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**CMJI**

**CHRISTIAN MEDICAL JOURNAL OF INDIA**

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*Sustainable  
Energy*

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WORLD.**

-MAHATMA GANDHI

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# LETTERS TO THE EDITOR

Dear Members and Readers,

I invite you on behalf of CMAI to share feedback and views and make the CMJI interactive, relevant and vibrant. As you read this edition and each issue of CMJI, we would like to know what comes to your mind?

Please share your thoughts to help guide the Editorial team. E-mail your responses to: [communication@cmai.org](mailto:communication@cmai.org)

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Regards  
Lead - Communication Department

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website for publication.

- Every effort is taken to process received articles at the earliest and these may be included in an issue where they are relevant.
- Articles accepted for publication can take up to six to eight months from the date of acceptance to appear in the CMJI. However, every effort is made to ensure early publication.
- The decision of the Editor is final and binding.

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- Authors are requested to provide full details for correspondence: postal and e-mail address and daytime phone numbers.

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- Articles submitted to CMAI should not have been simultaneously submitted to any other newspaper, journal or

- Authors are requested to send the article in Microsoft Word format. Authors are encouraged to use UK English spellings.
- Contributors are requested to send articles that are complete in every respect, including references, as this facilitates quicker processing.
- All submissions will be acknowledged immediately on receipt with a reference number. Please quote this number when making enquiries.

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# EDITORIAL



As the world grapples with the pressing challenges of climate change and resource depletion, the urgency to transition towards sustainable energy sources becomes increasingly evident. The very foundation of our modern society relies on energy, but the methods by which we harness it must evolve. It is imperative that we prioritize sustainable energy solutions to secure a better future for generations to come.

One of the most remarkable aspects of sustainable energy is its potential to create a domino effect of positive change. By reducing carbon emissions and air pollutants, we mitigate the adverse effects of climate change, improve air quality, and safeguard public health. Moreover, the integration of sustainable energy fosters economic growth through job creation, technological innovation, and increased energy independence. A shift towards solar panels, wind turbines, and energy-efficient infrastructure catalyses advancements across sectors, positioning us at the forefront of global progress.

However, achieving a sustainable energy future requires a collective effort. Governments, businesses, and individuals must collaborate to dismantle the barriers hindering widespread adoption. Policy incentives and investments

in research and development are crucial to accelerating the transition. Industries must commit to sustainable practices and innovation. Individuals, as consumers, can choose to support clean energy and adopt energy-efficient habits that reduce their ecological footprint.

In conclusion, the shift towards sustainable energy is no longer a choice but a moral imperative. We stand at a crossroads where the decisions we make today will profoundly impact our planet's health and the quality of life for generations to come.

By investing in renewable resources, advocating for policy changes, and adopting eco-conscious practices, we have the power to transform our energy landscape into one that is harmonious with nature.

Let us seize this opportunity to create a brighter, more sustainable future for all.

Best Wishes,

A handwritten signature in black ink that reads "Cmoses". The signature is written in a cursive style and is underlined.

Dr Christopher D Moses | Editor - CMJI



# FAMILY, PRAYER, CHRISTIAN HOMES AND SOCIETY

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**DR NITIN JOSEPH**

Family, a cornerstone of life, embodies love, support, and connection. It nurtures us through challenges and celebrates our triumphs. In its embrace, we find belonging and shared experiences, forming an unbreakable bond that shapes our identity and provides a haven of acceptance in an ever-changing world.

The family is the basic unit of society.

Someone rightly said that there would be peace in the world if there is peace within every

family. For a Christian the family is all the more important since Jesus compared His relation with the Church to that of a husband and his wife. Paul uses this metaphor when he says, “Husbands, love your wives, just as Christ also loved the church and gave Himself for her” (Eph.5:25). To have a peaceful marriage both husbands and wives must submit, love and respect one another. The Lord established the sacred union of marriage and instructed, “For this reason a man shall leave his father

and mother and be joined to his wife, and the two shall become one flesh” (Gen.2:24). Paul in his beautiful essay on love says, “Love bears all things, believes all things, hopes all things, endures all things. Love never fails” (1Cor.13:7).

Contemporary society seems to be drifting from traditional values, with materialism and self-interest overshadowing compassion and community. Respect, empathy, and integrity are waning, leading to strained relationships and societal divisions. Rekindling these

## AS FAMILIES GATHER TO PRAY, THEY CREATE A SACRED PLACE.



values is essential for fostering harmony, understanding, and a more cohesive future.

We live in a society that is fast losing its values and morals.

It is rapidly becoming permissive and fractious. Live-in relationships are now commonplace and divorces are on the rise. The Biblical principles of divorce are very clear in the Gospels and 1 Cor.7 and can be summed up as- Don't separate, but if you do, seek reconciliation. If the unbelieving spouse consents to stay, do not seek divorce

and if the unbelieving spouse separates, the believer is not bound and is free to remarry a believer. If a spouse dies the one who lives is free to marry a believer. If someone divorces his believing spouse and marries another he/she is guilty of adultery against him/her.

A lot of intolerance, unfaithfulness and compromise are the direct result of a lack of family prayer time. In the quest of having a 'comfortable life' even having one meal together is becoming a rarity.

The local church must actively intervene to address these vital issues. The youth must be mentored and nurtured by mature believers and trained personnel for premarital and family counseling must be available. The importance and sanctity of marriage must be adequately explained and all efforts must be made towards reconciliation.

