



EIE-06-256 REEPRO



Promotion of the Efficient Use of Renewable Energies in Developing Countries

**Training of Trainers level 2
Solar PV systems, Rocket stove construction
and Project development**

level 2 course 6 and 7 in Saravanh

Report

Author

CDEA

Revised by

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List of Acronymes

NUOL	National University of Laos
CDEA	Community Development and Environment Association
PDEM	Provincial Department of Energy and Mines
DOEM	District Office of Energy and Mines
EDL	Electricite du Laos

Documentation of REEPRO level 1 Training by Trainers

1. Summary Sheet

Event:	Training on low cost gasifier construction and modification
Task number	04.02.05 and 04.02.06
Date, Location, Time:	July 21 to 23, 2009, 8:00 - 16.30 EDL Saravanh Branch's meeting room. Saravanh district, Saravanh Province, Lao PDR
Theme:	Solar PV systems, Rocket stove construction and Project development
Target group:	<input type="checkbox"/> Level 1 <input checked="" type="checkbox"/> Level 2 <input type="checkbox"/> Level 3
Performance:	Three full days training comprised of theoretical presentation, video shows, practical exercises and field trip
Participants:	20 participants,
Success:	<p>Deputy Director of Saravanh provincial Department of Energy and Mines in his opening remarks has mentioned importance of such kind of training, which as he stated, was the first one in province, and he also pointed on the right approach for efficiently promoting renewable energy to local users, particularly regarding process of poverty reduction by mean of sustainable access to modern energy service.</p> <p>This point was also shown through very active involvement and support by the Department's staffs to the training.</p> <p>During the three days training three courses namely Solar PV systems, Rocket stove construction and Project management were given to trainees, who come from Departments of Southern provinces (Saravanh, Attapeu and Sekong), 4 Districts offices of Energy and Mines of Saravanh province and also some villages' group representatives.</p> <p>One day field trip also organized to brick making villages group. During the training, there was always kept dual communication between trainers and trainees, in particular discussion on such issues as what local energy resources they have, solar PV systems use and installation, stoves' efficiency and use, project initiation and management, etc. At the end of each topic, the reviewed questions were also given and the correct answers were awarded with REEPRO promotional materials. All these measures helped creating good environment in the training room.</p>

2. Workshop Preparation

- The workshop preparation was assisted by NUOL REEPRO team in close cooperation with CDEA and Saravanh province Department of Energy and Mines in the following matters:
 - Participants contact
 - Training venue arrangement
 - Field trip arrangement

3. Workshop Performance

REEPRO Team for Saravanh training was comprised of 4 people: Mr. Khampha Keomanichanh, Mr. Bounpon Luangphimmajak (CDEA); Dr. Khamphone Nanthavong and Mr. Sengratry Kythavone (NUOL). The team arrived by rented van to Saravanh on late Monday, 20 July 2009 and participated into training from 21-24 July 2009. The team returned to Vientiane on 25 July 2009.

Day 1: 21 July 2009

- The first training session started by brief introduction on REEPRO trainings by Dr. Khamphone Nanthavong, and opening remarks by Mr. Thonxay Bounthisavath, Deputy Director of Department of Energy and Mines of Saravan province.
- The opening session ended with group photo and coffee break. During the break, short trilateral meeting between REEPRO team-Deputy Director of Department of Energy and Mines of Saravan province-Deputy Head of EDL Saravanh Branch, concerning current energy development situation and future plan in Saravanh province.
- After the break, the training was continued, on PV system: Introduction to Solar energy, PV system and its applications, PV system components, Solar home system sizing. Fundamental of electricity and energy consumption were also shortly reviewed and exercised;
- Afternoon session continued with PV systems: PV system installation, experiences on PV (home) systems use.
- Some short promotional materials (video scrip, pictures) time to times were shown during the training.

Day 2: 22 July 2009

- Mr. Sengratry Kythavone took over the training in the second day. The second day training was going on biomass and its conversion into energy by rocket stove.
- Training on rocket stove construction included such materials as (1) principle of rocket stoves and its specific features compared to common wood stoves; (2) construction of rocket stoves; (3) rocket stove modifications for adaptation to real Lao conditions.
- The level 2 and 3 performed practical exercise on rocket stove assembling and brick making at the field trip spot
- Shown Video on rocket stove production

Day 3: 23 July 2009

- Day 3 was about Project development and management, conducted by Mr. Khampha Keommanichanh from CDEA.
- Mr. Khampha told trainees how to initiate a certain project, what steps and information required for this process,
- Parallel to theoretical knowledge, the trainer also provided a lot of practical experiences from carried out by CDEA or others projects
- There were given some basic tools in project planning and management (project cycle and its steps' management, SWOT analysis, etc)
- Trainer-Trainees dual conversation was always kept during the training in order to achieve more understanding of the audience.

