for irrigation to cotton crop on saline Vertisols created secondary salinisation (Fig. 5). To avoid further degradation of the soil resources i.e. sodification due to irrigation with canal water having low salt concentration on these saline Vertisols, suitable water and crop management practices like conjunctive use of saline water with canal water, cultivation of low water requiring crops, use of pressurized irrigation system are suggested.

Developed farming system model for enhancing farm productivity: Low water requiring crops like papaya, dill and coriander along with vegetables viz., bottle gourd, tomato and brinjal because of their higher water productivity and B/C ratio are found ideal for the saline Vertisols of Bara tract.

Developed groundwater recharging structure design: Fifteen artificial rainwater recharge wells at farmers' fields in Bharuch and Narmada districts of Gujarat have been installed. Groundwater recharge has helped in rise of water-table at all the locations and water quality improved i.e., decrease in salinity..

Developed package of practices for cultivation of *Salvadora persica*: Highly saline black soils (with salinity greater than 55 dS m-1) which are not suitable for arable farming can be brought under cultivation with economically important and salt tolerant plant species like *S. persica*, which is a good source of non-edible seed oil having immense applications in soap and detergent industry. Technology for raising *Salvadora persica* saplings using saline water of EC about 15 dS m^{-1} and also package of practices for field planting has been developed.

Package of practices for cultivation of Dill (*Anethum graveolens*) on saline black soils has been developed. Dill is locally known as Suwa, was found an ideal species for cultivation on saline black soils having salinity up to 5 dS m-1, in rabi season after kharif paddy (Fig. 6).

Fig. 5. Field view of cotton

Package of practices for cultivation of forage grasses: Cultivation of salt tolerant grasses like *Dichanthium annulatum* and *Leptochloa fusca* on moderate saline soils resulted in dry matter yield of 1.9 tha^{-1} and 3.2 tha^{-1}, respectively. Halophytic forage grasses, viz., *Aeluropus lagopoides* and *Eragrostis* spp. have also been found ideal for saline agriculture on saline black soils. Of these two, *A. lagopoides* was found to possess better forage qualities and salt removal ability from the soils.

Salt tolerance in arable crop: Desi cotton line (G Cot 23-a variety from GAU) as salt tolerant and high yielding even at 11.2 dS/m salinity and identified as salt tolerant desi cotton variety and on-farm trials recorded yield of 1.8 to 1.9 t ha^{-1}. (Success Story-ICAR website, 2015). Salt tolerance in maize crop studied and DKC-8101 (7742 kg/ha) emerged as the best hybrid under saline water irrigation (ECiw 3-3.5 dS/m) while SS-7077 (7264 kg/ha) ranked second. In case of wheat, genotype KRL 370 was found salt tolerant with 3.88 t/ ha grain yield at ECe of 8.5 dS/m soil salinity under saline water irrigation (ECiw 9-11 dS/m).

Fig. 6. Field view of Dill crop

Saline water irrigation to guava: It is recommended that saline water of 4 dS/m salinity to guava plantation along with 25% pruning and fertilizer application (750g: 250g: 250g NPK/tree/year + 50kg FYM/tree/year) is suitable to get better yield without affecting the soil properties.

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Knowledge Corner

Saji: An Economic Plant Product from Halophytic Chenopode Shrubs

Saji (also known as Barilla) is the soda ash obtained by burning of air-dried foliage materials of halophytic chenopd shrubs. The *Saji* is an essential ingredient of Papad, and contributes to organoleptic quality in terms of crispness and expansion of fried papad. *Saji* is incorporated into papad dough. Since ancient time, the halophytic chenopod shrubs *Haloxylon*, *Salsola* and *Sueada* have been used for making *Saji* in north-western Rajasthan. The Anupgarh, Vijaynagar and Suratgarh tehsils are major *Saji* producing centers in Rajasthan. The local *Banwaria* community has expertise of making *Saji*. The *Saji* produced from Khara Lana (*Haloxylon recurvum*) is of the best quality, whereas *Saji* produced from Pichki Lana or Luni (*Suaeda fruticosa*) is of medium quality and that produced from Lani (*Salsola baryosma*) is of inferior quality.