A Christian marriage is a sacred union between a man and a woman, guided by faith and love. Rooted in biblical principles, it emphasizes

## FEATURE

mutual respect, commitment, and selflessness. The couple vows to honor God, each other, and their shared journey, seeking guidance from Scripture in times of joy and challenge. Prayer, forgiveness, and unity are integral, reflecting Christ's relationship with His Church.

A Christian marriage serves as a testament to God's love, demonstrating the importance of sacrificial love, partnership, and spiritual growth, while fostering a strong foundation for a lifelong journey together.

Good Christian homes serve as nurturing grounds for faith, love, and values. Central to these homes is the practice of prayer, which plays a pivotal role in fostering spiritual growth, unity, and a strong foundation for family life.

Prayer in a Christian home is more than a ritual; it's a powerful means of connecting with God and each other.

Families gather to pray together, expressing gratitude, seeking guidance, and sharing concerns. Through prayer, family members deepen their relationship with God and reinforce their bonds with one another.

Incorporating prayer into daily routines cultivates a sense of reverence and dependence on God. Morning prayers set a positive tone for the day, while evening prayers offer reflection

and gratitude. Mealtime prayers acknowledge God's provision and remind everyone of their blessings. Bedtime prayers provide solace, allowing family members to entrust their worries to God's care.

Family prayer promotes open communication and a supportive environment. Children learn to express their feelings and seek guidance, fostering emotional well-being. Parents model humility and reliance on God, teaching valuable lessons about faith and trust.

Prayer in Christian homes also instills values of compassion and empathy. As families pray for the needs of others, they cultivate a heart for service and a sense of responsibility towards their community. This practice encourages selflessness and reinforces the Christian call to love one's neighbor.

Furthermore, the habit of praying together encourages unity and teamwork.

It reminds family members that they are part of a spiritual journey together, reinforcing their commitment to each other and to God. Praying for one another creates a sense of accountability, fostering an environment of grace and forgiveness.

In essence, prayer in good Christian homes serves as a

cornerstone for building a life rooted in faith, love, and values. It nurtures relationships, shapes character, and provides a strong moral compass for navigating the challenges of life.

As families gather to pray, they create a sacred space where they can draw closer to God and to each other, fostering a sense of belonging and purpose that transcends the boundaries of their home.

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Dr Nitin Joseph,  
Director/CEO,

The Rural Gospel & Medical Missions  
of India, Nashik 422101, India



# SUSTAINABLE ENERGY SOLUTIONS TO SERVE MORE EFFECTIVELY

## TRAVANCORE FOUNDATION

**Mr Jiji Philip, please share with us about the Travancore Foundation?**

Travancore Foundation was formed on 17th September 2009 with a vision to provide dignified, healthy, and secure lives to seniors of our society, through person-centered quality care enriching their lives by nurturing spiritual and human values with a focus on community-based care,

education, and research.

At, Travancore Foundation we have a holistic view of senior care services. We constantly strive to successfully address all the care needs of a senior in the most appropriate and suitable way. From basic care to high care requirements of an older adult. The Foundation, thus stands apart in its uniqueness in providing Lifelong Care. This

constant demand necessitated Travancore Foundation to embark on setting up a full fledged, Education and Research Centre on Aging in its Campus.

**How do you implement care to the elderly?**

We have initiated projects that offer practical solutions to senior care needs. At present we have a series of projects,



# SOLAR ENERGY SOLUTIONS FOR A CLEAN FUTURE

which include specialty care and residential rehab centers exclusively for seniors, that too for the first time in India.

**We understand that your Mission Valley project is effectively utilising Solar energy production. Why did you feel that at this project it was important to do so?**

Solar projects today hold significant importance for various reasons, ranging from environmental benefits to economic advantages. Solar energy is a renewable resource, unlike finite fossil fuels, solar energy offers a sustainable and continuous source of power. It has massive environmental benefits as

emissions and pollutants are less, we require to create such an environment in our journey of providing care. Now we have witnessed that it has created our independence on energy creation and also a goodwill among the nearby communities as jobs are created. The solar installations created jobs for installation,



maintenance and specialised care around our facilities where we extend care.

Solar projects are important due to their positive environmental impact, role in mitigating climate change, economic benefits, job creation, technological innovation, and contribution to energy

independence and resilience. As solar technology continues to evolve and become more accessible, its importance in the global energy landscape is expected to increase even further.

Solar projects are also valuable in remote and off-grid areas where traditional power

sources are difficult to establish or maintain. Solar installations can provide essential electricity for lighting, communication, healthcare, and education whilst engaging with local communities, governments, and businesses in sustainable energy initiatives, fostering a sense of environmental

### Mr. Jiji Philip

Managing Trustee  
Travancore Foundation



responsibility and promoting a cleaner future.

### **Solar energy can provide stable and predictable energy costs over the long term. Please share some details?**

Thanks to advancements in photovoltaic technology, the efficiency of solar panels is currently between 15% and 22% and high-efficiency panels can even reach nearly 23%. Today, our Solar Energy initiatives produce around 50 kilowatt-hours (kWh) of electricity daily.

Prior to installation of the solar panels, average electricity bill was approximately 1,20,000 Rupees. This represents the electricity consumed without any solar energy contribution. However, now our electricity

bill has decreased to around 70,000 Rupees. A total reduction of more than 50 percent. This reduction in consumption is due to the energy generated by the solar panels, which offsets the electricity we would have otherwise pulled from the grid.

**Usage Timing:** The solar energy system generates power from 6 AM to 6 PM, which covers daylight hours when the sun is shining and the panels are producing electricity. During this time, our electricity consumption is primarily covered by the solar panels.

