Delivering SDG 7: A new approach to designing sustainable energy services to maximize impact

Dr Sarah Wykes, Catholic Agency For Overseas Development (CAFOD)

Ben Garside, the International Institute for Environment & Development (IIED)

What is modern energy access?

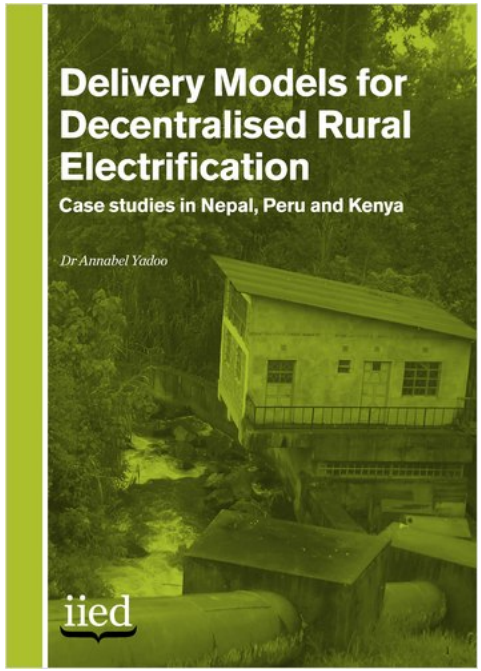
- Adequate amount
- Available when needed
- Good quality
- Reliable
- Convenient
- Affordable
- Legal
- Healthy & Safe

= Reduce poverty & contribute to human well-being

SDG7 – ensure universal access to 'affordable, reliable, sustainable and modern energy' by 2030

Case study: 'Green mini-grids' – lessons from Nepal, Kenya and Peru

- Consider technical, economic, social, environmental and institutional dimensions; aim to improve overall development prospects
- Generate a sense of local responsibility for electricity system and upkeep; separate project management from ownership, with checks and balances
- Tailor system to local needs, desires and cultural specificities, esp. choice of management model
- Future-proof systems by including demand growth margins in the original project design; risk analysis
- Try to influence the enabling environment (e.g. raise awareness of technologies, train technicians, improve access to finance, engage in policy dialogue)
- Engage private sector in partnerships , hybrid models

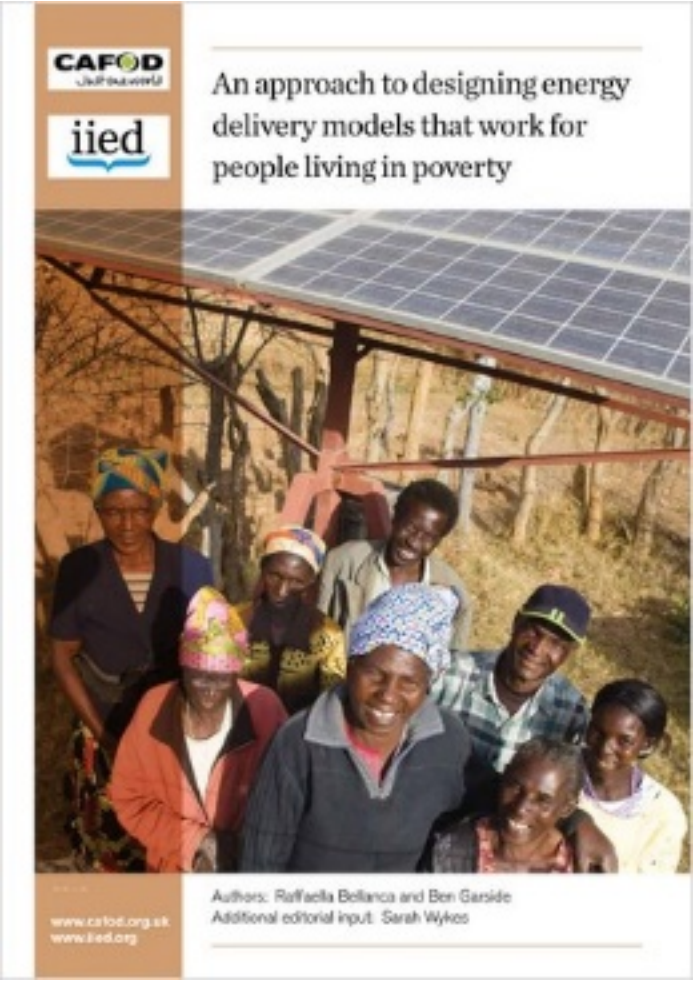


Reference: Yadoo (2012)