For preparing *Saji*, the plants are harvested after fruiting stage during December. The harvested material is stacked in circular heaps in the field. About one month after stacking, the harvested materials become semi-dried which become suitable for preparing *Saji*. The semi-dried material is burnt in *Bhatti* (circular pit made in the ground). The size of *Bhatti* depends on the quantity of materials available for burning. In general, a circular pit (having 1-2 m diameter and 1-1.5 m depth) is dug and with this circular pit, another rectangular pit is made. Two iron rods and bricks are placed to cover the opening of the rectangular pit. A hole is made at the center of covering of rectangular pit. This rectangular pit is used for collecting Choa (more purified form of *Saji*) (Fig. 7).

Fig. 7 Burning of dried material of *Haloxylon recurvum* (Left) and *Saji* product (Right)

The semi-dried materials is placed in circular pit and put to lit, thereafter regular supply of plant materials is assured by placing materials along the periphery of circular pit. After burning, the material turns to greenish semi-solid, which is then covered with soil and left for solidification (for 305 days) by cooling. After completion of the cooling process, the *Saji* and Choa is collected. Sodium (Na^{+}) is dominant cations and carbonate (CO_3^{-2}) is the dominant anion in *Saji*. On dry-weight basis, sodium and carbonate constitutes 31 and 34% of *Saji*. There is huge demand of *Saji* in local papad industries of Rajasthan.

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Kharchia wheat: King of Saline Environment

Kharchia wheat commonly known as red wheat is indigenous to Kharchia village of Pali district of Rajasthan (Fig. 8). It is universally recognized as highest salt tolerant wheat genotype. This local landrace has been extensively used for the development of high yielding saline resistant variety, namely Kharchia 65, KRL 1-4, KRL 39 and KRL 19. This genotype can withstand the effects of salinity more efficiently than any other wheat variety and also give a very good yield under these conditions. This is being used as the base material for the development of salt tolerant wheat variety not only in India but in other countries as well. Considering its potential for future Crop Improvement programme, it has been registered with NBPGR, New Delhi by the ICAR-Indian Institute of Wheat and Barley Research, Karnal vide registration number INGR 99020. The Kharchia wheat is grown in some villages of Marwar, Pali since generations. The main reasons of growing this cultivar is because of its high tolerance to salinity, very low irrigation requirement than other hybrid wheat varieties and can also be grown as rain fed on conserved soil moisture (Fig. 9 a, b). Another feature of this variety is that the plants are tall with more straw content so that the farmer gets more fodder for feeding to animals along with grains. The animals prefer the straw of Kharchia wheat over other wheat straw.

