



**REPORT ON TWO-DAY WORKSHOP ON  
“SOIL HEALTH IMPROVEMENT OF WATER LOGGED,  
SALINE, SODIC AND UNPRODUCTIVE SOILS THROUGH  
MODERN TECHNOLOGIES” SPONSORED BY GUJCOST**



छोटुभाई गोपालभाई पटेल प्रौद्योगिकी संस्थान, बारडोली  
Chhotubhai Gopalbhai Patel Institute of Technology, Bardoli

*Organized By:*

*Department of Civil Engineering  
Chhotubhai Gopalbhai Patel Institute of Technology,  
Uka Tarsadia University, Maliba Campus, Bardoli.*

*(16<sup>th</sup> & 17<sup>th</sup> March, 2023, Thursday-Friday)*

**Target Audience:** Diploma Civil Engineering, and B. Tech (Civil and Chemical) Engineering

**No of Participants:** Total **90** (Boys-**51**), (Girls-**21**), (Faculties-**18**)

**Faculty Coordinator/Organizer:**

Prof. (Dr.) Manoj J. Gundalia, Prof. (Dr.) Vaibhav R. Pawar, Prof. Shrinivas T. Mundkar and  
Prof. Maulik G. Kakadiya

## *Detail Report on Workshop*

### **Soil Health Improvement of Water Logged, Saline, Sodic and Unproductive Soils through Modern Technologies**

Soil is an important natural resource providing water, nutrient, and mechanical support for plant growth. In agro ecosystem, continuous manipulation of soil is going on due to addition of input, removal of nutrients, changing water balance, and microbial life. These processes affect soil properties (physical, chemical, and biological), and the deviation of these properties from the normal status is controlled by soil buffering capacity and soil resilience. If these changes are beyond the reach of soil resilience, then soil loses its original state, leading to soil degradation. The major strategy to improve soil health should be based on integrated plant nutrient supply system, promotion of balanced fertilization and finding ways to incorporate organic matter into the soil. Past studies reported that a 60% increase in the current agricultural productivity will be required from existing available resources (land and water) to feed the growing human population. Worldwide soil degradation is currently estimated at 1.9 billion hectares and is increasing at a rate of 5 to 7 million hectares each year. At present, the extent of the degraded area in the world is 1,036 to 1,470 million ha. This urges the need for maintaining soil health rather than the mere addition of input for crop production. Soil health is an integrative property that reflects the capacity of soil to respond to agricultural intervention, so that it continues to support both agricultural production and the provision of other ecosystem services. Maintaining the physical, chemical, and biological properties of soil is needed to keep it healthy, and this is possible through the adoption of different agronomic approaches.

The objectives of this workshop is to provide an overview of the concept of soil health and its development, issues related to soil health, indicators of healthy soil, the impact of the ill health of the soil on crop productivity and resource use efficiency, and modern technologies used to improve soil health.

### **Details of Workshop**

<b>Workshop Title</b>	Soil Health Improvement of Water Logged, Saline, Sodic and Unproductive Soils through Modern Technologies
<b>Number of days</b>	Two Days
<b>Number of Sessions</b>	4
<b>Organizing secretary</b>	Prof. (Dr.) Manoj J. Gundalia
<b>Coordinators</b>	Prof. (Dr.) Vaibhav Pawar, Prof. Shrinivas T. Mundkar and Prof. Maulik G. Kakadiya
<b>Numbers of Institutes Participated</b>	CGPIT
<b>Numbers of Faculties</b>	Environmental Engineering (01), Soil Mechanics and Foundation Engineering (03), Structural Engineering (05), Civil Engineering (01) , Transportation (01), Water Resource Engineering (02), Chemical Engineering (04), Electrical Engineering (01)
<b>Numbers of Participants</b>	Diploma Civil (04), B. Tech Civil (27), B. Tech Chemical (41), Faculty (18)
<b>Objectives of the Workshop</b>	To provide an overview of the concept of soil health and its development, issues related to soil health, indicators of healthy soil, the impact of the ill health of the soil on crop productivity and resource use efficiency, and modern technologies used to improve soil health
<b>Outcomes of the Workshop</b>	<ul style="list-style-type: none"> <li>• Aware about soil health concept, its impact on crop production and resource use efficiency.</li> <li>• Be acquainted with advanced technologies used to improve soil health of Water Logged, Saline, Sodic and Unproductive Soils</li> <li>• Understand the importance of soil health</li> </ul>
<b>Speakers</b>	<b>Dr. Anand. R. Kaswala, Dr. Ganesh D. Kal, and Er. Bharat M. Solia</b>
<b>General Feedbacks/ Suggestions</b>	Overwhelming positive feedbacks have been received from Participants on the workshop and demanded to conduct more workshops on advanced technologies for Soil Health Improvement to increase food production.