CBGE Kenya - 490,635 people impacted

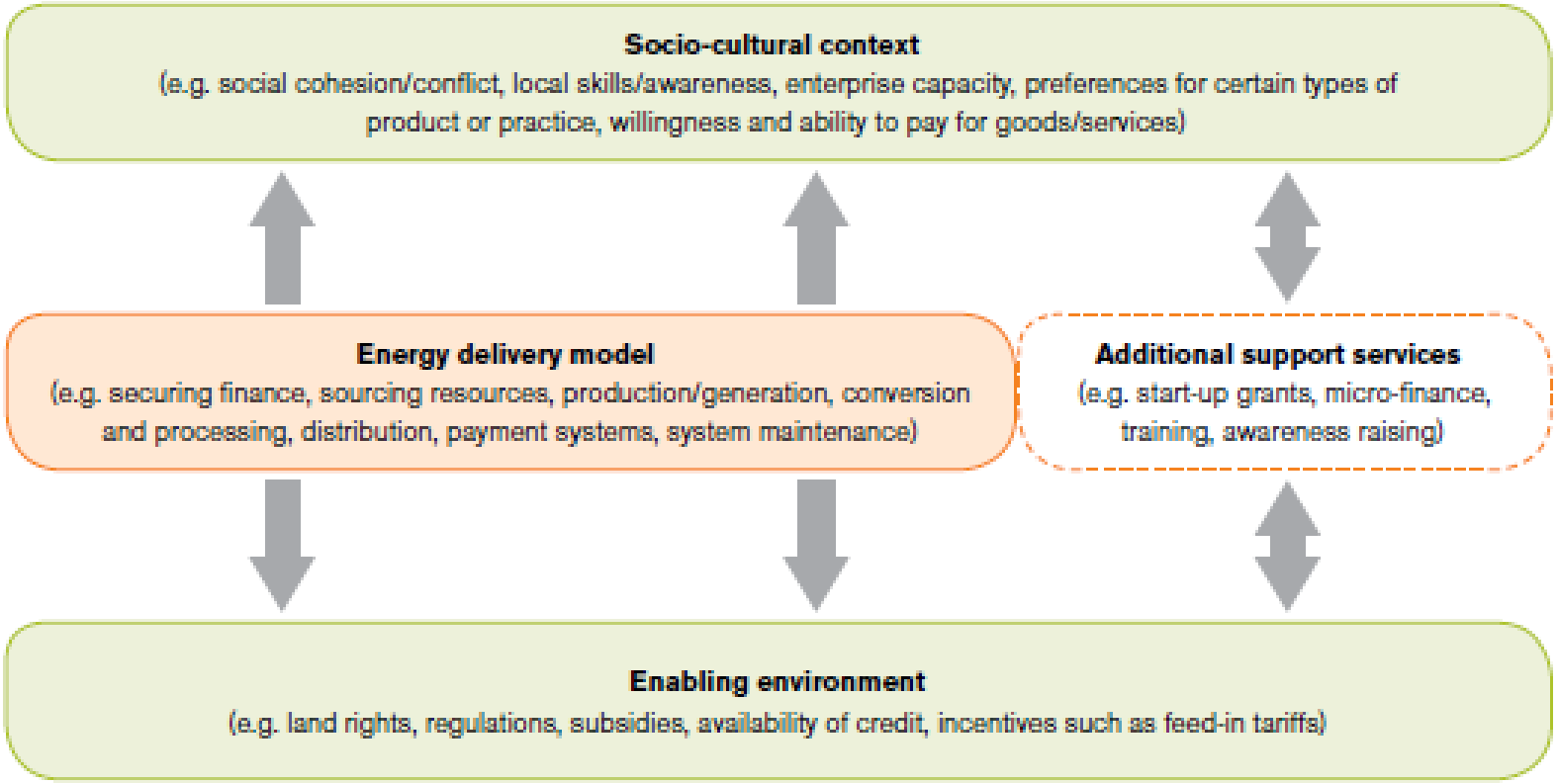
Intervention	Outputs	Impacts
Education 90 schools 91 schools	Solar water heaters & lighting Efficient cookstoves	Improved educational performance by students Teacher retention.
Health 48 clinics 19 clinics	Solar refrigeration & lighting Solar water purification	Increased vaccinations of children Increased attendance of patients
Youth groups 8 ICT centres	Solar powered	Access to job/education opportunities Improved communications
Livelihoods Women's groups (1,300+ members)	61 solar water pumps & 56 greenhouses *Supporting services*	Improved food security Additional income generation. Increased skills & empowerment for women.