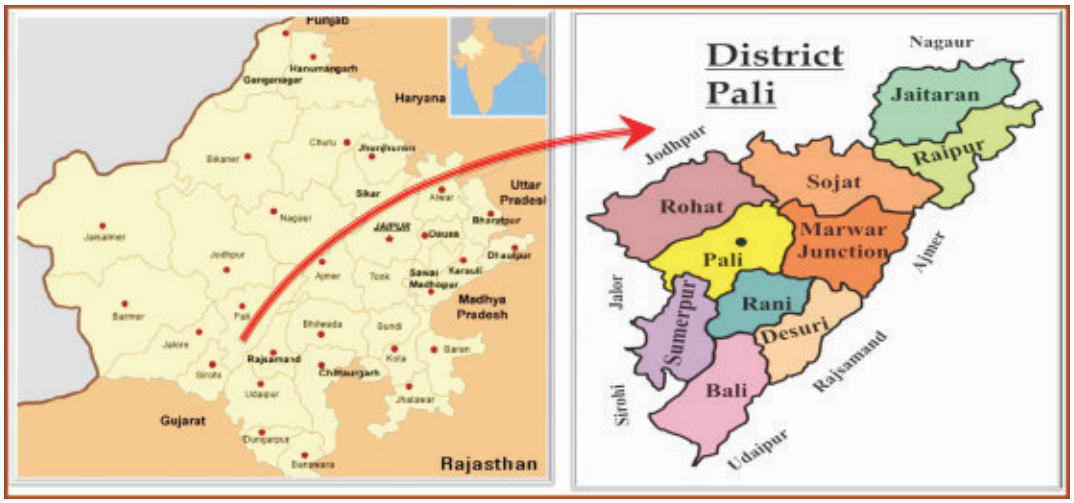


Fig. 8. Location of Kharchia village of Pali district

Uses of Kharchia wheat:

It is primarily used for making *chapattis* (Indian bread) and also for making *Dalia*, *Batti* and *Churma*. Taste of *chapati* is sweet and stays fresh for longer time. Its *Dalia* is very tasty and given to pregnant ladies before and after delivery for better

Fig. 9 (a). Kharchia wheat in irrigated condition at Kharchi village

Fig. 9 (b). Kharchia wheat in conserving moisture condition

Fig. 10 (a). Grains of *Kharchia* wheat

Fig. 10 (b). PPVFRA team discussing with villagers about *Kharchia* wheat

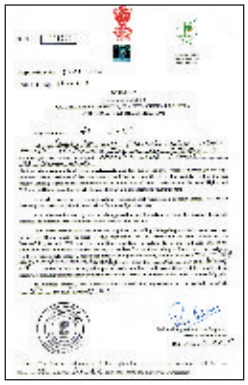


Fig. 11. PPVFRA Certificate for *Kharchia* wheat

health care of mother. It is also used for making *ladoos* by mixing sugar or jaggery with dry fruits. In storage no insect- pests are attracted on grains, hence it can be stored for long duration. It has high water use efficiency hence *dalia* prepared from *Kharchia* is very tasty and nutritive.

Kharchia wheat has been registered as a farmer's variety in 2015 under the Protection of Plant Varieties and Farmer's Rights Act (Fig. 10 a, b). For Conservation of traditional *Kharchia* wheat, Kharchia Gram Panchayat district Pali was awarded the national level Plant Genome Saviour Community Award for the year 2012-13 by the Protection of Plant Varieties and Farmer's Rights Authority, India on 24th August, 2016 (Fig. 11).

Dheeraj Singh, M K Choudhary, M L Meena, Laxman and Chandan Kumar
Krishi Vigyan Kendra, ICAR-CAZRI, Pali

Events by ENVIS CAZRI

Visit of Secretary MoEF&CC

Sri A.N. Jha, Secretary, MoEF&CC, New Delhi visited ICAR-CAZRI, Jodhpur on 20th February 2017 and interacted with Director, CAZRI and Scientists also visited Experimental area and Desert Botanical Garden.

Exhibition display at National Workshop for ENVIS Centres

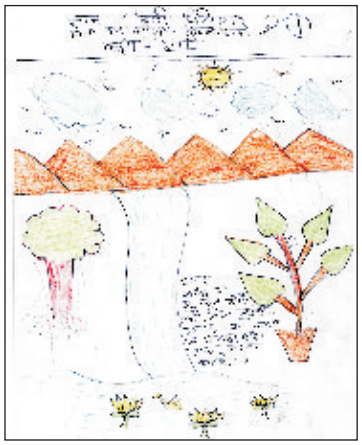
During the National Workshop of ENVIS Centres (March 17-18 2017) at Gandhinagar, Gujarat , ICAR-CAZRI Centre presented its accomplishments through displayed posters, newsletters and details of other activities of the centre.

