

**National Strategic Consultation on
Green Technology for Fisheries Sector
12 - 13 July 2013
Nagercoil, Tamil Nadu**

Report

1.0 A National Strategic Consultation on Green Technologies for Fisheries Sector (NSCGTF) was held at Nagercoil in Kanniyakumari district of Tamil Nadu from 12-13 July 2013. The objective of the NSCGTF was to share the findings of pilot-scale activities on the utilization of solar power in maintaining auxiliary activities on-board fishing vessels, understanding technical requirements and policy support in scaling up the use of solar power in fisheries sector and reducing fuel consumption to improve profitability and reducing carbon footprints of fishing operations. The NSCGTF was organized in the backdrop of escalating fuel costs, which are the largest contributing factors in the operational cost of powered fishing vessels. The NSCGTF was organized by the Association of Deep Sea Going Artisanal Fishermen (ADSGAF) in collaboration with the Ministry of New and Renewable Energy, Government of India (MNRE) and the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO). The NSCGTF was also supported by the South Indian Federation of Fishermen Societies (SIFFS); Kerala Matsya Thozhilali Federation (KSMTF); Kanniyakumari District Fishermen Sangams Federation; Nagapattanam District Fishermen Sangams Federation (NDFSF); International Collective in Support of Fishworkers (ICSF); Fisheries Management Resource Centre (FishMARC); AIMS; GUIDE; Building and Enabling Disaster Resilience of Coastal Communities (*BEDROC*); Southern Construction and Contract Works; Tamil Nadu Rural Reconstruction Movement (TRRM); Sirius Controls Private Limited; Jagath Jothi Solar Energy (P) Limited; A S Moloobhoy & Sons; Gladson Exporters; Jude Foods; Johnson's Centre for Development and Consultancy; Indian Overseas bank (Nadaikavoo Branch) and Raj TV.

Inaugural Session (Session 1)

2.0 109 participants from various national and international organizations, academia, fisheries research and development (R&D) institutions, service providers, financial institutions, fishermen organizations, media and organizers took part. Ms Helen Davidson, Member of Parliament, Nagercoil, inaugurated the NSCGTF and also chaired the Inaugural Session. The NSCGTF was conducted in Tamil language. The Agenda of the NSCGTF is given in **Annex 1** and the List of Participants is given in **Annex 2**.

3.0 Welcoming the participants, Mr J Vincent Jain, Chief Executive, ADSGAF said that since long members of the ADSGAF are raising the issue of increasing fuel prices leading to decline in their income from fisheries. He said that fuel cost is accounting for about 70 percent of the total operational costs and to compensate for the increasing cost, fishermen have extended the duration of their voyage from about 10 days a decade earlier to about 45 days now. Despite this increase in fishing duration, they are still finding it difficult to make their operations viable. Faced with this challenge and also considering the carbon footprints generated by the fisheries sector the Association decided to experiment with the use of solar energy in fishing vessels in 2010. The Association has since then carried out several techno-economic assessments and pilot trials to measure the efficacy and viability of their

venture. It is found that while at sea the engine is run for several hours at partial load to provide power for auxiliary activities such as lighting, communication, navigation, signalling and on-board entertainment. Therefore, if these services can be run by using alternative power sources there could be a significant saving of fuel and this will improve the viability of the operation as well as reduce the carbon footprints. He hoped that the NSCGTF would help in sharing the lessons learned so far and also critically look at the scope of using solar energy in the fishing vessels.

4.0 In his opening remark, Dr Yugraj Singh Yadava, Director, BOBP-IGO welcomed the participants and appreciated the effort of the community to search for viable solutions to make cost-effective and greener fishery. He said that although the scope of solar energy is well-known, certain technological challenges are needed to be addressed before making it operational. Dr Yadava said that the BOBP-IGO is closely involved with this venture and monitoring its progress keenly. Informing the participants about the policy framework on this issue, he said that a committee has been constituted by the Ministry of Agriculture, Government of India (MoA) under the Secretary, MoA to find ways and means to make fisheries sustainable and more remunerative. Among other ways and means, this committee is also considering use of solar energy in fishing vessels. He said that, the Government is keen on promoting the use of alternative energies and a dedicated Ministry in the form of MNRE is working towards this. He called for greater public-private cooperation in research and implementation to addressing the challenges associated with promotion of alternative and greener energy.

