EVALUATION REPORT

for

Vimal Jyothi Engineering College

AISHE Code C43798

Prepared by

Indian Institute of Technology Palakkad

Regional Coordinating Institute, UBA

उन्नत भारत अभियान

UNNAT BHARAT ABHIYAN

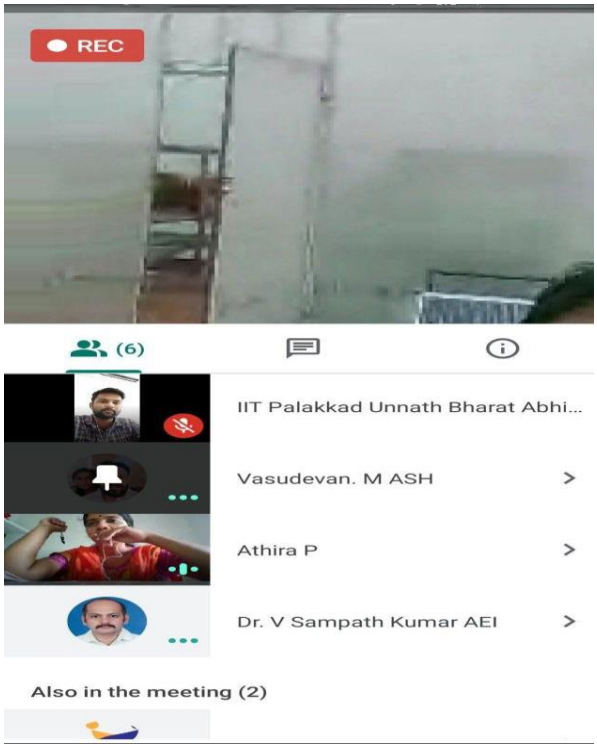
INDIAN INSTITUTE OF TECHNOLOGY PALAKKAD

INTRODUCTION

Vimal Jyothi Engineering College (VJEC) is an educational project of the Archdiocese of Thalassery established in the year 2002 and is managed by Meshar Diocesan Educational Trust. The college is approved by AICTE and affiliated to APJ Abdul Kalam Technological University (KTU). The Unnat Bharat Abhiyan cell of VJEC has conducted various activities related to entrepreneurship and product development including the development of Coconut Leaf broom making machine for village households, Smart Ambulatory Monitoring for Alakkode old age homes, Hybrid bamboo structured solar dryer, etc. UBA cell of Vimal Jyothi Engineering College has constituted an R&D / Product Development Cell to promote the IEDC supported Start-up and Product Development.

Method Adopted

Due to the COVID-19 pandemic and the government regulations, evaluation for the perennial assistance was held through video conference and an online survey. A video conference was conducted on 17-06-2020 with the UBA cell of Vimal Jyothi Engineering College and the Regional Coordinating Institute IIT Palakkad.



Participants in the video conference are as follows:

1. Dr. Athira P., Regional Coordinator UBA, IIT Palakkad
2. Mr. Nikhil R. R., Staff Coordinator UBA, IIT Palakkad
3. Dr. Sampath Kumar, Convenor UBA, VJEC
4. Mr. M Vasudevan, VJEC
5. Mr. Sunil Paul, VJEC