CAFOD & IIED Energy Delivery Models (EDM) approach to designing energy services for people living in poverty (2013)



What is a pro-poor energy delivery model?

Figure 1: Map of the pro-poor energy delivery system, showing the four building blocks of the delivery model and their inter-relation (Source: Wilson *et al*, 2012)



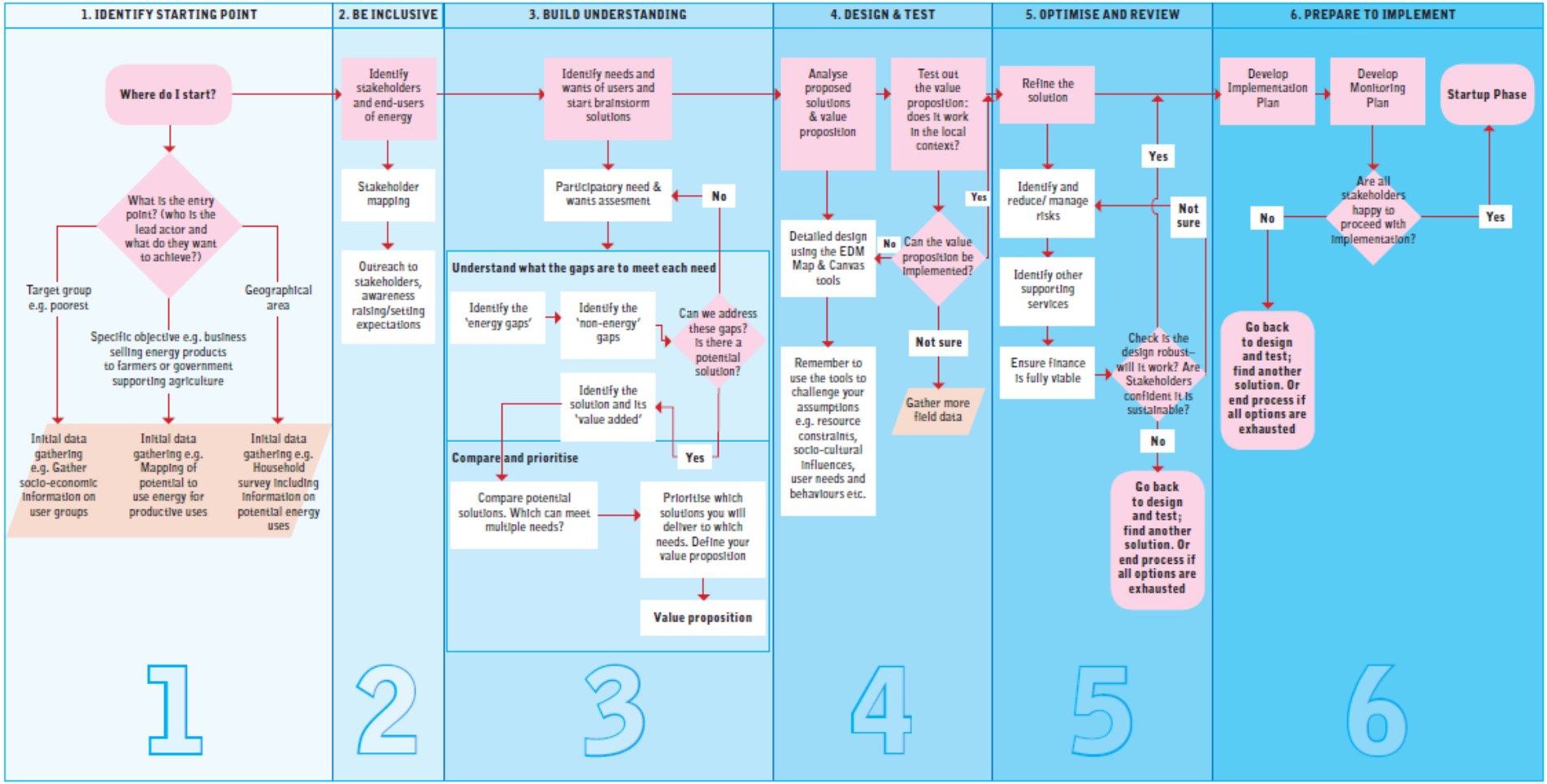
The EDM Approach

- ✓ Starts from the energy needs/wants of the end-users in relation to wider development needs (demand-led or "bottom up").
- ✓ Builds awareness of the local context & tailors energy services to be appropriate. Pays attention to socio-cultural ("soft") factors as well as formal enabling environment.
- ✓ Analyses systematically what is needed for long-term social, financial, and environmental sustainability of the energy service.
- ✓ A participatory process, with guidelines adaptable to local context & expertise.