## Program Schedule

<b>Day-1 (Thursday, 16<sup>th</sup> March, 2023)</b>	
09.00-09.30 AM	<b>Registration and Breakfast at J. D. Hall, CGPIT, Uka Tarsadia University</b>
09:30 - 10:00AM	<b>Inauguration and Welcome Speech</b>
10:00 AM to 11:30 AM	<b>Effect of Climate Change and their effect on different types soil</b> <b>Dr. Ganesh D. Kale</b> Assistant Professor, Department of Civil Engineering, SVNIT, Surat
11:30 AM to 13:00 AM	<b>Management of problematic soil-I</b> <b>Dr. Anand. R. Kaswala</b> Associate Professor and Head, Department of Natural Resource Management, ASPEE college of Horticulture and Forestry, NAU, Navsari
13:00 PM to 13:30 PM	<b>Lunch Break</b>
13:30 PM to 15.00 PM	<b>Management of problematic soil-II</b> <b>Dr. Anand. R. Kaswala</b> Associate Professor and Head, Department of Natural Resource Management, ASPEE college of Horticulture and Forestry, NAU, Navsari
15.00 PM – 15:30 PM	<b>High Tea</b>
<b>Day-2 (Friday, 17<sup>th</sup> March, 2023)</b>	
9.00-10.00 AM	<b>Breakfast</b>
10:00AM to 11:00 PM	<b>Travel to Navsari Agricultural University, Navsari for Site Visit</b>
11.00 AM to 13.00 PM	<b>-Site Visit-</b> <b>At farm of Navsari Agricultural University</b> <b>Er. Bharat M. Solia</b> Asst. Research Scientist, (SWMRU), Navsari Agricultural University
13:00 PM to 13:30 PM	<b>Lunch Break</b>
13.30 PM to 14:30 PM	<b>Travel to UTU</b>
14:30- 15:30 PM	<b>Certificate Distribution and Vote of Thanks</b>

Department of Civil Engineering of Chhotubhai Goplabhai Patel Institute of Technology (CGPIT), Uka Tarsadia University (UTU) organized Two-Day Workshop on “**Soil Health Improvement of Water Logged, Saline, Sodic and Unproductive Soils through Modern Technologies Production**”. The workshop was sponsored by Gujarat Council on Science and Technology (GUJCOST) and conducted on 16<sup>th</sup> and 17<sup>th</sup> March, 2023. Total 90 participants from Diploma and Degree of Civil and Chemical Engineering have actively participated in the workshop.

## **Day-1**

### **Session-1**

The first session was started with prayer, UTU anthem, lighting of the lamp and an inaugural ceremony. Coordinator and anchor Prof. (Dr.) Vaibhav R. Pawar welcomed speakers from Navsari Agricultural University and Sardar Vallabhbhai National Institute of Technology, Surat, Director of CGPIT, Director of Diwaliba Campus, HoDs of different Departments, faculty members and participants. Dr. Manoj J, Gundalia, Head of the Department of Civil Engineering and I/C Director of CGPIT felicitated the speakers with bouquets. Similarly the Director of other Institutes of UTU and other invitees were also welcomed by the coordinators. **Dr. Manoj J. Gundalia** congratulated the DCE for organizing this GUJCOST sponsored workshop and gave brief introduction of Uka Tarsadia University, CGPIT and DCE. He explored the importance and purpose of this workshop in his inaugural keynote address. He discussed importance of soil health, demerits of soil degradation and why soil health improvement is required during his welcome speech and key note address. He also explained the aim, objectives and need of the workshop for bringing awareness on soil health issues and the modern technologies used to improve soil health. He gave the brief of the workshop schedules and details of the different sessions. He appreciated and congratulated to the coordinators for organizing such workshop which highly relevant to the latest top issues. This was followed by the technical sessions.

