

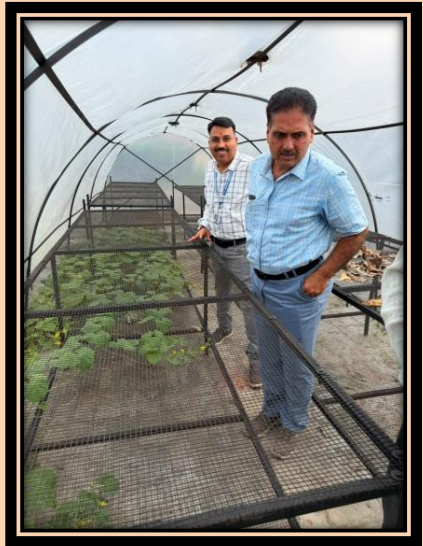
Department Activities & Achievement Information

The role of Renewable Energy has been assuming increasing significance in recent times with the growing concern for the country's energy security. CAET, NAU, Dediapada is also committed to impart quality education and practical trainings of different sources of renewable energy, methods of its utilization and energy conservation etc. to the students. The courses taught under this department are further sub divisions of the renewable energy, namely solar energy (both photovoltaic and thermal), wind energy, bio-energy, and hydro power, geothermal and tidal. The department has developed technical facilities under laboratory for technology evaluation, performance reliability and monitoring. Department of Renewable Energy Engineering has also started the PG and In-service Ph.D programme from the year 2019.



Laboratory View









List of Agresco Studies

Sr. No.	Title of Project	PI & Co-PI	Status
1.	Design, development and evaluation of biomass based cook stove (Year 2015)	PI : Dr. S. H. Sengar Co PI : Prof. P. R. Pandey, Prof. B. R. Patel, Mr. AnkurDhimar	Completed
2.	Development and evaluation of low cost of solar still (Year 2017)	PI : Dr. S. H. Sengar Co PI :Er. T. V. Chavda, Dr..Alok Singh, Prof. P. R. Pandey, Prof. B. R. Patel, Mr. AnkurDhimar	Completed
3.	Evaluation of Solar tunnel dryer for feasibility of green leaves drying for herbal product in Dediapada (Year 2019)	PI : Dr. S. H. Sengar Co PI :Er. T. V. Chavda, Er. Rajesh G. Burbade	Completed
4.	Design, development and performance evaluation of mixed mode cabinet solar dryer. (Year 2022)	PI : Dr. Alok Singh Co PI :Er. T. V. Chavda, Dr. S. H. Sengar	Completed
5.	Study the effect of SPV roof top power plant on space cooling under the roof (Year 2023)	PI :Er. T. V. Chavda Co PI :Dr. Alok Singh, Dr. S. H. Sengar	Completed
6.	Feasibility of box and concentrating solar cooker for formulation of herbal oil (Year 2026)	PI : Dr. S. H. Sengar Co PI :Er. T. V. Chavda, Dr. Alok Singh, Er. A. K. Senapati	Completed
7.	Evaluation and feasibility study of Solar PV system for boiling of corn by roadside vendors	PI : Dr. Alok Singh Co PI :Er. T. V. Chavda, Dr. S. H. Sengar	On going
8.	Development and evaluation of Pyrolyser (kiln) for carbonization of locally available biomass for small farmer	PI : Dr. S. H. Sengar Co PI :Er. T. V. Chavda, Dr. Alok Singh, Dr. Ashish Sonwane	On going