5.0 In her opening remark, Ms Davidson said that solar energy is a viable alternate energy source to address power shortage and appreciated the initiatives of the fishermen community for using solar energy in fishing. She said that there are more than 42 fishing villages in Kanniyakumari District and the fishermen of these villages are using diesel and kerosene for fishing. However, the increasing cost of diesel and kerosene was affecting their income. In addition, it was also not easy to get fuel on time. Ms Davidson said that fishing is one of the major sources of earning foreign exchange in the country, yet the sector's contribution to the economy has not being recognised properly. Therefore, the Government should take note of this initiative and provide the solar equipments through grants or easy loan to fishermen. She said that using solar energy could create a win-win situation as it would help in reducing carbon emissions too and making it environment- friendly. She hoped that the 2-day Consultation would bring innovative ideas of using solar energy in fisheries sector and the recommendations of the Consultation would help the fishing community to enhance their fishing and improve the revenue. She thanked the organizers for their effort in arranging the Consultation highlighting such an important issue.

6.0 Mr B Romanse, Secretary, AD SGAF delivered the Vote of Thanks. He appreciated the participants for taking time out of their schedule to attend the NSCGTF in Nagercoil. He thanked the collaborating agencies for their support in organizing the Consultation.

Technical Presentations (Session 2)

7.0 The technical presentation started with a presentation by Mr N Ravisundhar, Managing Director, Jagath Jothi Solar Energy Private Ltd., Chennai which is collaborating with the AD SGAF in implementing the pilot-scale project. The presentation entitled "Power from the Sun" introduced the company and its experience in promoting the use of solar

power in fisheries sector. Mr Ravisundhar said that Jagath Jothi Solar Energy is one of the leading manufacturers of solar based energy efficient LED lighting systems and Solar based total solution EPC provider. He said that there is some scepticism about the potential of solar energy. Solar energy will certainly play an important role to meet the future energy needs of our planet, but it's also here today and ready for hundreds of uses in homes, businesses, and industry. Explaining the mechanism of converting sun's energy into usable electrical energy, solar panels comprise photo-voltaic cells (PV cells), which trap solar energy and convert it into electrical energy. The energy output of a 1 KW solar energy unit is roughly equivalent to the burning of 170 pounds of coal and 300 pounds of carbon dioxide being released in to the atmosphere. Sharing the details of the Company's work in providing solar power to fishing vessels, he said that the Company is installing 1 kilo-watt (KW) solar power plants in the fishing vessels, which is sufficient for energy efficient CFL lighting and charging of GPS, mobiles, etc. The Plant also comprises a battery where energy could be stored for use during night. Mr Ravisundhar provided technical details of inputs use and their efficiency and also shared the experience of the Company in promoting solar power in other sectors.

8.0 The next technical presentation was made by Mr M Krishnan, Managing Director, Sirius Controls Private Limited, Bangalore, which is collaborating with the AD SGAF in implementing the pilot-scale project. The presentation, entitled "Present status of solar energy in various fields in India/world" provided a detail on global trend in using solar energy and also introduced the 'Neptune Solution' developed by the Company for the fisheries sector. Mr Krishnan said that 70 percent of operating cost of a powered fishing vessel is towards diesel and the diesel consumption is more because fishermen are apprehensive that if the engine is turned off, starting the engine could be difficult. In addition, batteries get discharged while starting the engine. He said that solar plants can address these issues and explained in detail the procedure for installing solar plant in a fishing vessel. Sharing the cost-benefit data from pilot-scale trials, he said that a solar plant as used by his Company would cost about Rs. 3.75 lakhs including installation and can generate an approximate saving of about Rs. 21 lakhs in five years by reducing fuel consumption and as a byproduct of this operation carbon emission is reduced to a large extent. He said that the efficacy of solar plants can be enhanced by using the higher quality solar panels, flexible solar panels, lithium Ion batteries, etc. Mr Krishnan called for governmental support to promote this initiative as it would enhance the fisheries livelihoods.

9.0 Dr Yugraj Singh Yadava made the next technical presentation on "Promotion of solar energy and energy conservation in India: Government policies and programmes". He said that the experimental use of solar panels in fishing vessels would provide vital information on the scope of use of alternative and renewable energy sources in fisheries and if successful, there would be considerable reduction in fuel consumption. He said that fisheries is one of the largest consumers of fossil fuel. By using solar energy, it is possible to reduce the dependence of the sector on fossil fuel. In terms of policy, these trials are adhering to two important governmental policies of energy conservation and promotion of non-conventional and renewable sources of energy – namely the solar energy. Dr Yadava said that India was the first country in the world to set up a Ministry of Non-Conventional Energy Resources in early 1980s and by 2000s, solar energy was identified as a possible solution for addressing power crisis and connectivity problems in power distribution and