**Energy Storage:** the solar system does not have energy storage capacity, which means it doesn't store excess energy generated during the day for

use at night. As a result, any energy consumption outside the solar generation hours (6 AM to 6 PM) is drawn from the grid.

**Energy Charges:** the electricity charges are structured based on normal peak and off-peak hours. Peak hours typically have higher rates due to higher demand, while off-peak hours have lower rates.

**This is incredible. We wish to share with our members and readers to take note of such developments and growth that these sustainable and green energy solutions can help the institutions and hospitals.**

**Is the Travancore Foundation, venturing in other forms and areas of sustainable energy solutions?**

## FEATURE

Electric vehicles (EVs) have gained significant attention and importance due to their potential to address various environmental, economic, and technological challenges. Local hospital transportation is increasingly adopting electric vehicles (EVs) for patient care, medical supply delivery, and staff mobility.

EVs enhance efficiency, reduce emissions, and improve air quality on hospital campuses. This shift demonstrates a commitment to sustainable healthcare practices while contributing to a healthier environment.

By incorporating electric vehicles into our fleet, the Travancore Foundation showcases a commitment to reducing carbon emissions

and combating air pollution, aligning with sustainable and eco-friendly practices. Electric vehicles generally have lower operational costs compared to conventional vehicles due to reduced maintenance needs and lower fuelling costs.

**Definitely adoption of electric vehicles in your fleet and transportation, displays your commitment to saving our climate. Please share your experience so far?**

Travancore Foundation too has embraced sustainable transportation with its electric vehicle fleet, consisting of two remarkable models: the MG ZS and the Tata Nexon EV. Additionally, an electric scooter, demonstrating a commitment to eco-friendly mobility.

MG ZS Electric, among the fleet is an impressive model with a remarkable driving range of 461 kilometres per full charge. This electric vehicle showcases remarkable energy efficiency and innovative design, allowing for extended journeys without frequent recharging. The Tata Nexon EV, is another key component of the fleet, boasting of a commendable driving range of 453 kilometres on a single full charge.

**Any more initiatives in progress, please share with our readers and members?**

Travancore Foundation proudly operates a biogas plant as part of its sustainable initiatives. This plant harnesses the power of organic waste to produce valuable biogas, contributing



## FEATURE

to a greener and more eco-friendly environment. The total capacity of the biogas plant is 9,000 litres of gas and by utilizing 30 kg of organic matter per day, the plant generates a substantial gas yield. The plant efficiently converts 30 kg of organic waste into energy and with this process we are able to produce approximately 1,200 litres (1.2 m<sup>3</sup>) of biogas per day.

The biogas plant has the capacity to process up to 30 kg of food waste per day. This waste is transformed into valuable biogas, minimizing the environmental impact of organic matter disposal. Utilizing food waste for biogas production has multiple benefits, including reducing methane emissions that would occur from food waste in landfills. The process also reduces the need for traditional fossil fuels, contributing to a more sustainable energy mix.

Travancore Foundation's biogas plant exemplifies a commitment to sustainable practices by efficiently converting organic waste into renewable energy.

This approach aligns with waste reduction goals, lowers the carbon footprint, and showcases responsible resource management.

Travancore Foundation's biogas plant serves as a testament to the organization's dedication to environmental preservation and sustainable energy generation.

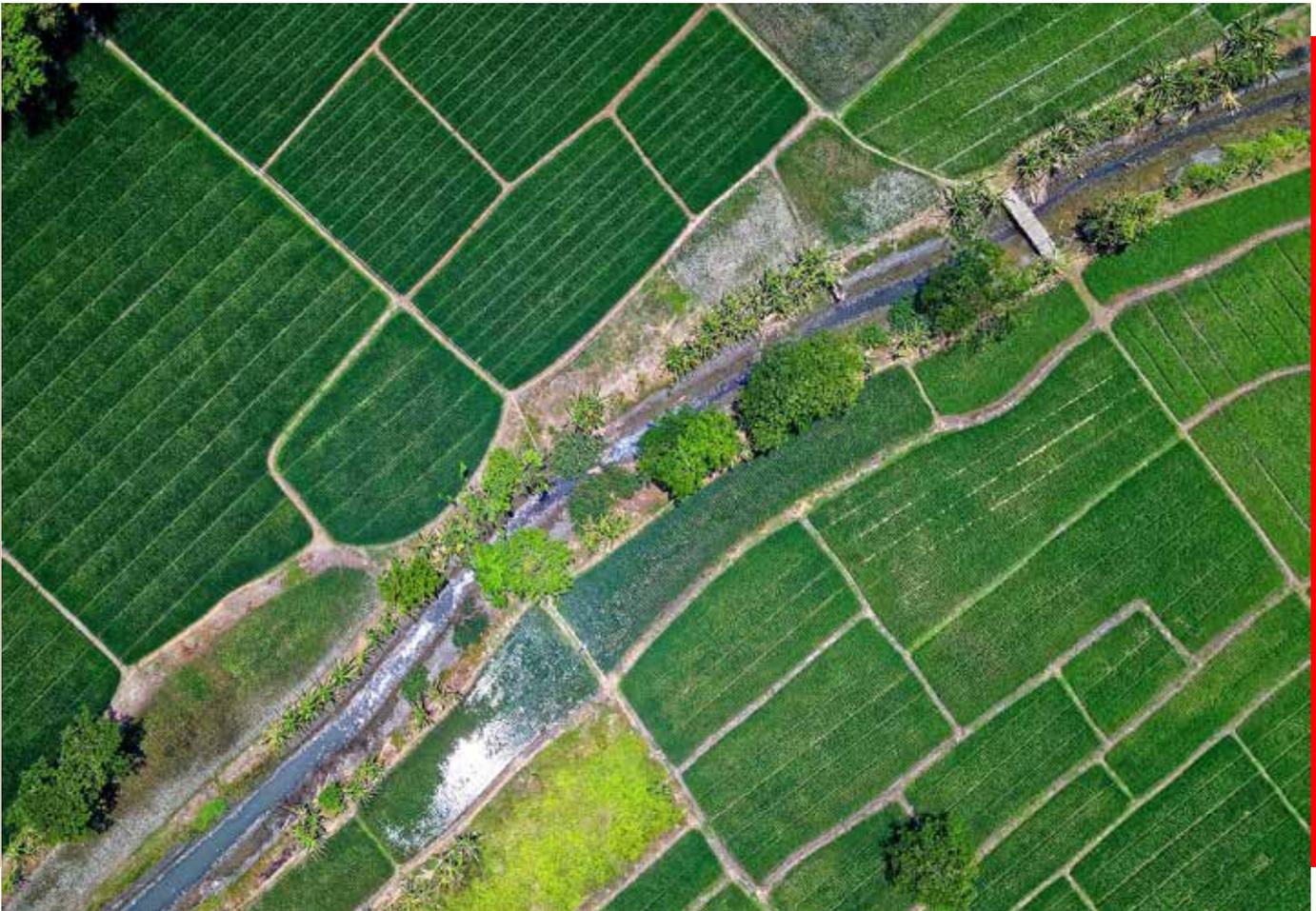
By efficiently utilizing organic waste to produce biogas, the foundation sets a positive example for responsible waste management and the reduction of greenhouse gas emissions.