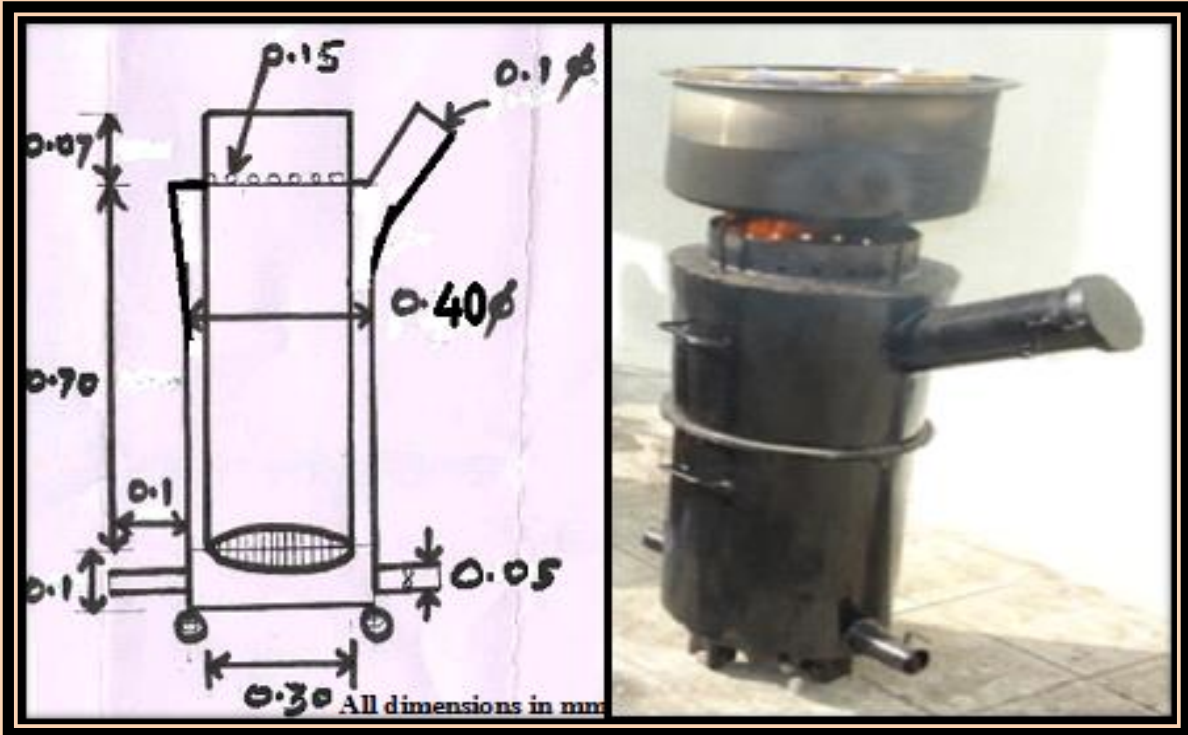
Department Recommendation

1. Recommendation for farmers (2015-2016) by Dr. S. H. Sengar

Design of funnel shaped cooked stove developed by Navsari Agricultural University is recommended to rural artisans, manufacturers and general public for community cooking of 60-70 number of meal using dry wood branches, which can reduce the fuel consumption by 3.97 kg/hr with average thermal efficiency of 20.19 % as compared to three bricks cooking chulha system.

ભલામણ:-

સુકાજલાઉ લાકડાનો ઉપયોગ કરી ૫૦ – ૭૦ થાળી સામુદાયીક રસોઈ બનાવવા નવસારી કૃષિ યુનિવર્સિટી દ્વારા તૈયાર કરેલ નળીયા આકારના રસોઈ ચુલ્હા વાપરવાની ભલામણ ગ્રામ્ય કારીગરો,ઉત્પાદન કર્તાઓ અને પ્રજા માટે કરવામાં આવે છે.આમ કરવાથી ત્રણ ઈંટ રસોઈ ચુલ્હાની સરખામણીમાં ૩.૯૭ કિ.ગ્રા/ કલાક ઈંધણની બચતની સાથે ૨૦.૧૯ % ઉષ્મા ઉપયોગ ક્ષમતા મળે છે.



2. Recommendation for farmers(2016-2017) by Dr. S. H. Sengar

A low cost roof top cement brick type solar still covered with 4mm thick toughened glass developed by NAU is recommended to get 2 l/m² - day distilled water for Dediapada area.

ભલામણ:-

નવસારીકૃષિ યુનિવર્સિટી દ્વારાવિકસાવવામાં આવેલ સિમેન્ટ- ઈંટ બાંધકામ અને ૪ એમ. એમ. ટફન કાચ કવર પ્રકારના ઓછી કિંમતના સોલર સ્ટીલ ૨ લી/ મીર પ્રતિ દિવસ શુદ્ધ પાણી (દેડીયાપાડા ક્ષેત્ર માટે) મેળવવા ઉપયોગ કરવાની ભલામણ કરવામાં આવે છે.



3 Recommendation for farmers(2018-2020) by Dr. S. H. Sengar

Semi circular solar tunnel dryer (covered with UV stabilized 200 micron polythene sheet) having 30 m² area (10m x 3m x 2m size) is recommended to farmer community in South Gujarat for low temperature drying of *Sargava* and *Mahendi* leaves as well as *Keshuda* flowers for herbal products with 33 % less drying time compare to sun drying with higher net present worth.

