INTRODUCTION OF EFFICIENT LAMPS FOR NIGHT FISHING IN SRI LANKA

PROJECT'S AIM: TO IMPROVE THE LIVELIHOODS OF FISHERMEN AT LAKES IN SOUTH-WEST SRI LANKA BY REPLACING KEROSENE LAMPS WITH LED AND CF LAMPS FOR NIGHT FISHING

Location:
South-West wetlands of Sri Lanka

Technology:
Efficient lamps

Costs:
Total: €88,770
WISIONS financial support: €€56,500

CO_2 Reduction:
400 to 600 tCO_2/year

Partners Involved:
Global Nature Fund
(www.globalnature.org/livinglakes)

EMACE Foundation, Sri Lanka
(www.emacesrilanka.com)

Nagenahiru Foundation, Sri Lanka
(www.nagenahiru.org)

Duration:
01/2009 – 12/2010

Picture: EMACE

This project was implemented at the lakes and wetlands of Bolgoda, Madampe, Maduganga, Maella, Malal and Lungamwehera in Sri Lanka. Bolgoda is the largest natural lake in Sri Lanka with a rich biodiversity. Over 40 fish species live in this stretch of water and the local communities rely heavily on the fish and prawns as a main source of food and income. At the lakes fishermen traditionally use kerosene lamps for night fishing with canoes and for catching prawns in traditional Ja-Kotu systems. The introduction of efficient lamps, specifically LEDs (Light Emitting Diodes) and CFLs (Compact Fluorescent Lamps), for night fishing was intended to reduce the use of fossil fuels and its associated negative effects on health and environment. From an income perspective it is also important to reduce dependence on fossil fuels as their price on the world energy markets is rising and becoming increasingly volatile.

The project was coordinated by Global Nature Fund and was implemented by the local partner organisations EMACE Foundation and Nagenahiru Foundation. The project started with a detailed socio-economic survey to obtain clear data about the lighting systems already in use and the number of fishermen in the region who carry out night fishing. As well as introducing sustainable lighting systems, training the users and technicians was another important element for the success of the project.

TECHNOLOGY, OPERATIONS AND MAINTENANCE

The first part of the project relates to the prawn catching. The traditional prawn catching systems called Ja-Kotu are made of interwoven bamboo panels which consist of two units of three interconnected catching chambers fitted with non-return devices. Fishermen light seven kerosene lamps in each Ja-Kotu, six in each catching chamber and one lamp at the outer stand. The seven kerosene lamps consume between 3.0 and 3.5 litres/kerosene per night.

In the context of this project 50 prawn traps were equipped with LED systems. Special attention was paid to the colour and light intensity of the different LED lamps as these factors were important to assure the acceptance of the new lighting systems by the fishermen. Each Ja-Kotu is fitted with six LEDs and a 12V (20 Amp) sealed lead battery to power the LEDs.

The second part of the project relates to the fishing with canoes. Traditionally, during the night, fishermen light kerosene lamps to illuminate and attract fish in rivers, tanks and lagoons. In the context of the project 500 kerosene lamps were replaced by CFLs. The design is powered by a rechargeable 12V 4-6 Amp sealed lead acid battery.

Six service centres were set up in the project area to manage the maintenance of

the new lighting systems and the capacity-building of the fishermen. The centres provide technical support, educate the fishermen to handle the new systems, hand out spare parts, carry out minor repairs, replace batteries and bulbs and give information on the recycling system for batteries and bulbs. Moreover, the centres maintain quick-charger systems to recharge batteries quickly. As the national electricity grid in Sri Lanka covers the project area and electricity is subsidised, in general the batteries are charged by conventional electricity from the grid. But for demonstration and testing purposes sixteen 30W photovoltaic units are used at Ja-Kotus to charge the batteries in an environmental sustainable way.

FINANCIAL ISSUES AND MANAGEMENT

The monthly payments for the kerosene lighting systems were about €15 (SLR 2500) for each canoe fisherman and €50 (SLR 8200) for a Ja-Kotu team of 7 to 8 fishermen. This is up to 30% of the monthly income. The steep price increase of kerosene on the world market since 2004 and the reduction of Sri Lankan subsidies for fuel created an environment where fishermen were willing to test the new efficient lighting systems in order to gain economic advantages. The running costs of the new systems, mainly the charging of the batteries, are negligible, because electricity is still (due to subsidies) relatively cheap. But most fishermen face difficulties in paying the initial cost of €36 to €45 (SLR 6000 to 7500) upfront, although this amount is already subsidised by 50%. To alleviate this obstacle the fishermen can make the payment in 5 monthly installments of about SLR 600 (€3.60). This payment is low in relation to the running costs of kerosene lamps. Due to this economic advantage, many fishermen in the region have become interested in using efficient lighting systems.

ENVIRONMENTAL ISSUES

Burning kerosene for night fishing has several environmental disadvantages: from a global perspective the CO_2 emissions are the central factor. In this project, CO_2 emissions were reduced by roughly 400 to 600 tonnes per year (the variance depends on the estimates about the average number of nights in a year that are used for fishing; estimates ranging from 180 to 300 nights). This high reduction results from the very inefficient conversion of kerosene to light. In the process of burning kerosene, most of the energy is converted to heat and not light. Local disadvantages of using kerosene for night fishing are the accidental kerosene spillages that cause pollution of the ecosystem and contaminate the water and the catch.

SOCIAL ISSUES

The financial burden for the fishermen of using kerosene for night fishing is significant. Fuel costs alone consume between 20% and 30% of the household income. The efficient lamps, therefore, enable the fishermen to have more disposable household income. In addition, the better performance of the new lighting systems (in comparison to the traditional kerosene lamps) benefits the fishermen and prawn catchers in various ways: the lights can be used in windy or rainy conditions, the catch is no longer at risk of contamination from kerosene spills and the accidental burning of traps is no longer a possibility. All these effects contribute to reducing poverty levels for the fishermen's families.

RESULTS & IMPACT

In total, kerosene lamps used by 504 canoe fishermen and 50 Ja-Kotu systems were replaced by efficient lamps. The resultant decrease in kerosene use amounted to 200,000 litres per year and CO_2 emissions were reduced by 600 tonnes per year. Additionally, the local ecosystems benefits from the switch to sustainable lighting systems. From a social perspective 850 households (or about 4000 people) have improved their standard of living – and this does not include the indirect beneficiaries (e.g. fish traders). The six service centres in the project area contribute to the sustainability of the development by supporting the fishermen in the use of efficient lamps.

REPLICABILITY

The potential to replicate the measures undertaken in the project is very good. 85,000 canoe fishermen operate in the southern coastal water bodies of Sri Lanka, burning more than 100,000 litres of kerosene per night (equivalent to between 18 and 30 million litres per year). This fossil fuel use has been significantly reduced by the introduction of efficient lamps. The project helped to raise awareness among local and national politicians, media representatives and the population about the many advantages of efficient lamps.

LESSONS LEARNED

To make the lighting system 100% environmentally sustainable the batteries would have to be charged using renewable energy. Therefore sixteen solar photovoltaic systems were installed for testing and demonstrating purposes. However, as the electricity from the grid is highly subsidised in Sri Lanka and photovoltaic energy is still relatively expensive and has high initial investment costs, this solution was not economically feasible. Despite this drawback, using grid electricity to charge the batteries is an economic solution that reduces CO_2 emissions and helps to alleviate the poverty of local fishermen.

Source: Final Report submitted to WISIONS by GNF

Picture: EMACE