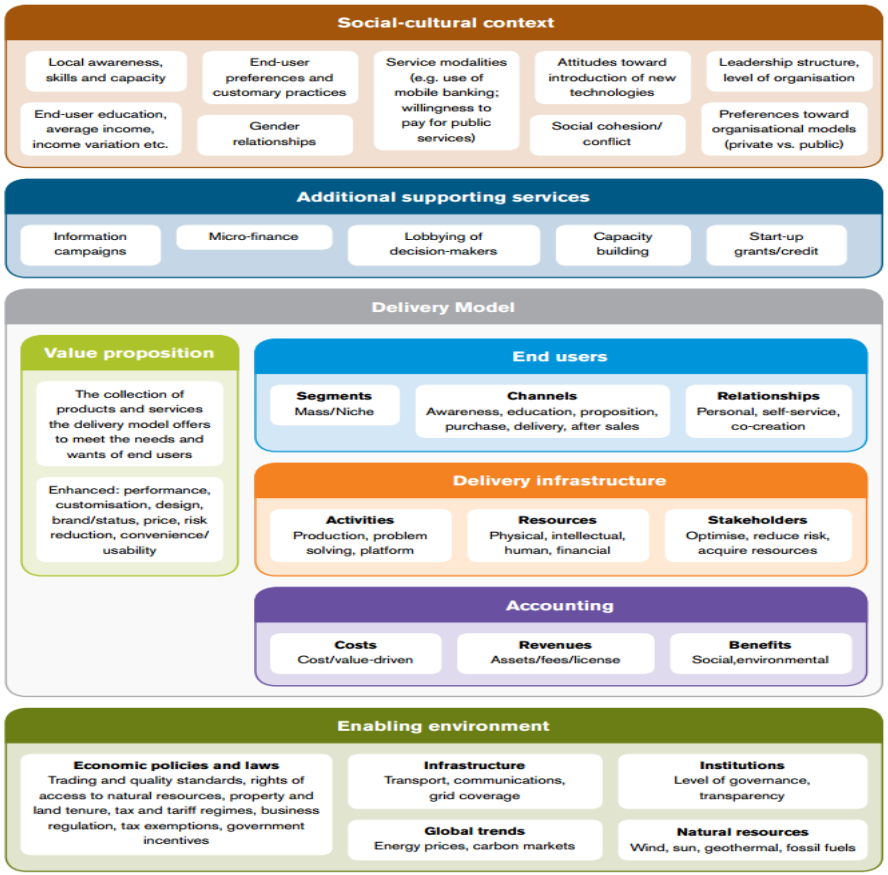
6 Step Design Process

1. IDENTIFY THE STARTING POINT	Identify the entry point and approach for delivery of an energy service to a particular group of people (potential end-users). Which organisation or group is initiating the process and what do they want to achieve? Carry out initial data-gathering.
2. BE INCLUSIVE	Map out all the relevant stakeholders who will participate in the design process and engage with them, building their awareness of the process and its aims.
3. BUILD UNDERSTANDING	Explore the target end-users' needs and wants, and their context, in more depth. Understand their priorities and the energy and non-energy 'gaps' to be filled. Brainstorm potential solutions and identify the 'value-added' of an energy service. Develop a value proposition.
4. DESIGN AND TEST	Explore in depth potential solutions (energy delivery models) using the EDM tools. Understand who will do what, and the various outputs and activities needed. Test out the value proposition/ different solutions by challenging your assumptions and gathering further data.
5. OPTIMISE AND REVIEW	Think through the financial, social and environmental risks and how to mitigate them. Ensure that the project is sustainable and all the supporting services required are in place. Finalize the EDM.
6. PREPARE TO IMPLEMENT	Develop an implementation and a monitoring and evaluation plan. Once financing and other support is in place, move to the start-up phase, beginning with piloting.

EDM Flow Chart



Innovative tools



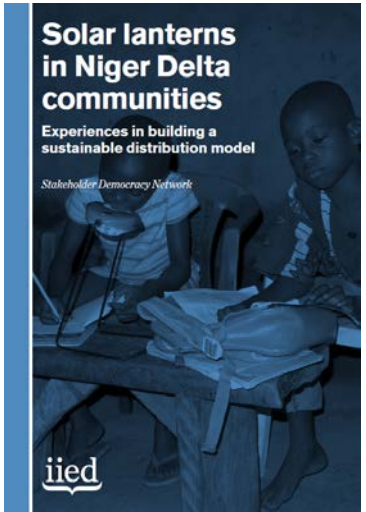
Energy Delivery Model Map

Energy Delivery Model Canvas

Nigeria: review of an existing solar lantern distribution model

Learning on improving process