ભલામણ:-

અર્ધગોળાકારસૌરટનલડ્રાયર.□ □ □ □ □ □ □ □ ૨૦૦)વીઅવરોધક .

પોલીથીનઆરછાદિત(જેનાક્ષેત્રફળ૩૦ચોરસમીટરછે .□ □૧૦)શ ૩મી. શરમી.)

જેનીદક્ષીણગુજરાતનાખેડૂતોનેઓછાતાપમાનેસરગવાઅનેમહેંદીનાપાનતથાકેસુડાનાફૂલનીસુકવવામાટેઅનેતેનુંઉર્ભવ ઉત્પાદનકરીતાપ્રબુલ્લામાંસુકવણીનીતુલનામાં૩૩ %

યનીબચતસમઅનેચોખ્ખીવધુઆવકસાથેખેડૂતોનેભલામણકરવામાંઆવેછે.



4. **Recommendation for farmers(2021-2022) by Dr. Alok Singh**

Farming community and entrepreneurs are recommended to use the 20 kg capacity mixed mode cabinet solar dryer (2 m²) solar collector and 0.8 m³ drying chamber with glass cover) for:

- (i) Tomato drying (from 94 % moisture content to 8 % moisture content) cut in to 8 mm thick slices and 7 kg/m² tray load in 10 hours in summer and 14 hours in winter, which saves 22 hours and 34 hours respectively in summer and winter, compared to open sun drying.
- (ii) (ii) Onion drying (from 85 % moisture content to 8 % moisture content) cut in to 8 mm thick slices and 7 kg/m² tray load in 9 hours in summer and 13 hours in winter, which saves 20 hours and 29 hours respectively in summer and winter, compared to open sun drying



ભલામણ:-

ખેડૂત સમુદાય અને ઉધોગ સહસિકોને, ૨૦ કિ.ગ્રા. ક્ષમતાવાળા મિશ્રમોડ કેબિનેટ સૌર સૂકવણી યત્ર ની (૨)ચો.મી સોલાર કલેક્ટર અને કાય ની છતસાથે ૦.૮ ઘનમીટર ડ્રાયિંગ ચેમ્બર ભલામણ કરવા માં આવે છે કે....

- (૧) ટમેટાને (૯૪% થી ૮%) ભેજ સુધી ૮ મી.મી જાડી સ્લાઈસ અને ૭ કિ.લો પ્રતિ ચો.મી ટ્રેલોડ સાથે સુકવણી કરતા ઉનાળામાં અને શિયાળા માં અનુક્રમે ૧૦ થી ૧૪ કલાક નો સમય લાગે છે. કે જે ખુલ્લા તડકાની સરખામણીએ અનુક્રમે ૨૨ થી ૩૪ કલાક ની બચત કરે છે.
- (૨) ડુગાડીને (૮૫% થી ૮%) ભેજ સુધી ૮મી.મી જાડી સ્લાઈસ અને ૭ કિ.લો પ્રતિ ચો.મી ટ્રેલોડ સાથે સુકવણી કરતા ઉનાળામાં અને શિયાળા માં અનુક્રમે ૮ થી ૧૩ કલાક નો સમય લાગે છે. કે જે ખુલ્લા તડકાની સરખામણીએ અનુક્રમે ૨૦ થી ૨૯ કલાક ની બચત કરે છે.

5. **Recommendation for scientific community(2022-2023) by Dr. T. V. Chavda**

Study the effect of SPV roof top power plant on space cooling under the roof Scientists are informed that during March to August, in Dediapada climate (latitude 21.66° N), use of Grid connected solar roof top system, having lower end of Polycrystalline solar module (with 20° tilt angle) installed at 12 cm height from roof surface, on the shadow free, flat RCC roof having china mosaic (at around 10 m from ground level), to minimize/reduce the 19th Combined AGRESO Meeting -2023 252 electrical energy consumption upto 27.74 kWh per kW of SPV system for 1°C reduction in space cooling, with average 69% of rated power

generation of the system.