EVALUATION REPORT

1. Solar Tunnel Greenhouse Dryer Coupled with Biomass Backup Heater

1	**Name of the institute code**	Vimal Jyothi Engineering college Chemperi AISHE Code C43798
2	**Title of the project**	Solar Tunnel Greenhouse Dryer Coupled with Biomass Backup Heater
3	**Name of the Subject expert group**	Rural Energy Systems
4	**Name of villages where project development activities were carried out**	Eruvessi, Kannur
5	**Duration/ Budget of the project**	5 months / 1,20,000₹
6	**Brief Introduction**	The use of open sun drying of coconut depends on climatic conditions and gives low-quality copra. To overcome the practical difficulties of the conventional method, a solar tunnel greenhouse dryer coupled with biomass backup heater was designed and developed. This dryer was basically on the principle of the greenhouse effect in which all the radiation emitted by the sun will be absorbed by the dryer. The biomass backup heater can be used as a backup to provide heat during the night time and rainy days.
7	**Current status/Achievement of the project**	The solar dryer attained a maximum temperature of 60 degrees Celsius when the peak ambient temperature was 33 degrees Celsius under no load and without a backup heater. About 10 hours the dryer temperature sustained over 40 degrees Celsius. The relative humidity of the dryer was less than that of ambient relative humidity due to the highest temperature prevailed at the peak time and it also enhances the drying of copra with good quality.
8	**Project Outcomes**	The products (coconuts) dried in the developed solar tunnel dryer is superior in quality and it is also compatible with the product available in the market.

9	**Description of Project in 150 words**	Solar and biomass are the two sources of renewable energy highly suitable for drying application. Hence a combination of solar and biomass energy for drying is experimentally analyzed in this project for copra drying in Eruvessi panchayat, Kannur. This dryer works basically on the principle of the greenhouse effect in which all the radiation emitted by the sun is absorbed by this dryer since it is wrapped with the polyethene sheet of 200 microns that enhances the greenhouse effect. The dryer is having a rigid load-bearing frame which is placed at certain spans and does not deform under the loads acting on them and a transparent cover material placed on them which allows shortwave solar radiation to enter and is partially opaque to the longwave radiation leading to a greenhouse effect.
10	**Beneficiaries**	5 – 7 members per month on average.
11	**Photos of the UBA activities (maximum of 6 photographs of high resolution)**	 Figure 1 : Site levelling

Figure 2 : Basement preparation

Figure 3 : Framework installation

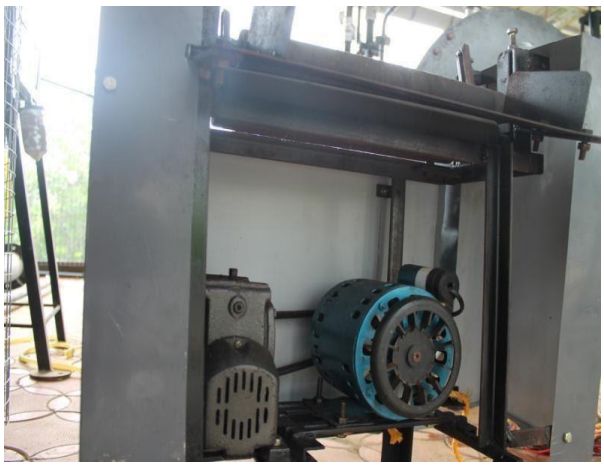
Figure 4 : Bamboo rack installation

Figure 5 : Installation of UV stabilized film

2. Automated Coconut Broom Making Machine

1	**Name of the Institute code**	Vimal Jyothi Engineering college Chemperi AISHE Code C43798
2	**Title of the project**	Automated Coconut Broom Making Machine
3	**Name of the Subject expert group**	Rural Craft and Artisans Development & Rural Industrialization and Entrepreneurship Development
4	**Name of villages where project development activities were carried out**	Eruvessi, Kannur
5	**Duration/ Budget of the project**	4 months / 1,40,000₹
6	**Brief Introduction**	The name "Kerala" derived from its name from *Kera and Ala* which means the land of coconuts due to its abundance of coconut trees in this state in India. Thus, there is a wide range of products that are derived from coconut trees. The coconut leaf brooms are one among them and these are mainly produced as a handmade product by the villagers. Villagers are performing almost all the activities by hand from the removal of the midrib from the leaves to final bundle generations. This process is a very time consuming and tedious process. The Proposed Coconut Leaf Broom Making Machine is a simple and economic machine which is user friendly and can be operated by any common person. In this machine, initially, the coconut leaves are fed through a roller arrangement that rotates slowly and pulls the leaves inside the system. Then the leaves are passed through two sharp spiked rollers and the midrib of the leaf gets separated. When the tip of the leaves come out of the spiked roller, it gets pulled in a pace by another set of rotating rollers which rotates faster than the spiked roller and then these ribs are passed through an agitating guideway into the collecting box. Then the collected leaf ribs are tied together automatically with the help of a sensor-based robotic manipulator to form a broom. The