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This article is created post an exclusive interaction of Mr Jiji Philip and Mr Christopher Peter, Lead - CMAI Communication Department

For more information on Trvancore Foundation, please visit [www.travancorefoundation.com](http://www.travancorefoundation.com)





## PRACTICING A CLIMATE SMART AGRICULTURE

### SALMON JACOB

Gajanan Rambhao Ghadge (52 years) is a farmer from Khursapar village in Umred block of Nagpur, with a family comprising of five members – viz. his wife and three grown up children. His eldest son works in the farm with him, while his second son works in a private company. His daughter, who is the youngest among them all, is studying in final year graduation - B.Com.

He has about 10 acres of farm land, where over the years he has been doing monoculture, which has been the tradition passed on to him by his fore-fathers. The crop production has been on the decline in recent years, on account of issues of water scarcity, depleting soil quality, erratic rainfall and issues of pest infestations, incurring significant financial losses.

Ghadge, over the years has been growing cotton, soyabean or chickpea in his farm. Water and irrigation is key, however it had its own challenges. Irrigation was traditionally done with the help of diesel pump, drawing water from an open well. The recurring cost of diesel to run the pump was a significant amount, which eroded into his income. He approximately needed about 6



to 8 litres of diesel daily, for a period of six months in a year, to meet the irrigation needs. In more recent times he also switched to electric pump, which along with the running cost, also came with a set of drawbacks. The power supply was unreliable, with erratic power cuts, at times no power for 5 to 6 days causing damage to crops as no irrigation is possible. Sometimes power was available only at night. During such occasions when power was available only during night times, he had to spend sleepless nights on the farm. During winters the nights are too cold – adding to the challenges. Some of the farmers from his village also died due to snake bite while irrigating their lands at night.

About two years back, Ghadge started participating in various agricultural trainings / exposure visits related to integrated / mixed farming and organic farming organised by World Vision India. This was a turning point in his life. The seeds of reformation were sown in his mind to develop his farms afresh in a new way. He started experimenting with mixed cropping in a small way. The water was limited, and so could not meet the requirement through the traditional flooding method of irrigation. However, with better results in his crop produce, Ghadge was keen to build on his new learnings. He then started experimenting with organic manure that he started developing in a small way. The chemical fertilisers

and pesticides which he used traditionally also eroded into his income, leaving too little to make ends meet. The success with gradual inclusion of organic fertilisers and organic pesticides along with his traditional methods, further cemented his resolve to build on, and not to turn back.

Continued handholding support from World Vision India, enabled Ghadge and number of other farmers to develop the mixed farming practice. Today, Ghadge is able to grow cotton, soyabean, chickpea, wheat, groundnut, mosambi as well as vegetables in his farm, as against a couple of crops like cotton, soyabean or chickpea grown earlier in a year. He has divided the available 10 acres of land into different segments

Sr. No.	Crops grown		Production (Quintal)		Increase in Production (%)	Chemical Fertiliser use		
	Before	At present	Before	At present		Before (Kg)	At Present (Kg)	Reduction (%)
1.	Soyabean	Soyabean	25	42	68%	2500	1000	60%
2.	Cotton	Cotton	4	10	150%			
3.	Chickpea (Chana)	Chickpea (Chana)	4	10	150%			
4.	-	Wheat	0	15	100%			
5.	-	Groundnut	0	10	100%			
6.		Mosambi	0	Fruiting next year	Expected next year			
7.	-	Vegetables	0	For household consumption	100%			

where he grows a combination of crops, which complements one another. He has added fruit tree of mosambi as agroforestry along with the crops, in 5 acres of land. A total of 555 mosambi trees have already been planted.

As part of the learnings from various trainings, land bunding was done in the farms in Khursapar village and adjoining villages, which helped in improving the infiltration of rainwater, thereby improving the ground water table in the area. World Vision India also initiated the construction of farm ponds and community ponds in the area, thereby harvesting rainwater and also further improve the ground water table, providing the much needed water for irrigation and other needs. The improved availability of water gave a much needed boost to Ghadge and other farmers in the village.