6. **Recommendation for farmers(2025-2026) by Dr. S. H. Sengar**

Farmers and Self Help Group (SHG) are recommended to use box type solar cooker for achieving 56 per cent herbal oil recovery in 18 sunshine hours from mixture of Coconut oil (500 ml) and herbs (each of 15 g Amla, Henna, Banyan aerial root, Curry leaves and hibiscusflower powdered) .

ભલામણ

ખેડૂતો અને સ્વ-સહાય જૂથને (એસ. એચ. જી.) હર્બલ તેલ બનાવવા માટે બોક્સ પ્રકારના સોલર કુકરનો ઉપયોગ કરવાની ભલામણ કરવામાં આવે છે જેમાં નાળિયેર તેલ (૫૦૦ મિલી) અને હર્બ્સ (દરેક વસ્તુ ૧૫ - ૧૫ ગ્રામ,જેમા આમળા, મેંદદી, વડની હવાઈ મૂળ, કઢીપાનઅને હિબિસ્કસપાવડર) ના મિશ્રણને ૧૮ કલાક સુધી સૂર્ય પ્રકાશ માં રાખવાથી ૫૬ ટકા જેટલું હર્બલ તેલ પ્રાપ્ત કરી શકાય છે.

(22.7.1.21)



List of B.Tech. /M.Tech. /Ph.D. Projects

Sr No	Year	UG or PG	Title of Project	No. Students
Dr. S. H. Sengar				
1.	2017	UG	Observation of growth parameters of wheatgrass under low cost pyramid type structure	02
2.	2017	UG	Development and performance evaluation of low cost solar tunnel dryer for drying of green leaves.	02
3.	2018	UG	Development of hand operated briquetting machine for locally available biomass	02
4.	2019	UG	Agri photovoltaic farming for raising of ornamental plant nursery	02
5.	2020	UG	Evaluation of solar tunnel dryer for drying of green leaves	02
6.	2022	UG	Production of herbal oil by using solar thermal technology	04
7.	2023	UG	Formulation and quality enhancement of produced herbal oil by using solar thermal technology	02
8.	2024	UG	Development and Evaluation of Charcoal kiln	02
9.	2025	UG	Development of green shade for raising of ornamental plants nursery	02
10.	2026	UG	Technology -driven organic fertilizer: a greener path for the soil restoration	02
11.	2024	Ph.D	Development of Indirect forced circulation solar dryer for roselle leaves and fruits.	01
12.	2025	Ph.D	Design and Development of evacuated based solar still	01
13.	2026	Ph.D	Development of on farm hydrolyser for valorized bio fertilizer from agricultural waste	01
14.	2026	M.Tech	Development and evaluation of farmer-friendly kiln for biochar production	01
15.	2026	M.Tech	Development of a biochar granulator and assessment of biochar granules performance	01
Dr. Alok Singh				
1.	2019	UG	Comparative study of performance of a direct solar dryer and mixed mode cabinet solar dryer	02
2.	2020	UG	Design modification and study of thermal performance of mixed mode cabinet solar dryer	02
3.	2021	UG	Study on solar powered induction solar cooker	02
4.	2023	UG	Performance study of solar cooking system.	02
5.	2024	UG	Studies on solar PV based cooking system.	02
6.	2025	UG	Optical and thermal performance of box type solar cooker with thermal heat storage.	02
Dr. T. V. Chavda				
1.	2017	UG	Performance evaluation of solar roof top system installed at CAET Dediapada	02
2.	2019	UG	Performance evaluation of solar photovoltaic system under indoor test condition installed at CAET Dediapada	02
3.	2020	UG	Performance evaluation of solar photovoltaic system under indoor test condition installed at CAET Dediapada	02
4.	2024	UG	Comparative study on different types of solar air heaters at Dediapada	01

5.	2026	M.Tech	Evaluation of existing biogas plant on kitchen waste and development of gas purification system	01
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List Of Research Publications