The first lecture was conducted by **Dr. Ganesh D. Kale**, Assistant Professor, Department of Civil Engineering, SVNIT, Surat on “**Effect of Climate Change and their effect on different type soils**”. He explored hydrologic cycle and climate change scenario. He discussed the dominant parameters responsible for climate change. Detail explanation of green house effect was given during his presentation. He explained the difference between climate and weather,

climate variability, brief introduction to climate modeling and dynamic downscaling methods for climate change projection. In the last part of the lecture, he shared impacts of climate change, risk of the climate change in near future and effect of climate change on different soil types. He also spoke about the water and soil conservation now a day carried out by advance technologies. The session was very interesting as he explained how the climate change badly affected on harming health, through air pollution, disease, extreme weather events, and forced displacement, pressures on mental health, and increased hunger and poor nutrition in places where people cannot grow or find sufficient food.

### **Session-2**

The second lecture on “**Management of problematic soil-I**” was delivered by **Dr. Anand. R. Kaswala**, Associate Professor and Head, Department of Natural Resource Management, ASPEE college of Horticulture and Forestry, NAU, Navsari. He differentiated between soil and land and demonstrated how long time it take to form by showing video. He explored different soil classifications and explained the concept of soil health. The characteristics of healthy soil along with the indicators which warn us about conduction of test for soil health were elaborated. He explained the major characteristics of sodic soils from the agricultural stand point and tells that excess exchangeable sodium has an adverse effect on the physical and nutritional properties of the soil, with consequent reduction in crop growth, significantly or entirely. He classified the unproductive soil and discussed the five major functions of healthy soil. He mentioned that the sodic soils are those which have an exchangeable sodium percentage (ESP) of more than 15. He also discussed that the electrical conductivity of saturation soil extracts are, therefore, likely to be variable but are often less than 4 dS/m at 25 °C. The pH of saturated soil pastes is 8.2 or more and in extreme cases may be above 10.5. He told that dispersed and dissolved organic matter present in the soil solution of highly sodic soils may be deposited on the soil surface by evaporation causing a dark surface which is why these soils have also been termed as black sodic soils. He discussed the role of organic matter and humus in soil health with suitable examples. He made the lecture interesting by asking questions to the participants.

### **Session-3**

The afternoon session of workshop was started after lunch. **Dr. Anand. R. Kaswala**, Associate Professor and Head, Department of Natural Resource Management, ASPEE college of Horticulture and Forestry, NAU, Navsari was delivered lecture on “**Management of**

**problematic soil-II**". The talk was simple and informative as he started the session by brushing up on the basics of poor soil health indicators and its management options. He presented the table showing the factors responsible for the development of saline soils or causes of Salinization. He explored the different methods of saline soils like hydrological method (flushing, leaching, and drainage), physical method and cultural method. He mentioned that alkali soils cannot be reclaimed by simple flooding the land. He described the role of chemicals, crop selection, tillage, layout, seed rate and spacing, irrigation, drainage, fertilizers in reclamation of alkali soils. Causes of soil acidity and different methods for acidic soil reclamation were discussed during the lecture. He clarified characteristics, causes and management of waterlogged/ wetland/ flooded/ submerged soils along with modern technologies used for the water logged and salinity affected soils. In the last part of the lecture, he discussed constraints due to sandy soils, classification, occurrence and management of calcareous soils. He gave deep insight in uses of modern techniques for soil health improvement of Water Logged, Saline, Sodic and Unproductive Soils. It was a very interactive technical session and the audience was curious to know about the future of modern technologies to improve soil health. The session was ended with questions answering.

## **Day-2**

### **Session-4**

As per the program schedule, a site visit was planned at farms of Navsari Agricultural University, Navsari 37 Kms away from CGPIT, UTU, Maliba Campus. The visit was conducted under the guidance of **Er. Bharat M. Solia**, Asst. Research Scientist, (SWMRU), Navsari Agricultural University.