Subsequently, World Vision

India supported Ghadge and other farmers to switch to solar irrigation pumps, by providing a portion of the solar pump cost and facilitating the tapping of subsidy scheme of the Government of India on solar pumps. Through this initiative, Ghadge received a 5 HP solar pump, which met all his irrigational needs – most importantly with no recurring cost, as it did not require diesel or electricity for its functioning and operated on clean renewable energy.

In addition, Ghadge also received sprinkler micro-irrigation system, which further enabled improved crop production with less water, compared to the traditional flooding method, thereby effectively managing the available water resources for optimum benefit. The estimated reduction in emission of carbon dioxide and savings through the adoption of solar irrigation pump, is as discussed below:

- Estimated CO2 emission by burning of 1 litre diesel = 2.64 kg of CO2
  - Per day CO2 emission from his farm = 2.64 x 7 (litres per day) = 18.48 Kg of CO2
  - Per month CO2 emission from his farm = 7 (litre) x 30 (days) x 18.48 = 554.4 Kg of CO2
  - Per year CO2 emission from his farm = 7 (litre) x 30 (days) x 6 (mths usage) x 554.4 = 3.3 tonnes of CO2
  - Estimated saving of diesel usage per year from Ghadge’s farm = 1260 litres
  - Estimated cost saving per year for Ghadge by switching to solar pump = INR 1,22,220 /-
- This is significant, as it is the contribution from 1 farmer, who is a representative of many other farmers from Umred



block, who have adopted solar irrigation system. He is able to reduce his emission by 3.3 tonnes of CO<sub>2</sub>. The emission reduction from 15 farmers having similar irrigation needs would be about 50 tonnes of CO<sub>2</sub> per year, which is a good contribution to the larger climate change mitigation efforts.

The crop productivity and benefits as a result of the integrated / mixed farming practices for Ghadge, is as mentioned in the table below. This is indicative of the positive benefits, as the figures are mentioned by the farmer, and not verified.

The above table shows the

increase in crop production that was achieved, along with crop diversification, and increase in the food basket at household level as vegetables for household consumption is also now being grown. The vegetables grown include tomato, brinjal, chilli, cluster beans etc. The use of chemical fertilisers over the past one year was reduced by 60% and organic fertilisers have slowly been introduced. He is developing organic fertilisers in-house, like vermi-compost, vermi-wash & other organic nutrient mix, and used in the farms.

The use of chemical fertilisers will be further reduced gradually, and more of organic

fertilisers used. Similarly Ghadge has switched from chemical pesticides to Neem seed based organic pesticides, which he is now preparing in-house.

These changes on the one side is improving the soil quality, crop produce and also reducing his input cost in the crop production.

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Case Study of a farmer practicing climate smart agriculture, from Umred block, Nagpur

By Dr. Salmon Jacob, Regional Climate Change Adaptation Advisor  
– World Vision International



# **GREEN HOSPITALS AND THE LEPROSY MISSION IN INDIA**

**WILLS MATHEW**

In a world increasingly grappling with the ominous threat of climate change, the quest for sustainable energy solutions has become paramount. Combatting the effects, The Leprosy Mission Trust India (TLMTI), an organization whose commitment to environmental consciousness shines as a beacon of hope. Harnessing the power of sustainable energy sources, The Leprosy Mission exemplifies a

groundbreaking approach to healthcare that transcends traditional boundaries.

Sustainable energy refers to energy sources that have minimal negative impact on the environment and can be used without depleting natural resources. Transitioning to sustainable energy sources can reduce greenhouse gas emissions and minimize our reliance on finite fossil fuels.

Climate change is a major

threat to the healthcare sector. Hospitals are resource-intensive establishments that consume large amounts of energy, water, food, and construction materials to provide high quality care. This makes them major contributors to climate change. Extreme weather conditions are becoming more common and can damage hospitals and disrupt healthcare delivery.

Healthcare institutions, by employing simple, smart,



## WELL-DESIGNED HOSPITAL BUILDINGS REDUCE CARBON FOOTPRINT AND CONTRIBUTE TO THE HEALING PROCESS

and sustainable measures can greatly reduce their environmental footprint. Well-designed hospital buildings and reducing carbon footprint mechanisms contribute to the healing process. Increasingly therefore, designers are focusing on green strategies and alternate energy sources to enhance the positive impacts on patients and staff in hospitals.

TLMTI is consciously implementing various methods of reducing carbon footprint to enable a greener hospital environment.

- Installation of Solar plants: 17 TLMTI campuses have installed solar plants which are reducing the use of electricity

and together generating around 1MW green power through Solar installations.

- Rainwater collection tank and harvesting.

- Effluent Treatment Plant (ETP)

- Medical waste which can't be recycled or composted is burnt cleanly in a government-controlled board approved incinerators and/or collected by third parties daily from campus.

- Tending gardens and producing vermi compost from fallen leaves and branches.

- Solar water heater for patient care.

- Solar powered emergency

lights at nursing stations.

- Banning all plastic & Polystyrene of hospital instead using disposable earthen/clay drinking cups and leaf-bowls or degradable bags.

- Several solar powered lamp posts to light the campus.