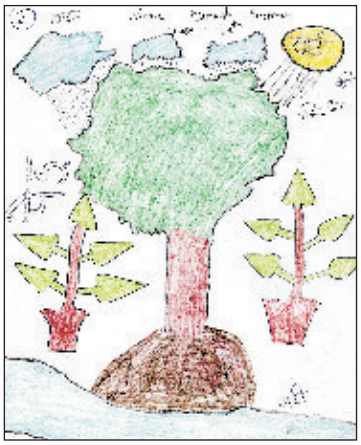
International Day for Biological Diversity

International Day for Biological Diversity was celebrated on 22nd May 2017 at Santa ki Dhani, Mandau, Jaisalmer. Through this programme the centre created awareness amongst the students, farmers and others about the theme "Biodiversity and Sustainable Tourism". The students from schools of Jaisalmer and farmers of the nearby villages actively participated and interacted on the issues of conserving local biodiversity.

World Environment Day

World Environment Day was organized on 5th June 2017 at village Khedapa, Jodhpur. On the theme of the day "Connecting People to Nature", the event comprised of drawing competition for school children, deliberations on arid environment and importance of biodiversity. Subsequently there was a plantation programme of multipurpose tree species in the vicinity. There was good participation of students, villagers and others in this awareness programme.





Swachta Pakhawara

Under Swachhach Bharat Abhiyan, center was actively involved in cleanliness drive at various places.

World Day to Combat Desertification

On this year's theme "Our Land-Our Home-Our Future", World Day to Combat Desertification was organized on 17th June, 2017 at ICAR-CAZRI, Jodhpur. Dr. R.P. Dheer Former Director, ICAR-CAZRI and a renowned Soil Scientist was the Chief Guest on this occasion. He delivered lecture on "Some Musings on Desertification Issues". Dr Dheer, opened up a horizon encompassing the genesis and subsequent recurrent process of research and developmental initiatives on desertification including policy perspectives. Dr. O.P. Yadav, Director, ICAR-CAZRI emphasized the importance of innovative research areas for better understanding of the desertification process and its control. A plantation programme at Desert Botanical Garden of the Institute was also organized on the occasion.

News

अन्तरराष्ट्रीय जैव विविधता दिवस पर हुए कार्यक्रम

'आदर्श पर्यावरण मित्र के रूप में समाज को नई दिशा देने की जरूरत'

मंडाऊ में भी हुई संगोष्ठी

पत्रिका न्यूज नेटवर्क

जैसलमेर के मंडाऊ गांव में जैव विविधता दिवस पर आयोजित संगोष्ठी में उपस्थित समाजी। पत्रिका

जैसलमेर अंतरराष्ट्रीय जैव विविधता दिवस पर सोमवार को स्काउट व गाइड मैदान हीन कोट जैसलमेर की ओर से राजकीय भाग का नाम में विभिन्न कार्यक्रम हुए। इस दौरान मुख्य अतिथि जिला परिषद सदस्य मिलना फकीर उपस्थित थे। कार्यक्रम में 10 भरे प्रतियोगिता में 30 बालक-बालिकाओं ने विभिन्न जैव जन्तुओं, पेड़ पौधों एवं प्राकृतिक दृश्यों में रंग भरे। इस दौरान निबंध प्रतियोगिता हुई। विहित अतिथि अमीन खां ने बालकों को जैव विविधता की जानकारी दी। विशिष्ट के प्रशिक्षक पीर मोहम्मद ने कहा कि पर्यावरण संरक्षण में युवा व बालक एक आदर्श पर्यावरण मित्र के रूप में समाज को नई दिशा दे सकते है। विशिष्ट संरक्षक पत्रिका ग्रुप ने पॉलीथिन का उपयोग न करने की सलाह बालकों को दी। संचालन प्रशिक्षक अक्षा अमीन, सुरेन्द्र सिंह, सुमलाराम सैन, संतोष रामदेव आदि ने जीव जन्तुओं के प्रति एवं चलना सहते हुए पर्यावरण को संतुलन रखने पर बल दिया।

इसी तरह केन्द्रीय शुष्क क्षेत्र अनुसंधान संस्थान जोधपुर व मरुस्थल पर्यावरण सूचना केन्द्र के संयुक्त तत्वावधान में खेजड़ा को जिले के मगड़ाऊ स्थित मांत की छाती में लगोड़ी हुई। कार्यक्रम में कृषि, वन, बालों व भूजल विभाग के विशेषज्ञों के साथ विद्यार्थियों, किसानों व विद्यार्थियों ने भाग लिया।