The advance micro irrigation systems, mulching, fiber production from Banana tree, subsurface drainage, reclamation practices for sodic, saline, acidic, water logged soils were installed at the farms of NAU. Mr. Shailesh Patel, assistant, has shown demonstration farm of drip irrigation system. He explained benefit of mulching and different methods of sodic, saline, alkali and acidic soils. He also explained the mechanism of making fiber from Banana tree and demonstrated the entire process. Students were asked questions and Mr. Shailesh Patel gave satisfactory answered to them. It was a productive site visit ended with good discussion. Prof. (Dr.) Vaibhav Pawar expressed gratitude to Mr. Shailesh Patel for taking pain and sparing his valuable time for the participants.

The two days workshop ended with valedictory function. Vote of thanks was proposed by **Prof. (Dr.) Vaibhav R. Pawar**, Department of Civil Engineering, C. G. Patel Institute of Technology, Uka Tarsadia University. The anchoring of the entire workshop was done by Prof. (Dr.) Vaibhav Pawar, while tea, breakfast, and lunch arrangement were done by **Prof. Shrinivas T. Mundakar**, organizing secretaries of the workshop. The Participation certificates were distributed by the invited speakers Dr. Ganesh D. Kale, Dr. Anand. R. Kaswala, Covener of the Workshop, Dr. Manoj J. Gundalia and Director of Diwaliba Campus, Sh. Vijay K. Shah. The feedbacks from all the participants were collected by **Prof. Maulik G. Kakadiya**. The Workshop ended successfully and everyone felt contended with every aspect of the Workshop. A huge vote of thanks and gratitude were extended to the UTU management for their motivation and honorable guest speakers for their time and incredibly good talk on the various topics.



## Photo Gallery

### **GUJARAT COUNCIL ON SCIENCE AND TECHNOLOGY**

**Department of Science & Technology, Government of Gujarat**



Block : B, 7th Floor, M. S. Building, Nr. Pathikashram, Sector-11,  
Gandhinagar, Gujarat - 382011.

Phone : (079) 23259362-65 Fax : (079) 23259363

E-mail : [info-gujcost@gujarat.gov.in](mailto:info-gujcost@gujarat.gov.in)

URL : [www.gujcost.gujarat.gov.in](http://www.gujcost.gujarat.gov.in)



**Dr. Narottam Sahoo**

Advisor & Member Secretary

GUJCOST/Sem-Symp 3921(2)/2022-23/2104

30<sup>th</sup> September, 2022

**Dr. Manoj J Gundalia,**

Associate Professor and Head,  
Department of Civil Engineering  
C G Patel Institute of Technology,  
UKA Tarsadia, Bardoli- Mahuva Road,  
Surat: 394350

Sub: Financial Support of GUJCOST for the State Workshop on "Soil Health Improvement of Water Logged, Saline, Sodic, and Unproductive Soils through Modern Technologies"  
Ref: Your proposal, dated 2<sup>nd</sup> July, 2022

Dear Sir,

Greetings from Gujarat Council on Science and Technology (GUJCOST), Gandhinagar.

With reference to above, it is our pleasure to inform you that your proposal for holding the "Soil Health Improvement of Water Logged, Saline, Sodic, and Unproductive Soils through Modern Technologies" during 24-25<sup>th</sup> March, 2023 has been considered for the financial support of GUJCOST.

GUJCOST, is in principle approved an amount of Rs.25,000/- (Rupees Twenty Five thousand only) for this programme on the following terms and conditions.

1. If you change the date and speakers or proposed resource person then please, intimate to GUJCOST.
2. The programme will be organised as per the proposal and guidelines of GUJCOST for the grant.
3. GUJCOST will release the sanctioned amount after the completion of the programme and on receipt of the programme report, Utilization Certificate, list of experts, Nos of participants, statement of income & expenditure copy of vouchers, photographs, press notes, etc. with necessary stamp and signature of the Programme Coordinator and Head of the Institute.
4. The organiser should send one illustrative poster including the title of the programme, dates, venue and other information details in one-week advance to publish on GUJCOST website and social media for broader outreach.
5. The organiser also publish the informative brochure / poster on institute social media for broader outreach.
6. The organiser shall acknowledge the support of GUJCOST, DST, and Govt. of Gujarat in all the publications including poster, brochure, banner, backdrop, invitation card, press release, souvenir and proceedings.
7. The organiser shall invite the DST, Govt. of Gujarat institutions as Resource Person / Expert Member as per the subject matter concern.
8. Once the programme is over, the organiser shall submit the program report, statement of expenditure and Utilization Certificate within one month of completion of the programme within one month.