Sr. No.	Details of Publications	NAAS rating
1.	S. H. Sengar, T. V. Chavda&Alok Singh (2016) “Roof top cemented solar still” Published in PARIPEX – Indian Journal of Research. Vol.5, Issue.10: 215-217, October 2016. [Print ISSN:2250-1991]	3.29
2.	S. H. Sengar, T. V. Chavda&Alok Singh (2017) “Development and evaluation of plastic based solar still for production of distilled water” Published in Journal of Applied and Natural Science. Vol. 9 (1): 427 - 434, February 2017. [Print ISSN: 0974-9411, Online ISSN: 2231-5209]	5.42
3.	T. V. Chavda, Prem Singh, SagarAgravat and S. K. Philip (2017) “Design, development and demonstration of a Shallow solar tunnel dryer for non-electrified areas” Published in Journal of Applied and Natural Science 9 (4): 2461 - 2468 (2017) November 2017. [Print ISSN: 0974-9411, Online ISSN: 2231-5209]	5.42
4.	Alok Singh & T. V. Chavda& S. H. Sengar& Alok Singh & Hitesh Sanchavat (2018) “Comparison of Outer Glass Cover Temperatures of a Double Glazed Flat Plate Solar Collector/Box Type Solar Cooker” Journal of Science – Issue No.14, Knowledge Consortium of Gujarat, Department of higher Education, Government of Gujarat. [ISSN: 2320 – 0006].	---
5.	Sengar, S.H., Chavda, T.V., Singh, Alok&Burbade, R. G. (2022). Solar drying of <i>Butea monosperma</i> (keshuda) flowers for herbal colour” <i>Indian Journal of Agroforestry</i> , 24(1):84-91.	5.19
6.	Chavda, T.V.,Sengar, S. H., Jena, S., Sanchavat, H., Shrivastava, A. and Suthar,H. G. (2024).Recent Research and Development on Solar Dryer Technologies for Roselle (<i>Hibiscus sabdariffa</i> L.) Drying <i>International Journal of Current Research and Academic Review</i> , 12(1):14-35. doi: https://doi.org/10.20546/ijcrar.2024.1201.003	3.92
7.	Alok Singh, Chavda, T.V.,Sengar, S.H., Vasava, A. and Mahla, N. (2024) प्रयाजऔरटमाटरकोसुखानेकेलएमशिरतिमोडकैबनिटसोलरड्रायरकाडजाइन।Proceedings of IRIS – 2024: AICTE-VAANI Conference. अभावपि - वाणीप्रायोजितनवीकरणीयऊर्जाएकीकरणऔरजलवायुसुधारकेलएसंधारणयावकिसमेंनवाचारहेतुराष्ट्रीयसंगोष्ठीकार्यवृत्तसंस्करण. 24 -26 October 2024, pp.1-9. Organized at Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur. [ISBN:978-81-969799-0-4]	---
8.	Chavda, T.V., Sengar, S.H., Jena, S., Sanchavat, H., Shrivastava, A. and Suthar, H.G. (2025). Economic viability of indirect forced circulationsolar dryer for roselle (<i>Hibiscus sabdariffa</i> L.)leaves processing in Gujarat’s tribal regions. <i>International Journal for Research Trends and Innovation</i> , 10(8):b140-b147. doi: https://www.ijrti.org/papers/IJRTI2508119	---
9.	Chavda, T.V., Sengar, S. H., Singh, A. and Akabari, P.D. (2025). Assessment of the economics of roselle (<i>Hibiscus Sabdariffa</i> L.) calyces powder and seeds production using indirect forced circulation solar dryer. <i>International Journal of Science, Environment and Technology</i> ,4(5):501-517.	4.17
10.	Akabari, P.D., Sengar, S.H., Jena, S., Sanchavat, H., Shrivastava, A., Suthar H.G. and	4.17

	Chavda,T.V.(2025) Recent research and development on water desalination using solar still. <i>International Journal of Science, Environment and Technology</i> ,14(5):529-540.	
11.	Chavda, T.V., Singh, A. and Sengar, S. H. (2025). Performance of a 35.2 kWp roof top grid-connected solar photovoltaic power plant in tribal region of Gujarat. <i>Annals of Arid Zone</i> ,64(4):603-617.	4.86
12.	Sengar, S., Chavda, T., Singh, A., Chaudhari, J. and Mishra, B. (2025). Innovative formulation and quality optimization of herbal pain relief oil using solar thermal technology. <i>American Journal of Agriculture and Forestry</i> , 13(6):290-303. DOI:10.11648/j.ajaf.20251306.14	---
13.	Dixit Mistry, D., Patel, R., Sengar, S.H. and Tarsariya, J.H. (2026). Growing of Tender Wheatgrass Under Pyramid Type Solar Structure and Comparative Evaluation of Tray and Solar Tunnel Drying Methods for Powder Production. <i>Journal of Experimental Agriculture International</i> , 47(5):456-465.	5.14
14.	Nirav Patel,S. H. Sengar, S. Jena, T. V. Chavda , A. Singh, N. Varshney, Ayush Patel, Sandeep Kumar, VasavaPragnesh and Sohan Patel (2026) “Physicochemical Properties of Biochar Derived from Agricultural Biomass Using a Developed Farmer Friendly Biochar Kiln” <i>International Journal of Environment and Climate Change</i> , 16(8):820-833. August 2026. ISSN: 2581-8627.	5.16
15.	T. V. Chavda, Alok Singh, S. H. Sengar, P. D. Akabari, O. S. Karpe and K. R. Trivedi (2026) “Thermal Impact of A 35.2 kW Grid-Connected Rooftop Solar PV Power Plant on Space Cooling” <i>International Journal of Environment and Climate Change</i> , 16(8):900-913. August 2026. ISSN: 2581-8627.	5.16