- Various plantation in the campus

As progressive mechanism beyond the above actions, TLMTI for a GREEN HOSPITAL initiation is planning to have a process of collection measurable variables as a baseline to understand carbon footprint of following across TLMTL campuses:

- Vehicle fuel/ per year (Fossil fuel) Offset by Electric cars/

## FEATURE

vehicles. personal/ institution

- Generator fuel/ per year (Fossil fuel)
- Electricity Units/ year (offset by solar units generated)
- Loss or increase in Vegetation/ Green cover (Trees planted/ Green cover created Vs Trees cut/ Green area lost (construction/renovation)
- Bio-gas plant
- Rainwater Harvesting plant
- Wastewater re-cycling/ conservation
- Solar Water Heaters- capacity
- Solar Plants
- Paper used in unit (purchased? printing etc.)
- Mercury Thermometers/ BP apparatus/ lead paints etc.

The Leprosy Mission was founded in 1874 as 'The Mission to Lepers' by an Irishman named Wellesley Cosby Bailey, in Ambala, India. Subsequently in 1973, The Leprosy Mission Trust India (TLMTI) was registered as a Society under the Societies Registration Act of 1860.

TLMTI is the largest leprosy-focused non-governmental organization in India and is headquartered in New Delhi, India. The organization works with people affected by leprosy, people with disabilities, marginalized communities, especially women and other neglected tropical diseases (NTDs). TLMTI has a diverse set of programmes – Healthcare, Sustainable

Livelihood, Community Empowerment, Advocacy, and Research and Training.

These programmes are implemented through 15 hospitals and two clinics, six vocational training centers, four residential care homes for elderly persons affected by leprosy, nine community empowerment projects, and a research laboratory, spread across 9 states of India – Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh, and West Bengal.

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Mr Wills Mathew, Audit & Risk Management - The Leprosy Mission Trust India



**TLMTI IS CONCIIOUSLY IMPLEMENTING VARIOUS METHODS TO ENABLE A GREENER HOSPITAL**



# JALNA MISSION HOSPITAL SPREADING LIGHT WITH SOLAR ENERGY

**DR CHRISTOPHER D MOSES**

Solar energy can help healthcare facilities reduce their energy bills and save money. By installing solar panels, healthcare facilities can generate their own electricity and reduce their dependence on the grid. This can result in significant cost savings, which can be reinvested in patient care and medical research.

There are two types of solar panels: thermal and photovoltaic. Thermal solar panels concentrate sunlight to produce heat. Photovoltaic

(PV) solar panels capture energy from the sun and convert it into electricity.

Rooftop solar power can meet up to 20% of a hospital's electricity requirements in India.

If an hospital consumes a lot of diesel for power generation, rooftop solar can abate up to 20% of the diesel bills, subject to timing of load shedding. 100 SF of shade-free rooftop space can provide 4 kWh of solar power per day, on average

a hospital will be seen as a trendsetter and early adopter of solar power.

Some key features:

**Energy security:** Rooftop solar plants can deliver power during load-shedding, ensuring that critical loads are always running if you are not connected to the grid. If connected to the grid you have to shift to the generator as reverse flow of current into the grid can electrocute someone who may be doing electrical

work nearby.

**Cost-effective:** Rooftop solar power has a levelized a cost of Rs. 4.5-5/kWh (or less), considerably lower than diesel power cost at Rs. 18/kWh (or more). Additionally, energy cost is now fixed for the next 25 years, unlike diesel power which keeps increasing

**Reliable:** A solar power plant has no moving parts, ensuring reliable power over 25 years

**Minimal maintenance:** A solar plant requires very little maintenance from the energy consumer

**Flexible configurations:** Solar panels can be installed on different kinds of roofs, including covered parking areas, as long as the structure can bear the weight of the panels. They are also highly scalable, with rooftop plants ranging in capacity from less

than 1 kW to more than 1 MW

**Rooftop space:** The capacity of the solar plant that can be installed in a hospital may be constrained by lack of sufficient shadow-free rooftop space. Roof requirements are discussed in detail here; a rule of thumb is that you will need about 100 SF of shade-free roof area for 1 kW of solar panels. Insufficient roof area will mean that the capacity of



## FEATURE

the solar plant on your roof may be sufficient to meet only part of your electrical load.

**Infirm power:** Solar power is dependent on the sun shining, and output varies depending on meteorological conditions e.g., passing clouds can temporarily reduce the solar plant's output. Therefore solar power for critical equipment should be used in conjunction with another source of power. This is a critical part of the design for hospitals, where solar may be used to power life-saving equipment

**Daylight power:** Solar power is only available when the sun shines. Therefore night time applications will require other sources of power, or power from batteries charged through solar.

**Load-shedding timings:** If your hospital experiences load shedding primarily at night, solar power may not help in reducing your diesel consumption as it is available only during the day.

**Inverter weight:** The DC power output from the solar panels needs to be converted to AC via an inverter which can be very heavy: a 100 kW inverter will weigh about 1,000 Kgs but occupy only a few square feet of space. If the construction cannot support this weight the inverter may need to be placed on the ground floor, with appropriate cables chosen to compensate for energy loss.

### **Jalna Mission Hospital's experience in the installation**

### **of the residential solar energy.**

1. The hospital has an agreement for 25 years
2. Energy cost is Rs 5.40 per unit as against state grid cost of Rs 9.50 per unit
3. Excess energy produced is metered to the grid and that amount is deducted from the state board bill every month
4. A clause has been incorporated in the MOU whenever state grid cost ...if ever...comes below the solar cost per unit, solar cost will be lowered by 50 paise below the grid cost. A situation most unlikely to occur
5. Solar per unit cost will remain static for the next 25 years
6. Hospital had to furnish a bank guarantee of Rs 25L for the first 3 years and then Rs 6L for the next 6 years
7. The hospital did not opt for storage devices/batteries as they're a recurring cost
8. Installed 150 Kwp solar power plant on rooftop which takes care of the needs of the hospital, school of nursing, nurses' hostel and about 30 staff quarters in the same campus
9. The site engineer visits every month for checking the solar panels, meter reading, preparation of energy bills, repairs if any etc.