- Need for more effective ways to reach end users e.g. word-of-mouth marketing, pidgin slogans on the radio, informal networks of communication, women acting as advertiser 'champions'
- Need for seizing opportunities to introduce products, and flexible repayment plans for periods when income is high – for example during harvest.



SE Asia Regional Pilot – 2015-17

- Baseline research on energy poverty/access in Indonesia, Cambodia & Myanmar. MS workshops to discuss findings (April-May 2016)
- Indonesia - introductory 3 day workshop on EDM approach with CBOs, CSOs, Energy Patriots, Ministries of Energy & Planning, Businesses.

Myanmar EDM Workshop
May 2016

SE Asia Regional Pilot – 2015-17

Boafeo EDM Design Process

Boafeo EDM Timeline

Baseline research on needs & gathering basic socio-economic data using RRA (HH survey, SS interviews, FGD & observation), initial stakeholder mapping (Oct-Nov 2016)

Additional data-gathering & analysis on 3 draft VPs - PFS for micro-hydro, Coffee value chain analysis, analysis of primary school education needs and gaps, HH lighting survey, research on electrification plans for Ende region (February-May 2017)

3 workshops – partner CBO & community (December 2016, January & June 2017)

Problem

Additional income from coffee farming

Solution

Increase quantity of current production
From 300kg to 600kg/ha

GAP Training

More time on coffee crop maintenance

Reduce time on candle nut collection

Improve agricultural inputs

Stakeholders

VECO, PAPATAKI
Farmers

Resources /Inputs

Fertilizer 2.5 M
+ pesticide
Every year

New trees > 20 years
10 M
(one-off cost)

Estimated labour time
Net : Time saving 3 hours / day
Netcost : 1.5 / tree
18 M /ha (12 trees)

SOLUTION:
MORE EFFECTIVE LEARNING BY PRIMARY SCHOOL CHILDREN through interactive learning