List of Popular Articles / Pamphlets

Sr. No.	Title
1.	T. V. Chavda, Alok Singh & S. H. Sengar (2016) “સૌર સુકવણીયંત્ર” Pamphlet, NAU, Navsariપ્રકાશન નં. ૨૧/૨૦૧૬-૧૭ .
2.	T. V. Chavda, Alok Singh & S. H. Sengar (2016) “સૂર્યકૂકર” Pamphlet, NAU, Navsariપ્રકાશન નં. ૨૨/૨૦૧૬-૧૭.
3.	T. V. Chavda, Alok Singh & S. H. Sengar (2016) “સામૂહિક સંકેન્દ્રિત સૂર્યકૂકર” Pamphlet, NAU, Navsariપ્રકાશન નં. ૨૩/૨૦૧૬-૧૭.
4.	S. H. Sengar, T. V. Chavda and Alok Singh (2017) “ઊર્જાની બચતએ જ ઊર્જાનું સર્જન” KrushiJivan, Gujarati periodicals. Vol. 49 No. 9: 6-8, April 2017. Published by GSFC Ltd., Vadodara [ISSN:0971-6440].
5.	T. V. Chavda, Alok Singh & S. H. Sengar (2017) “સોલર વોટર હીટર” Pamphlet, NAU, Navsariપ્રકાશન નં. ૦૨/૨૦૧૭-૧૮.
6.	T. V. Chavda, Alok Singh & S. H. Sengar (2017) “સૌર પાણી પંપ” Pamphlet, NAU, Navsariપ્રકાશન નં. ૦૩/૨૦૧૭-૧૮.
7.	S. H. Sengar, T. V. Chavda and P. D. Akbari (2017) “વીજ બિલ ઘટાડો સૌરફાનસ અપનાવો” KrushiJivan,

	Gujarati periodicals. Vol. 49 No. 11: 33-34, June 2017. Published by GSFC Ltd., Vadodara [ISSN:0971-6440].
8.	S. H. Sengar, T. V. Chavda and Alok Singh (2017) “સોલર ફિજ” KrushiVigyan, Gujarati agri Monthly. Vol. 43 No. 10, pp.16, November 2017. Published by Gujarat Printers, Rajkot.
9.	T. V. Chavda, Alok Singh, S. H. Sengar & H. Sanchavat (2018) “સૌર ફાનસ” Pamphlet, NAU, Navsari પ્રકાશન નં. ૦૫/૨૦૧૮-૧૯.
10.	T. V. Chavda, Alok Singh, S. H. Sengar & H. Sanchavat (2018) “સૌર શેરી દીવાબત્તી” Pamphlet, NAU, Navsari પ્રકાશન નં. ૦૬/૨૦૧૮-૧૯.
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List of Book Chapters / Books