beginning mid-2000, government took several measures to promote solar energy with other renewable non-conventional energy resources. In 2009, government initiated the Jawaharlal Nehru National Solar Mission (JNNSM) as one of the 8 missions to deal with climate change. The plan has an ambitious target of generating 20,000 MW solar power by 2020 in three phases using both on-grid and off-grid technologies. As a result of these efforts and policies, the utilization of solar energy has increased in India and many solar power stations have been established in different parts of the country. He said that although there are no specific schemes that could address the promotion of solar power in fisheries sector, the Governmental programme to promote use of rooftop solar panels, closely resemble it and could be extended to the fisheries sector. He said that the MNRE and the National Bank of Agriculture and Rural Development (NABARD) have several scheme on providing financial assistance for promotion of solar energy apart from dedicated MNRE schemes of solar R&D, awareness creation and information dissemination, etc. He suggested that the Government may consider bring fisheries sector under the purview of the schemes. Apart from schemes on promotion of solar power, there are also several schemes to encourage conservation of fossil fuel. A scheme to promote efficient pump sets and optimize use of pumps in agriculture sector as it is a major consumer of fossil fuel already exists. Such scheme should also consider fisheries sector as a user group since the country has over one lakh mechanized and motorized (powered) fishing vessels, which are using fuel powered engines for 250-300 days in a year. He called for integrating fisheries in such schemes and requested the ADSGAF to seek clarification from the Government on position of fisheries sector in such schemes.

10.0 Mr J Vincent Jain made a video presentation on “Overview of the work done so far by ADSGAF in Promotion of use of Solar Energy in Fisheries Sector”. The presentation has been uploaded on the YouTube and can be viewed at [®] (<http://www.youtube.com/watch?v=XiCh8Rkw8eM&feature=youtu.be>).

11.0 Dr Leela Edwin, Principal Scientist & Head of the Division, Fisheries Technology Division, Central Institute of Fisheries Technology (CIFT) made the next technical presentation on “Reducing Energy Use in Fisheries”. She said that the global capture fisheries consumes about 50 billion liters of fuel annually and releases about 134 million tonnes of CO₂ into the atmosphere which is equivalent to 1.7 tonnes of CO₂ per tonne of live-weight fish landed. While, Indian capture fisheries consumes 1220 million liters of fuel annually and releases about 3.17 million tonnes of CO₂ into the atmosphere, which is equivalent to 1.13 tonnes of CO₂ per tonne of live-weight of marine fish landed. However, this data on Indian fisheries is pertaining to the year 2000 and since then there have been more entries in the rank of powered fishing vessels, which according to the latest national marine fisheries census (2010) comprise 74 percent of the total fishing craft in the country. She said that certain technical and behavioral measures can be taken to reduce consumption of fuel including using correct nozzle and low rpm propeller combination for trawling speed; using insulated fish holds in multi-day fishing vessels, optimizing mesh size to reduce drag in trawl nets and preventing fouling of the propeller in combination with proper fishing techniques and choice of right gear and location. Dr Edwin said that vessels are now constructed by boatyards incorporating traditional boat building knowledge modified for local fishing needs and the size of the craft and power use has been increasing. However, very little scientific input has been incorporated into better boat building material, fuel efficiency through improved propulsion systems, ensuring structural

parameters and safety aspects of the crew. She said that the lack of Indian Fishing Vessel Standards for small fishing vessels is a major stumbling block in ensuring operationally efficient fishing systems, as it has to take into account the structural stability, operational efficiency, safety of fishing vessels, gear standards etc. She suggested that institutional arrangements should be put into place to ensure efficacy and safety of fishing operations and called for R&D initiatives in making fishing greener.

Technical Demonstrations on Application of Solar Energy in Fisheries Sector

12.0 Following the technical presentations, the ADSGAF and the technological service providers made a demonstration on the versatility of using solar energy.

Solar CCRF Reader: The Solar CCRF reader is a display screen operated with solar energy. The purpose of developing the display screen was to disseminate knowledge on the Code of Conduct for Responsible Fisheries of the Food and Agriculture Organization of the United Nations (CCRF) in the fishing villages during the free hours available to the fishermen. As it is difficult to arrange projection and digital media in such places, the low-cost and easily assembled display units could be used to create awareness on responsible fishing practices as well as on other issues. This prototype unit runs with two wiper motors such as used in sewing machines and is powered by a 75 watt solar panel. A wooden frame was made to hold the PVC rollers at the top and the bottom of the frame.

Solar powered insulated van: Fish landed in far-flung centres are transported to markets spread all over the country. However, as fish is highly perishable, sufficient cooling is necessary to preserve it. Traditionally, ice is used for preserving fish during transportation. However, increasing cost of ice and increasing cost of fuel as in case of a modern refrigerated van is posing a major challenge. For the demonstration, a Tata Ace vehicle was fitted with 170 litre refrigeration system with a compressor load of 1200 Watts. This refrigeration system is powered by four solar panels of 75 watts each (300Watts), which are fitted on the top of the unit. The technical solution for the demonstration was provided by Jagath Jothi Solar Energy (P) Ltd and the demonstration was sponsored by BOBP-IGO.