PROBLEM/GAP

Lack of Infrastructure

SOLUTION

- Provide AV Equipment - 2 Laptops, 1 projectors, 1 printer
- Provide power for AV – 1.2 KWh Solar system (+ lighting for classrooms, toilet, passages)
- Provide new materials
  - Interactive
  - Literacy
- Training technicians

STAKEHOLDERS

- BPD+ School Comittee INGO (CAFOD-IIED, AMAN, IESR)
- Supplier (eg KAS Contain-energy)
- Dept of Education ?
- Arun Payoda Foundation)
- YLAI

RESOURCES

AV equipment = USD3,000 (39.9m RPH)
Solar power system = USD 6,125 (81.4m RPH)
Training 2 Technicians - USD300 x 2 = USD600 (7.98m RPH)
Maintenance/repair fund = USD 135 per month (1.8m RPH)

Literacy materials (YLAI)
Interactive materials (Arun Payoda)

SOLUTION:
MORE EFFECTIVE LEARNING BY PRIMARY SCHOOL CHILDREN through interactive learning

PROBLEM/GAP

Teacher Motivation/Satisfaction

SOLUTION

- Raise salary of honorary teachers
- Teacher development (training)
- Contract between teachers & school (3 years)

STAKEHOLDERS

- School Committee Teachers Parents
- Dept of Education ?
- Arun Payoda Foundation
- YLAI
- Yasukel Foundation
- School Committee Teachers Parents

RESOURCES

Salary raise for 4 teachers
Eg 1.8 million RPH per month x 4 = 7.2 million RPH

SOLUTION:
MORE EFFECTIVE LEARNING BY PRIMARY SCHOOL CHILDREN through interactive learning

PROBLEM/GAP

Lack of teacher training

SOLUTION

- Develop a training strategy for Boafeo (+ wider district) – 3+ years
  - Introduction to interactive teaching approaches (20 teachers)
  - Introduction to teaching literacy (20 teachers)
- Ongoing mentoring Community of practice

STAKEHOLDERS

- Arun Payoda Foundation
- YLAI
- Dept of Education ?

RESOURCES

Literacy training + materials (YLAI)
USD 10,000 (133m RPH)
Interactive training + materials (Arun Payoda)
USD 7,000 (93m RPH)

Better quality household lighting

Problem

Current solutions do not provide good quality, sufficient power for HH lighting needs

Solution

Option 1

120 SHS with 7-8 LED lamps, small fan & phone charging

Train 3 technicians

Option 2

30 KWH microhyidro power HH needs + extra power for productive uses or community services

Set-up ownership structure

Contract operating technician

Identify expert technical support

Stakeholders

HH (customers)
SHS Suppliers
Village Government
Min of energy (District)
Local banks
(Funders ?)

Plus - PLN
CSR, international funders (donors)

Resources

Equipment per HH: $600 (system) or
$ 12.5/ pcm for 4 years
Maintenance fund (5% total) : $ 8,5/pcm
Total = $ 21/ pm for 4 years (14% pcm income)

MH Full Feasibility Study: $30K
MH System: $250,000 for system plus transport & installation etc. costs. **Total cost = U$300,000**
Maintenance fund at 5% cost.

EDM Practitioners Workshop July 2017

Practitioners Workshop July 2017

"This workshop is very useful in designing a program using bottom-up approach. This model suggests to donors and implementers that the interventions must suit the beneficiaries' needs."

"Using EDM lays the foundations of sustainability."

"I have found the EDM process to be a really thorough approach to community, bottom-up planning that allows planners and communities to prototype activity ideas before selecting the most appropriate ones."

"Donors should learn this EDM approach so they can understand the importance of bottom-up approach"

"EDM training is fantastic in giving systematic planning on community based projects."

Boafeo EDM – Lessons Learned?

Next Steps

- Analysing lessons learned & developing learning products
- Planning for implementation of Boafeo EDM
- Discussion with other Indonesian groups on collaboration
- Further discussion with Indonesian Ministry of Planning
- Work with partners in Kenya at county level
- Review aspects of existing CBGE in Kenya using EDM tools

Contacts:
Sarah Wykes (CAFOD)
swykes@cafod.org.uk
Ben Garside (IIED)
ben.garside@iied.org