		remaining part of the coconut leaves can be fed to the cattle.
7	**Current status/Achievement of the project**	Project first phase completed successfully
8.	**Project Outcomes**	Women empowerment and provide income to the household women.
9.	**Description of Project in 150 words**	Initially, the raw/dry coconut leaves are fed to the input roller set and the leaves are automatically pulled in by the input roller and are fed to the spiked roller which rotates at a speed greater than the input roller speed and at a slower speed compared to the output roller. Then when the leaves are inside the spiked roller the spikes of the roller cut the leaves or pierces it and when the leaves are transferred to the output roller set which rotates at a speed twice that of the spiked roller, the leaves are pulled out which separate the mid-rib from the leaves and the mid-rib comes out of the output roller and falls on the slopped vibrating table. The mid-ribs from the slopped vibrating table fall in the mid-rib collecting container which is pushed by the linear actuator towards the tying mechanism. Then the sensor-based tying mechanism ties the mid-ribs together with the plastic thread by rotating around the mid-ribs. After tying the midribs together, the thread is cut off and the final broom is pushed out using the linear actuator through the tying mechanism outlet hole. Then the final produced broom is collected from the outlet of the tying mechanism. The separated leaf can be then collected from the bottom and can be used for different purposes such as the feeding of cattle, agricultural fertilizer etc.
10	**Beneficiaries**	One Kudumbasree group in the adopted village. Currently, fabricating a broom making machine with double the capacity.

11	**Photos of the UBA activities (maximum of 6 photographs of high resolution)**	 Figure 6: Double rubber roller with spikes  Figure 7: Motor and gear assembly  Figure 8: Broom collector area

3. Nightingale-19 Robot

The robot is designed to carry food and medicine for patients in the COVID-19 ward. Also, it is built with a video calling facility to interact with patients in the COVID-19 ward. Automobile parts are used for fabricating the robot. Two heavy-duty wiper motors are used for driving the robot. Wiper motors are designed to run continuously at full load for longer duration and its reliability is very high. Instead of using a hobby-grade remote, standard remote control used for aeromodelling is used for controlling direction. Additional features like controlling the solenoid valve of tea/coffee dispenser and temperature sensor are performed using the same remote. Robot speed can be controlled for 0 to 20 m/min for easy navigation and control. Machine language is used for programming the controls for better reliability. Safety features like obstacle sensors and the remotely operated buzzer can be attached for better safety of people around the robot.

The team behind the project:
Students: Noyal Jose, Amal Babu, Daniel Paul Lalat
Faculty: Mr. Sunil Paul, Dr. T D John, Dr. V Sampath Kumar, Mr. Sarin C R

4. Breathing Support Device- Mini Ventilator

The need for a breathing support device for emergency situations like COVID- 19, in case of shortage of full-fledged ventilators, prompted the design and fabrication of a low-cost portable breathing support system. It can be used in emergency situations even at households and primary health-centres.

The bag-mask valve bag is a manual resuscitator which is used to provide positive pressure ventilation to patients who are feeling difficulty in breathing. This bag mask valve bag is placed horizontally on a platform with a rack and pinion arrangement for making horizontal movement. This arrangement helps to fix the bag-mask valve bag on the exact position as per the requirements. A motor is used for pressing the bag-mask valve bag. This is done by using a slider-crank mechanism which converts rotary motion to linear motion. Thus, the bag-mask valve bag will be pressed and released alternatively which in turn induces pumping of air. The rate of pressing and the speed of pressing can be controlled depending on the patient's beat rate and various other parameters. This is a microcontroller-based system. Different parameters such as heartbeat rate, respiratory rate, air intake rate, blood pressure etc are given as inputs to the microcontroller. The microcontroller evaluates the inputs and the speed of the motor is controlled. Also, two sensors, a pressure sensor and a flow sensor are used. The pressure sensor is used to find out negative pressure and increase the stroke and the Flow sensor is used to maintain residual volume in the lungs. An LCD display is used for displaying the parameters and the pair of switches is used for navigation. This full arrangement is fixed on a platform and this platform is fully portable.