Sr. No.	Title
1.	Alok Singh, Kishan Singh Rawat, O.P. Nautiyal, and Tilak V. Chavda (2016) “Chapter – 8: Biomass to Fuel: Conversion Techniques” Book title, “Energy Resources: Development, Harvesting and Management” Editors - Dr. Om Prakash Nautiyal, Dr. bhavtosh Sharma, Prof. Durgesh Pant. Published by Abhimanyu Gahlot for M/s Bishen Singh Mahendra Pal Singh, 23-A, New Connaught Place, Dehra Dun and Uttarakhand Science Education and Research Centre (USERC) Dehra Dun, India, Printed at Shiva Offset Press and composed by Doon Phototype Printers, 14 Old Connaught Place, Dehra Dun, India. [ISBN-978-81-211-0941-3]
2.	Tilak V. Chavda and N. S. Rathore (2017) Book on “An Engineered Prototype Solar Dryer for Rose Petal – Value addition through drying on commercial scale” Publisher: LAP LAMBERT Academic Publishing. [ISBN: 978-3-330-34465-5]
3.	Alok Singh, Tilak V. Chavda, Sandip H. Sengar and Hitesh Sanchavat (2021) “Chapter – 4: Design of Solar Photovoltaic System for Rooftop” Book title, “Advances in Renewable Energy Engineering” pp. 67 – 92. Editors – Prof. Mahendra S. Seveda, Dr. Pradip D. Narale and Dr. Sudhir N. Kharpude. Published by Narendra Publishing House, Delhi. [ISBN-978-93-91063-93-1] August 2021
4.	Tilak V. Chavda, Alok Singh, Sandip H. Sengar and Hitesh Sanchavat (2021) “Chapter – 11: Hydropower” Book title, “Advances in Renewable Energy Engineering” pp. 227 – 258. Editors – Prof. Mahendra S. Seveda, Dr. Pradip D. Narale and Dr. Sudhir N. Kharpude. Published by Narendra Publishing House, Delhi. [ISBN-978-93-91063-93-1]
5.	Alok Singh and T. V. Chavda (2021) “Chapter-64: Decentralized solar photovoltaic system design for future energy needs” Book title: “Agriculture innovation: A way forward for nation development” pp. 327 – 333. Editors – S.R. Kalbande and V.M. Bhale. Published by Himanshu Publications, Rajasthan. [ISBN-978-81-7906-934-9]
6.	Alok Singh, Tilak V. Chavda, S.H. Sengar, Alok Singh Ektaray Vasava, Riddhi Lakhtariya, Arti Luhar (2026) Chapter - 113: A Solar Energy based Dryer for Environmental Sustainability, for Accelerated Drying of Vegetables; pp 345-347. Published in the book entitled “Recent Trends in Applied Physics and Material Science”; Editors: Sudhir Bhardwaj, et al. Publisher: Taylor & Francis Group, London, ISBN 978-1-041-16452-4; DOI: 10.1201/9781003684718-113.

List of Practical Manual

No.	Authors	Year	Title	Name of college	Semester
1	S. H. Sengar, Alok Singh and Tilak V. Chavda	March 2016	Engineering Chemistry	CAET	1st
2	T. V. Chavda, Alok Singh and S. H. Sengar	March 2016	Engineering Physics	CAET	1st
3	S. H. Sengar, Alok Singh and Tilak V. Chavda	March 2016	Non-Conventional Energy Sources	PAE	4th
4	T. V. Chavda, Alok Singh and S. H. Sengar	March 2016	Design & Maintenance of Greenhouse	PAE	5th
5	Alok Singh, T. V. Chavda and S. H. Sengar	March 2016	Engineering Mechanics (Degree)	CAET	2nd
6	Alok Singh, T. V. Chavda and S. H. Sengar	March 2016	Engineering Mechanics (Diploma)	PAE	2nd
7	T. V. Chavda, Alok Singh and S. H. Sengar	July 2019	Design of Structures	CAET	3rd

List of Patents Published

Sr. No.	Patent Application No.	Inventor/s Name	Title of the Patent	Patent Published Date/ Granted Date	Patent Publication Number / Patent Granted Number
1.	475954-001	1. Navsari Agricultural University 2. Dr. Sandip Hanumansingh Sengar 3. Dr. Tilakkumar Vithalbhai Chavda 4. Dr. Alok Singh 5. Er. Niravkumar Sureshbhai Patel	Funnel Shaped Biomass Cook stove	08-01-2026	219033
2.	476206-001	1. Navsari Agricultural University 2. Dr. Sandip Hanumansingh Sengar 3. Dr. TilakkumarVithalbhai Chavda 4. Dr. Alok Singh	Low Cost Cemented Solar Still	28-01-2026	221696
3.	491150-001	1. Navsari Agricultural University 2. Dr. Alok Singh 3. Dr. Tilakkumar Vithalbhai Chavda 4. Dr. Sandip Hanumansingh Sengar	Mixed mode cabinet solar dryer	23-04-2026	230990
4.	476356-001	1. Navsari Agricultural University 2. Dr. Sandip Hanumansingh Sengar 3. Dr. Tilakkumar Vithalbhai Chavda 4. Dr. Alok Singh 5. Er. Niravkumar Sureshbhai Patel	Low Cost W-shaped Solar Still	18-06-2026	238530