This cost is met by the service provider, including the responsibility of the insurance

against breakages

### **Benefits of Residential Solar**

- 1: Solar panels are increasingly affordable
- 2: Save money by going solar
- 3: Keep the lights on when the grid goes down
- 4: Solar will often increase the value of your home/property
- 5: Solar systems work in a variety of climates

### **Disadvantages:**

1. Initial Cost
2. Pollution and Environmental Impact. Discarding photoelectric cells and panels which still is undecided on their impact
3. Space Limitations
4. Inefficient Energy Conversion
5. Energy Storage Cost. Batteries need to be replaced every 3-4 years though solar panels have long life
6. Sunlight Unpredictability
7. No Energy Production at Night

### **Documents required for installation of solar energy plant of large scale on energy payment basis and not direct purchase**

1. Balance Sheet – Last 3 years
2. FCRA – Foreign Funding Expenditure Statement – Last 3 years
3. Clear Copy of Trust registration certificate
4. Trust profile



### Financial implications as experienced by the Jalna Mission Hospital:

1. Energy bill purely of state electricity board before 2018 was Rs 2.50L each month (average)
2. Current state grid monthly bill varies between Rs 15000-25000 and the solar generation bill between Rs 75000-100000. Approximately Rs 1.25L per month, almost half of the past
3. The diesel utilisation of the generator (125Kw) hasn't changed much as whenever there is power cut or repairs on the grid, solar flow across the meter also has to be suspended
4. Voltage fluctuations are avoided thus leading to less damage to equipment

### Why NOT to own a solar energy plant...

a) Heavy cost. A few crores

b) Entire responsibility and adequate function is of the hospital

c) Repairs, Maintenance, Insurance are hospital's challenge

d) Rental agreement has an exit clause as well as the plant becomes yours at the end of 25 years. Similar to BOT principle of tolled roads.

### Additional green initiatives undertaken by Jalna Mission Hospital:

**Rain Water Harvesting:** We also have fully developed rooftop rain water harvesting system where rain water from the rooftop is channelled through sand filters into 2 open wells. This water is mainly used for cleaning, mopping, gardening and toilets and bathrooms. Till about 10 years ago, come February, we had to start buying water for all the above activities. And this

would go on till July. Each month our water purchase bill used to be Rs 2.0-2.4L. Last 10 years we've never had to purchase water.

### Sewage Treatment Plant:

I think we can next start thinking about diverting our sewage treatment plant water for gardening at least. One may ask why only gardening and toilets? Well it would mean changing entire piping of the institution and having separate rooftop water tanks etc. Here at ground level watering the garden and starting a vegetable garden on large scale for staff as well as nursing students hostel is far more cost effective.

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Dr C D Moses, Medical Superintendent/CEO, Jalna Mission Hospital is also the current Editor of CMJI.



# CHRISTIAN DISCIPLESHIP

**DRA T MOSHER**

St. Paul said: 'Now ye are the body of Christ, and members in particular. And God hath set some in the church, first apostles, secondarily prophets, thirdly teachers, after that miracles, then gifts of healings, helps, governments, diversities of tongues.

Martin Luther said: 'It is pure invention that pope, bishops, priests, and monks are to be called the "spiritual estate", princes, lords, artisans, and farmers the "temporal estate".... A cobbler, a smith,

a farmer, each has the work and office of his trade, and yet they are all alike consecrated priests and bishops, and every one by means of his own office must benefit and serve every other, that in this way many kinds of work may be done for the bodily and spiritual welfare of the community, even as all the members of the body serve one another'.

We are recognizing again these days that what we do in our occupations is a real part of our faith in God: that

doctors, teachers, research workers have as definite a part in God's plan for our age as theologians and pastors. But we are all susceptible to a common failing.

Although we recognize and claim this divine calling, we are likely to neglect nurturing one or the other side of it. By temperament, some of us prefer to study theological literature, spend much time in worship, much time in prayer. By temperament, others of us lean toward study of

# SUSTAINABLE ENERGY AND GREENHOUSE GAS EMISSIONS



Sustainable energy refers to energy sources that have minimal negative impact on the environment and can be used without depleting natural resources. Examples include solar, wind, hydro, and geothermal energy. These sources are considered sustainable because they produce little to no greenhouse gas emissions, which are a major contributor to global warming and climate change.

Greenhouse gases, such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), trap heat in the Earth's atmosphere, leading to an increase in global temperatures. This phenomenon, known as the greenhouse effect, is largely driven by human activities like burning fossil fuels (coal, oil, and natural gas) for energy, deforestation, and industrial processes. The resulting rise

in temperatures can lead to melting ice caps, rising sea levels, extreme weather events, and disruption of ecosystems.

Transitioning to sustainable energy sources is essential to mitigate the effects of climate change. Solar energy harnesses sunlight through photovoltaic cells, while wind energy utilizes wind turbines to generate electricity. Hydroelectric power is generated from flowing water, and geothermal energy taps into the Earth's heat. By adopting these sources, we can reduce greenhouse gas emissions and minimize our reliance on finite fossil fuels.

Governments, businesses, and individuals play a vital role in promoting sustainable energy adoption. Policies that incentivize renewable energy production and consumption, such as tax credits and subsidies, can accelerate the

shift away from fossil fuels. Technological advancements, improved infrastructure, and energy storage solutions are also crucial to ensure consistent and reliable access to sustainable energy.