Vimal Jyothi Engineering college has been in interactions with European FP7-project (funded by the European Commission and coordinated by the Fuel Cell and Hydrogen Joint Undertaking) that aims at providing to the widest possible audience of technicians specific training modules, practical, in an appropriate format and at affordable cost, to facilitate the deployment of the FC&H2 technologies expected to enter the market within the time frame 2014-2020.
KnowHy intends to create six different courses with one common core module and five different specialisations modules. Courses will be supported in E-learning format and will be available in multiple countries and in 7 languages (English, German, French, Italian, Spanish, Portuguese and Dutch).
With support from KnigHt and many academic / research partners are planning to launch an open-source ventilator design course.

The team behind the project
Students: Febin J Nalappat, Aswin Sudhan, Athul Prasanth
Faculty: Dr. V Sampath Kumar, Dr. T D John, Mr. Sunil Paul, Mr. Sarin C R

5. Automatic Sanitizer dispenser

Safely managed water, sanitation, and hygiene (WASH) services are an essential part of preventing and protecting human health during infectious disease outbreaks, including the current COVID-19 pandemic. COVID-19 could be prevented by adopting extensive hygienic behaviours. Using bottles for hand washing needs direct contact with the bottle. If many people are using the same sanitizer, this may cause the spreading of viruses. In this project, an automatic hand sanitizer dispenser with a proximity sensor which will automatically detect the human presence and provide a sanitizer solution. This idea was developed to prevent people from having to touch the dispenser of the hand sanitizer, ensuring that it always remains germ-free.

The team behind the project:
Students: Mr Sharan Rathnakar
Faculty: Prof. Laly James, Prof. Prabhin James, Mr. Sarin C R

6. Leg operated hand sanitizer dispenser

The proposed system contains two major components, pedal-operated lever and an actuation system with a nozzle for dispensing sanitizer. Both of the units are connected using an automobile brake cable for better flexibility. This device is purely mechanical operated so the running cost is absolutely nothing. Major materials used in this project are MDF sheets and automobile brake cable. Both are water and dustproof so it can be used in any weather conditions and both are highly reliable materials. Another advantage of this system is that it is designed for connecting the sanitizer inlet tube to a separate container so that the device can be connected to any type of container. This will reduce the requirement of frequent changing of sanitizer bottles.

Hon. Kadannappalli Ramachandran, Minister for Ports, Museums, Archaeology and Archives inaugurating the product. We have also installed the same at various police stations and received 50+ orders so far.
The same model is installed in Kannur international airport. The NRI Malayalees will be using the same upon arrival at the airport.

The team behind the project:
Students: Noyal Jose, Amal Babu, Daniel Paul Lalat
Faculty: Mr. Sunil Paul, Dr. T D John, Dr. V Sampath Kumar, Mr. Sarin C R

7. Hercules 19 - EV Kiosk

It is an Electric Vehicle based mobile Kiosk. The doctor can sit inside the Hercules 19, designed in a square shape. There are two holes through which the doctor can extend the hands to the patient. The doctor will use double-layered disposable gloves. There is an automatic sanitiser unit, which can be operated with a doctor's leg. A disinfecting mist will be sprayed after the patient's exit. Electric mobility is added which helps the doctor to drive the Kiosk to patients.
The kiosk will not require the staff to wear Personal Protective Equipment (PPE). The staff can stand inside the kiosk and collect the throat swabs without exposing themselves to the person under observation. The exposed part of the glove will be sanitised after each use.
The PPE kits which cost about Rs 1,200 per piece cannot be used more than once. Though at present there is no severe shortage of the kits in Kerala, medical staff have raised concerns that if there happens to be a sudden surge in the number of COVID-19 cases, then PPE kits' availability will become a problem.