Group Discussion (Session 3)

13.0 Following the technical session, participants were divided into three groups to further explore the scope of using green energies in fisheries sector. Group I was entrusted with the task of 'Application of solar energy in fisheries sector – areas of application and their magnitude, comparative advantages/disadvantages (with other energy forms); R&D support and linkages with the end users, etc.'; Group II was assigned the topic of 'Present and future scope of solar energy in fisheries sector – available technology, R&D requirements to meet user needs, cost-benefit dimensions, etc.' and for Group III, the topic was 'Promoting the use of solar energy in fisheries sector – Central and State Government schemes/programmes for promoting the use of solar energy; modalities for tapping government assistance; building linkages with R & D sector for constant technical inputs and up-gradation of technology, etc.' Following intra-group brainstorming the groups came out with their suggestions and presented them in the plenary.

Field visit

14.0 A field visit was organized from 0700-1000 hours on the second day of the consultation. The participants visited Muttom Fishing Harbour in Kanniyakumari district and also took a short trip on a fishing vessel fitted with solar panel. Mr Vincent Jain shared the technology used for the solar plant on the vessel and experience of the vessel owner with the participants. Participants were also shown live demonstration on the use of solar power.

Concluding Session (Session 5)

15.0 The Concluding Session began with a Panel Discussion comprising Dr K Vijayakumaran, Director General, Fishery Survey of India (FSI); Dr Gopi N Ghosh, Assistant Country Representative, India Country Office of the FAO; Dr Reena Selvi, Joint Director, Department of Fisheries, Government of Tamil Nadu; Mr J Vincent Jain; Mr N Ravisundhar and Mr M Krishnan. Dr Yugraj Singh Yadava moderated the panel discussion. Dr K Vijayakumaran chaired the concluding session.

16.0 The panel was of the view that the solar technology is not a new idea but it needs to be encouraged in all possible fields, including fisheries. The panel said that fuel being the most costly input, every drop saved would result in the form of additional income to the fishermen. Therefore, the opportunities opened up by solar technology for saving fuel have to be aggressively pursued. The role of institutions like CIFT to carry further research and development in application of energy saving technologies needs no emphasis. The FSI can also be roped in to support R&D initiatives and beta testing using the FSI fleet and shore establishments. The panel also called all the participants to carry back the message of the consultation to their respective field of work and communicating the same to the concerned Ministries so that necessary support can be given to the agencies for promotion of solar technologies in fisheries.

17.0 Dr Yugraj Singh Yadava presented the recommendations of the Consultation. He said that the two-day consultation was extremely fruitful and thanked the participants for their active participation. He said that the NSCGTF is not an end in itself but the beginning of an initiative to fully explore the potential uses of solar energy in non-conventional sectors like fisheries. He said that the community has taken a great leap forward by taking their own initiative and now there is a need to spread it both horizontally and vertically. With these words, he presented the following recommendation which were accepted in the plenary.

- Representations should be made to the Government, both from the community and the concerned agencies and organizations to bring fisheries explicitly within the scope of existing schemes of the MNRE and other state-level agencies dealing with MNRE to promote solar energy and to save fuel.
- There is a need for better cooperation among the users, technology providers, financial institutions and R&D institutions to further accelerate the use of solar energy.
- The R&D institutes in the public sector should come forward to increase the efficacy, cost-effectiveness and design challenges in installing solar panels in fishing vessels.
- The community should also take initiative to further promulgate the idea of using solar energy through internal discussions and community meetings.

18.0 In his concluding remarks, Dr K Vijayakumaran said that we have heard of the opportunities and limitations of use of solar technology onboard fishing vessels and are confident that it can be used in a variety of ways, and the end goal of R&D institutions should be on the use of solar energy for propulsion. The use of technology for ice production seems to be a promising area. MPEDA is promoting with subsidies the installation of a small flake ice making machine. Probably there is a scope for applying solar power for small ice machines onboard. The R&D institutions and entrepreneurs need to pay attention on this aspect. The subsidies offered for solar technology are due to the benefits it gives in saving the precious fossil fuel and reducing the carbon emissions. Dr Vijayakumaran further said that the spreading of technology adoption is achieved best by peer communication and endorsement. Those who had installed solar gadgets could pass the news to their peer in the right spirit so that more and more people can adopt with confidence and benefit. Fortunately, solar energy is not a limited resource at present. Concluding the presentation, Dr Vijayakumaran said that we all have an aversion to change. Adoption of new technologies also fall prey to this inability to change. However, by nature fishermen are daring and not averse to risk. It is necessary to apply this risk-taking capacity in adoption of innovative technologies, such as solar technologies. Most of the issues we face are man-made. Individual and collective efforts are needed for resolving them. Hopefully with the spirit of unity most of the problems can be addressed amicably.

19.0 The report of the NSCGTF was adopted on 13 July 2013 in Nagercoil.