In conclusion, the transition to sustainable energy sources is crucial for reducing greenhouse gas emissions and combating climate change. By embracing solar, wind, hydro, and geothermal energy, we can mitigate environmental damage and work towards a more sustainable and resilient future.

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Mr Wills Mathew, Audit & Risk Management - The Leprosy Mission Trust India



# RAINWATER HARVESTING IN RURAL HOSPITALS IS SUSTAINABLE

**CHRISTOPHER N PETER**

In the quest for sustainable and resilient healthcare infrastructure, rainwater harvesting has emerged as a promising solution for addressing water scarcity challenges in rural hospitals. These facilities often face the dual challenge of providing quality medical services while coping with limited access to water resources.

Rainwater harvesting presents an innovative and environmentally friendly approach that can alleviate these challenges while

promoting self-sufficiency and cost-effectiveness.

## **The Importance of Water in Rural Hospitals**

Access to clean and reliable water is paramount for the functioning of healthcare facilities, as water is essential for medical procedures, sanitation, hygiene, and general hospital operations.

However, rural hospitals frequently grapple with inadequate water supplies, unreliable sources, and high costs associated with water

procurement and maintenance.

Rainwater harvesting is a technique that involves collecting and storing rainwater for future use. This water can be used for a variety of purposes, including flushing toilets, cleaning, laundry, and even certain medical procedures.

Rural hospitals can benefit from rainwater harvesting in several ways. Rainwater harvesting increases the availability of water, ensuring a consistent supply for various hospital activities. By tapping

into rainwater, hospitals can reduce their dependence on unreliable or distant water sources.

Implementing rainwater harvesting systems can significantly reduce water bills and operational costs for rural hospitals. The initial investment in setting up the system can lead to substantial long-term savings, making it a financially prudent choice.

Rainwater harvesting enhances the hospital's resilience against water shortages, especially during droughts or disruptions in municipal water supply. The stored rainwater serves as a backup, ensuring that essential services can continue without interruption.

This practice aligns with sustainable and eco-friendly practices by reducing the hospital's reliance on groundwater and decreasing the burden on local water resources. It also contributes to water conservation efforts and minimizes the hospital's ecological footprint.

Successful integration of rainwater harvesting in rural hospitals requires careful planning, technical expertise, and community involvement. Here are some key considerations:

1. **Site Assessment:** Evaluate the hospital's location, roof area, rainfall patterns, and water requirements to determine the feasibility and design of the harvesting

system.

2. **System Design:** Design the system to include gutters, downspouts, filters, storage tanks, and distribution mechanisms. The design should consider factors such as water quality, storage capacity, and treatment methods.

3. **Community Engagement:** Involve hospital staff, local communities, and relevant authorities in the decision-making process. This fosters ownership and encourages sustainable use of the harvested rainwater.

4. **Maintenance:** Regular maintenance is crucial to ensure the efficiency and hygiene of the system. Cleaning gutters, filters, and tanks, along with water quality testing, should be part of the routine.

### **Conclusion:**

Rainwater harvesting holds immense potential for transforming water management in rural hospitals.

By harnessing a natural resource, these facilities can enhance their water security, reduce costs, and contribute to environmental conservation.

As the world continues to prioritize sustainability, embracing rainwater harvesting not only addresses immediate water challenges but also contributes to the long-term well-being of both healthcare systems and the communities they serve.

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Mr Christopher N Peter, Lead  
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# e-CMJJ on CMAI Website

Dear Members,

CMJJ as a quarterly journal and an official publication for Christian Medical Association of India, with its online presence today, brings a much wider reach, diversity, and a global reach. The print run of CMJJ, for recent editions, due to the pandemic was held up by the editorial team and the leadership. We regret the inconvenience and wish to inform that we are working to provide our members with the printed copies of the editions.

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## Past 3-Year Editions

We are excited as you view both new and old editions (2015-2020) of CMJJ. In case you require older editions please send an email to [communication@cmai.org](mailto:communication@cmai.org)

We on behalf of CMAI editorial team, thank you for being our support and helping us in building a just and healthy society.

## Regards

*Editor - CMJJ*

*Head Communications - CMAI*

# Join Hands with us in the Healing Ministry

## CHRISTIAN MEDICAL ASSOCIATION OF INDIA

CMAI is a national network of health professionals and institutions promoting a just and healthy society for all irrespective of religion, caste, economic status, gender or language

- CMAI has over 10,000 Christian health care professionals and over 270 institutions representing various denominations.
- CMAI builds Individuals to be technically sound, spiritually alive, and socially relevant, in fellowship and with a Christian perspective on health and development.
- CMAI is the health arm of the National Council of Churches in India(NCCI).

### WHAT DO WE DO?

- Build capacity to respond to the current and future health care needs
- Advocate for innovations, create evidence and promote policy change
- Work closely with the churches, civil society and the government
- Build alliances for health action on a national scale
- CMAI influences other networks and alliances on thinking change in health systems practices in India. We partner with national and international agencies to promote this objective.

### OUR PUBLICATIONS

- Christian Medical Journal of India (Perspective)
- Life for All (Newsletter)
- Footsteps (Development) English & Hindi (A Tearfund publication distributed by CMAI)

### COME JOIN US

The core of CMAI is its members- Individuals and institutions. Individual membership consists of five professional groups - Doctors, Nurses, Allied Health Professionals, Chaplains and Administrators. Each section comes together for conferences, workshops, a time of fellowship to learn from, to share with and to encourage each other spiritually and professionally.

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