The team behind the project:
Students: Aswad S Kumar, Aswin Sudhan, Athul Prasanth, Febin J Nalappat, Joyal Joy

Faculty: Dr. V Sampath Kumar, Dr. T D John, Mr. Sunil Paul, Mr. Sarin C R

8. Two-Wheeler based Sanitiser

These days, disinfectant jets, mists and sprays seem to have become weapons of choice against the coronavirus in public areas. A two-wheeler-based sanitiser spray will spray disinfectants in the hot-spot area or a street or at a congested and densely populated locality. It could be attached to any two-wheeler or other vehicles. The system can be utilized for sanitizing shelter homes, quarantine centres and isolation wards. Wiping down surfaces with bleach is laborious. This project is under development and will be implemented within a day or two.

The team behind the project:
Students: Aswad S Kumar, Aswin Sudhan, Athul Prasanth, Febin J Nalappat, Joyal Joy
Faculty: Dr V Sampath Kumar, Dr. T D John, Mr. Sunil Paul, Mr. Sarin C R

9. Pedal-operated hand wash

This project is designed for District COVID-19 treatment centre Kannur and is under development.

10.Patient Information system and tracking

This project is designed for District COVID-19 treatment centre Kannur and is under development.

11.Automated Kiosk for Pharmacy and Shopping malls

This project is designed for Pharmacies and Shopping malls and is under development.

12.Automated Mask detection system

This project is designed for public areas and is under development.

Sl No:	Question	Details	Score
1	Name of the institution	Vimal Jyothi Engineering College	-
2	AISHE CODE	43798	-
3	Village Adopted	5	-
4	No. of Gram Sabha conducted	6	30
5	Have you done the village survey and uploaded it on the website before 31st December 2019?	No	0
6	Have you done the Household survey and uploaded it on the website before 31st December 2019?	No	0
7	No. of faculty members involved for UBA activities.	More than 5	5
8	No. of students involved in UBA activities.	More than 10	5
9	The number of Quarterly progress reports submitted in 2019	2	10
10	Have you submitted the Jal Sakti activity report?	Yes	5
11	Have you submitted Swachhta hi Seva activity Report?	Yes	5
12	Have you uploaded the VDP (Village development plan) before 31st December 2019?	No	0
13	Have you applied for SEG proposal?	Yes	5
14	Have your project got approved under SEG?	Yes	5
15	Have you done situation analysis and need assessment mentioned in your reports?	Yes	5
16	Have you made the plan of action and uploaded it on the website?	Yes	5
Total Score			80

MEDIA REPORTS

1. Time Now Channel: https://www.youtube.com/watch?v=XA0qu4C968w
2. Indian Express: https://www.newindianexpress.com/good-news/2020/apr/21/robot-designed-by-kerala-engineering-students-joins-fight-against-covid-19-2132998.html
3. Economic Times: https://economictimes.indiatimes.com/news/politics-and-nation/now-robot-is-part-of-keralas-fight-against-coronavirus/articleshow/75273490.cms?from=mdr
4. Times of India: https://timesofindia.indiatimes.com/city/kozhikode/now-nightingale-of-kannur-to-the-aid-of-covid-hospital/articleshow/75258069.cms
5. Mathrubhumi: https://english.mathrubhumi.com/news/good-news/-nighthingale-19-robot-to-help-covid-19-patients-in-kannur-1.4703214
6. Outlook: https://www.outlookindia.com/newsscroll/now-robot-is-part-of-keralas-fight-against-coronavirus/1809934
7. MSN: https://www.msn.com/en-in/video/healthandfitness/robot-in-kannur-hospital-to-assist-healthcare-teams-in-treating-covid-19-patients/vi-BB12XtdL
8. Business India: https://www.businesstoday.in/magazine/technology/tech-rescue/story/403609.html
9. Business Live: https://www.businessonlive.com/startups/58098
10. Asianet News: https://www.youtube.com/watch?v=DefMm-0sIlQ