List of major instruments/equipments/ devices available in the Solar Laboratory

1. **Box Type Solar Cooker**
2. **Parabolic Solar Concentrating Cooker (Sk-14)**
3. **Flat Plate Collector Based Solar Hot Water System**
4. **Evacuated Tube Collector Solar Hot Water System**
5. **Different Sizes of Evacuated Tube**
6. **Solar Baby Hot Water System**
7. **Solar Air Heater Model**
8. **Solar Baby Dryer**
9. **Mixed Mode Cabinet Solar Dryer**
10. **Solar tunnel dryer**
11. **Solar Still**
12. **Solar Lantern**
13. **Solar PV Grid Tied Training System**
14. **Solar PV Training and Research System (Stand Alone System)**
15. **Solar micro water pumping system**
16. **Moisture Analyser**
17. **Datalogger (DT- 80 Model)**
18. **Wind Speed & Direction Sensor with Data Logger**
19. **Solarimeter with Data Logger**
20. **SPV Powered Temperature Scanner**
21. **Temperature Scanner for Thermocouple Wire**
22. **Temperature Scanner for RTD (PT-100) Sensor**
23. **Solar Thermal Training System**
24. **Sun Shine Recorder**
25. **Digital Vernier Caliper**
26. **Micrometer**
27. **Thermo Gravimetric Analyzer**
28. **Hot Wire Thermal Anemometer**
29. **Digital Display Temperature & Humidity Datalogger**
30. **PV induction based solar cooker**
31. **Anemometer**
32. **Precision pyranometer with printer**
33. **Hot wire thermal anemometer**
34. **Digital thermo-hygrometer with clock**
35. **Stevenson screen**
36. **Light measurement device**
37. **Centrifugal air blower**
38. **Solar street light system**

39. **Wind mill model**
40. **Solar light transmittance meter**
41. **Cup counter anemometer**
42. **Packed bed collector type solar air heater**
43. **Solar flat plate (PV – thermal) collector**
44. **Flat plate collector type solar air heater**
45. **Multichannel temperature scanner**
46. **Solar Thermal Training System (Flat Plate Collector Based System)**
47. **Solar Concentrator Training System (Parabolic Trough Collector Based System)**
48. **Thermal Energy Storage Training System**
49. **Wind Energy Training System**
50. **Solar Thermal Direct Cooking System With 16 m² Parabolic Dish**

List of major instruments/equipments/ devices available in the Biomass Laboratory

1. **Hand Operated Briquetting Machine**
2. **Power Operated Briquetting Machine (Screw Type)**
3. **CAET developed community cook stove**
4. **SPRERITECH 160NDS/M Side Feeding Type Natural Draft Biomass Cook Stove**
5. **SPRERITECH 170NDT/L Top Feeding Type Natural Draft Biomass Cook Stove**
6. **SPRERITECH 190NDS/L Side Feeding Type Natural Draft Biomass Cook Stove**
7. **SUPERNOVE Company Forced Draft Improved Biomass Cook Stove Hot Air Oven**
8. **Fuel Cell Model and Testing Kit**
9. **Timber Moisture Meter**
10. **Thermo Gravimetric Analyzer**
11. **Abels Flash Point Apparatus**
12. **Redwood Apparatus**
13. **Simple Cloud And Pour Point Apparatus**
14. **Digital Bomb Calorimeter**
15. **Muffle Furnace**
16. **Digital TDS Meter**
17. **Gasifier models**
18. **Biogas Plant models**
19. **Biogas flow meter**
20. **Portable Gas Analyzer**
21. **Down Draft Type Gasifier Model**
22. **Biochar Production Unit**

TSP Scheme information

An Extension project is approved by Government of Gujarat for Department of Renewable Energy Engineering, with below mentioned details.

Title	Name of the funding Agency	Date of start
“Establishment of Energy Park and Impart Training to farmers and small entrepreneurs in the field Renewable Energy Engineering”	Extension PLAN project funded by Government of Gujarat. through Budget Head No. 12122.	April 2024