We once again thank you for your kind effort and interest in organising the programme and wish the programme a grand success.

Thank you and with best regards.

Yours sincerely,

(Narottam Sahoo)



Banners of the Workshop





Lamp Lightening by Invited Speakers and Guests



Felicitation of Invited Speakers by Presenting Bouquets



Welcome Speech and Key Note Address delivered by Convener of the Workshop and Head, Department of Civil Engineering Prof. (Dr.) Manoj J. Gundalia



Dr. Ganesh Kale Explaining the Dominant Parameters Responsible for Climate Change

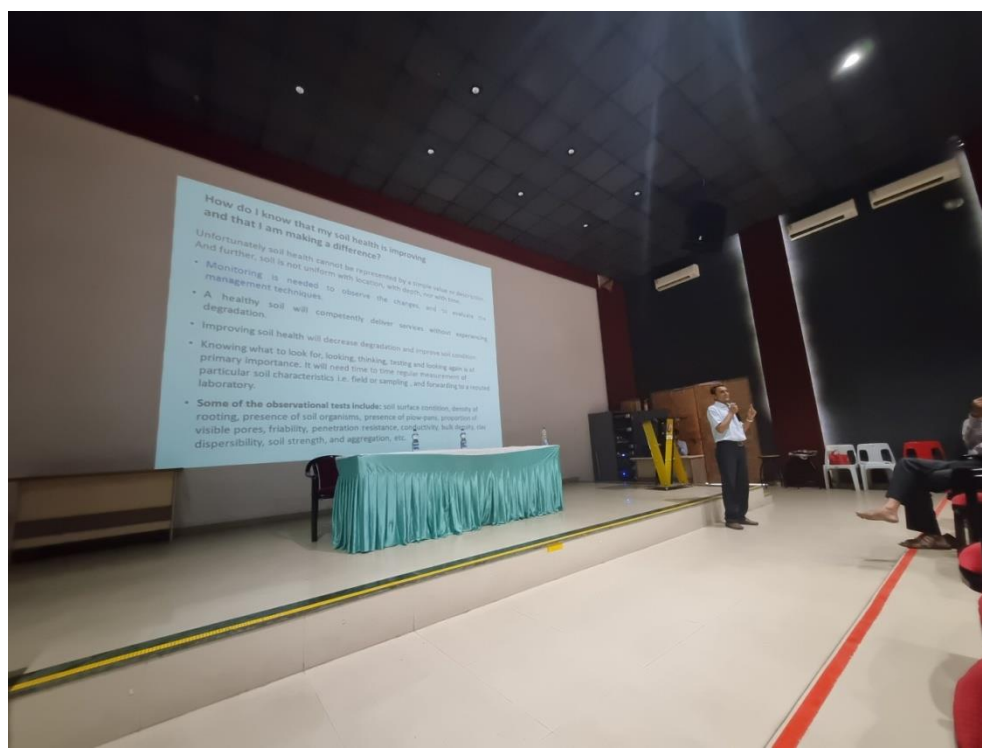


Dr. Ganesh Kale Explaining the Green House Effects on Climate





Dr. Ganesh Kale Answering the Participant Questions on Green House Effects



Dr. Anand Kaswala Discussing about How to Know that my Soils Required Soil Health Testing



Dr. Anand Kaswala Explaining Significant of Soil Health in Agriculture



Dr. Anand Kaswala showing the factors responsible for the development of saline soils





Dr. Anand Kaswala Explaining the different method of Reclamation for Water Logged, Saline, Sodic, Acidic, Alkali and Unproductive Soils



Dr. Anand Kaswala Answering the Queries Raised by the Participant





Convener Dr. Manoj Gundalia Presenting Memento to the Speaker as a Token of Love



Vote of Thanks by Dr. Vaibhav Pawar



Site Visit at the farms of Navsari Agricultural University, Navsari





Certificates Distribution



Group Photo