कार्यक्रम के दौरान काजरी के प्रधान वैज्ञानिक जोधे सिंह ने मरुस्थलीय पर्यावरण में जैव विविधता संरक्षणीय पर्यटन के संबंध में जानकारी दी। उन्होंने पोलपो धोरे पर किए जा रहे शोध व इसके महत्व के बारे में बताया। पूर्व अतिरिक्त अधिकारी डॉ. जीआर पैनल ने इको कंपोनेंट के विकास में अपने अनुभव बताए। महिलाओं दीनदयाल ओझा ने महिलाओं व जैव विविधता के सामंजस्य की जानकारी दी। वन विभाग के एसीएफ रंधावा सुता ने वन्य जैव विविधता में पर्यटन की बढ़ती संभावनाओं पर विचार व्यक्त किए।

कार्यक्रम में डॉ. प्रवीण कुमार ने जैव विविधता के संदर्भ में बालकों को शोध उपलब्धियों की जानकारी दी। इसी प्रकार भूजल वैज्ञानिक डॉ. एसडी इनखिया ने किसानों को जल संरक्षण व प्रबंध के उपाय व कृषि उद्यानिकी वनोपज वालाल ने कृषि के साथ पलायन पीने लगाने की सलाह दी। संगोष्ठी में डॉ. दुर्गालाल बोर्ड ने खेजड़ा उपादन के बारे में बताया। बालकों के प्रधान वैज्ञानिक डॉ. अशरफ विश्नोई, पैनकर साहा ने भी विचार व्यक्त किए। इस दौरान सभी ने सामिल कृषक मंगेज पैनल की ओर से कृषि क्षेत्र में किए गए नवाचारों की सराहना की। संतोष सांखला तीर्थेशम ने आभार व्यक्त किया।

पत्रिका Tue, 23 May 2017 epaper.patrika.com//c/19254362

मरुस्थलीकरण नियंत्रण को चुनौती के रूप में स्वीकारें

बासनी.पत्रिका
rajasthanpatrika.com

बासनी (जोधपुर) @ पत्रिका. केंद्रीय शुष्क क्षेत्र अनुसंधान संस्थान (काजरी) में स्थित भारत सरकार के केन्द्रीय पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय के मरुस्थलीय पर्यावरण सूचना केन्द्र की ओर से 2017 की विश्व मरुस्थलीकरण दिवस पर कार्यक्रम आयोजित किया गया।

इसमें मुख्य अतिथि काजरी के पूर्व प्रभारी निदेशक डॉ. आरपी धीर ने विश्व मरुस्थलीकरण दिवस पर व्याख्यान देते हुए कहा कि वायु की तेज गति के कारण खेतों की मिट्टी उड़ती है। इससे पर्यावरण तथा जलवायु पर विपरीत प्रभाव पड़ता है। ये मिट्टी समुद्र, नदी-नालों में जमा हो जाती है जो पूरे पारिस्थितिकी तन्त्र को असन्तुलित कर देती है। मरुस्थल के रहने वाले मनुष्य, जीव-जन्तुओं के स्वास्थ्य पर भी विपरीत प्रभाव पड़ता है। यातायात सेवाएं भी प्रभावित होती है। उन्होंने बताया कि खेत के चारों ओर दक्षिण, पश्चिम दिशा में पेड़-पौधों की रक्षा पट्टी विकसित करें, इससे मिट्टी का कटाव नहीं होगा। पानी खेत में ही रुकेगा, पैदावार भी अच्छी होगी। जिससे मनुष्य व जीव-जन्तुओं का भी स्वास्थ्य अच्छा रहेगा पर्यावरण भी अच्छा रहेगा।

वैज्ञानिकों के मार्गदर्शन से योजनाएं हुई साकार

काजरी निदेशक डॉ. ओपी यादव ने कहा कि मरुस्थलीकरण नियंत्रण एक गम्भीर चुनौती है, बदलते जलवायु के अनकूल विशेष रूप से शुष्क भू-भाग क्षेत्रों में कृषि उत्पादन बढ़ाने की आवश्यकता है। शुष्क क्षेत्रों के विकास के लिए राष्ट्रीय एवं अन्तरराष्ट्रीय स्तर की कई बड़ी योजनाएं बनाने, कार्यान्वित करने में वैज्ञानिकों ने मार्ग दर्शन एवं योगदान दिया है। विश्व पर्यावरण, खाद्य सुरक्षा के लिए निम्नतम भूमि में हरियाली व उत्पादन बढ़ाने, जल संरक्षण करने की जरूरत है।

पत्रिका Mon, 19 June 2017 epaper.patrika.com//c/19994526

सुनियोजित प्रयास से होगा मरूस्थलीकरण नियंत्रण

बासनी (जोधपुर) @ पत्रिका. काजरी में स्थित भारत सरकार के केन्द्रीय पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय के मरुस्थलीय पर्यावरण सूचना केन्द्र की ओर से 2017 की विश्व मरुस्थलीकरण दिवस पर कार्यक्रम आयोजित किया गया।

काजरी के पूर्व प्रभारी निदेशक डॉ. आरपी धीर ने कहा कि वायु की तेज गति के कारण खेतों की मिट्टी उड़ती है। इससे जलवायु पर विपरीत प्रभाव पड़ता है। इसके लिए खेत के चारों ओर दक्षिण, पश्चिम दिशा में पेड़-पौधों की रक्षा पट्टी विकसित करें, इससे पानी खेत में ही रुकेगा, पैदावार भी अच्छी होगी। काजरी निदेशक डॉ. ओपी यादव ने कहा कि मरुस्थलीकरण नियंत्रण एक गम्भीर चुनौती है, बदलते जलवायु के अनकूल विशेष रूप से शुष्क भू-भाग क्षेत्रों में कृषि उत्पादन बढ़ाने की आवश्यकता है। एनविरा के प्रभारी डॉ. जोगे सिंह ने कहा कि भार के अनुरूप भूमि में उत्पादन एवं खाद्य सुरक्षा बढ़ाने के लिए सुनियोजित प्रयास करने की आवश्यकता है।

पत्रिका Sun, 18 June 2017 epaper.patrika.com//c/19919337

विविधता दिवस पर होंगे कार्यक्रम

जैसलमेर @ पत्रिका . केन्द्रीय शुष्क क्षेत्र अनुसंधान संस्थान जोधपुर के मरुस्थलीय पर्यावरण सूचना केन्द्र की ओर से 22 मई को अंतरराष्ट्रीय जैव विविधता दिवस का आयोजन किया जाएगा। कार्यक्रम का आयोजन संता की ढाणी ईको बायोफार्म, मोहनगढ़ में सुबह 9 बजे किया जाएगा। यह जानकारी संस्थान के ओमप्रकाश यादव ने दी।

पत्रिका Sun, 21 M epaper.pa

Conferences

Date	Topic	Place
National		
January 21-23, 2017	5th National Seminar on Climate Resilient Saline Agriculture: Sustaining Livelihood Security	SKRAU, Bikaner, Rajasthan
February 16-17, 2017	5th National Conference on Biodiversity and Climate Change	New Delhi
March 3-4, 2017	National Symposium on New Directions in Managing Forage Resources and livestock Productivity in 21st Century: Challenges and Opportunities.	RVSKVV, Gwalior, Madhya Pradesh
March 10-12, 2017	4th Indian Biodiversity Congress	Pondichery University, Puduchery.
International		
April 18 - 19, 2017	19th International Conference on Agroforestry and Forestry Technologies (ICAFTE 2017)	Paris, France [World Academy of Science Engineering and Technology (WASET)]
April 27-28, 2017	6th International Conference on Biodiversity and Conservation	Dubai, UAE