Day 4: Field trip to a village cluster

- The visited village was belong to a so-called villages cluster, which usually grouped several nearby located villages with overall steering committee.
- The main income generating activities in the cluster include irrigated rice plantation, brick making cottage, husbandry and traditional handicraft.
- The visited spot was about 6 km from the Saravan provincial centre.
- Training session at the spot included such as activities as demonstration on rocket stove assembling, rocket stove production video and then practical exercises on brick making, firstly by trainees level 2 and then by level 3 trainees (village craftsmen and women)
- In the afternoon session, question-answer games were conducted: the asked questions mainly were about wood fuel use issues, stove efficiency, fuel saving, wood collecting, gender issues of wood use, etc. The right answers or the active villagers were awarded with REEPRO shirts or caps.

Presentation and discussion results

- PV systems' presentations:
 - What is PV system?
 - Fundamental of electricity and energy consumption review;
 - PV system components;
 - PV system installation design;
 - PV system maintenance and troubleshooting;
 - Experiences
- Rocket systems:
 - Biomass and its conversion technologies
 - Rocket stove principle
 - Rocket stove construction (video)
- Project management:
 - What is project management?

- Project development process and cycle
- Experiences Project development

4. Discussion

- Lacking of clear policy to support local energy service providers would be a big concern for local technician or entrepreneurs to run energy service business in Lao rural areas
- Production of rocket stove for sale would be a good profitable business because less imported materials are used and relatively easy production process, and therefore unskilled craftsmen can do that;
- Mostly participants have had experiences on project development and management, in particular project development cycle, problems analysis (e.g., SWOT analysis)

5. Conclusion

The participants have come to conclusion that this training was a good opportunity for local craftsmen and officers to obtain knowledge on some renewable energy technologies as well as experiences in project development and management.

Although due to very short training duration and therefore limited knowledge transferred, but, participants have expressed that obtained knowledge will reserve as a basis for level 2 trainers to promote renewable energy technologies and their application in their localities, and in the future they may require further deeper trainings to make their knowledge repositories sustainable.

6. Participants' evaluation

Trainees comprised mostly males (figure 1).

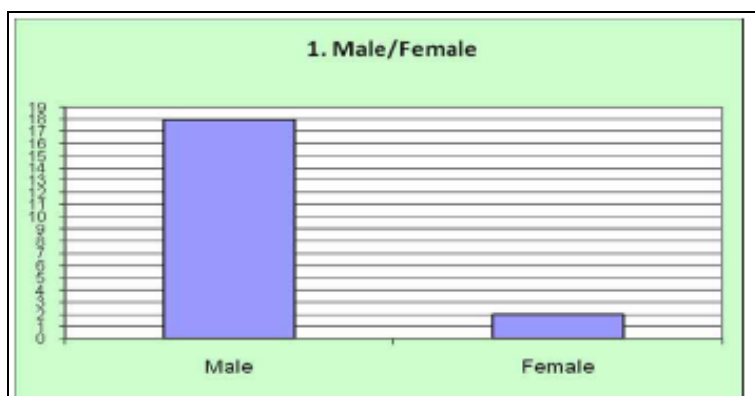


Figure 1: Participants' profile

Mostly participants have known about the training through REEPRO project news letter and personal contact (figure **Fehler! Verweisquelle konnte nicht gefunden werden.**). The REEPRO brochures have been sent to Saravanh Department of Energy and Mines several months earlier, which then in turn have sent together with official letter from REEPRO team, to other PDEM and to Districts' offices of Energy and Mines of Saravanh province.

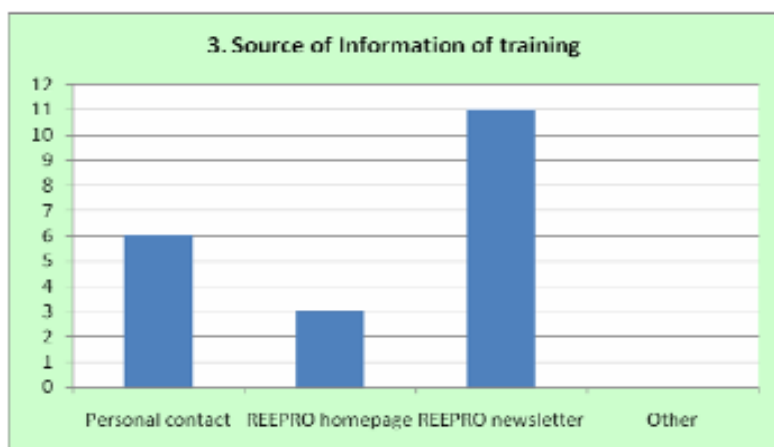


Figure 2: Information on the training

About 70% of participants have had engineering-technical background and almost of them are working in this field also (figures 3-4). This point is also supported by their satisfied expectations with the training topics and materials (figure 5).

Mostly participants expressed that obtained materials and knowledge will serve as a good basis for their future work plan in renewable energy promotion in their localities (figure 6)

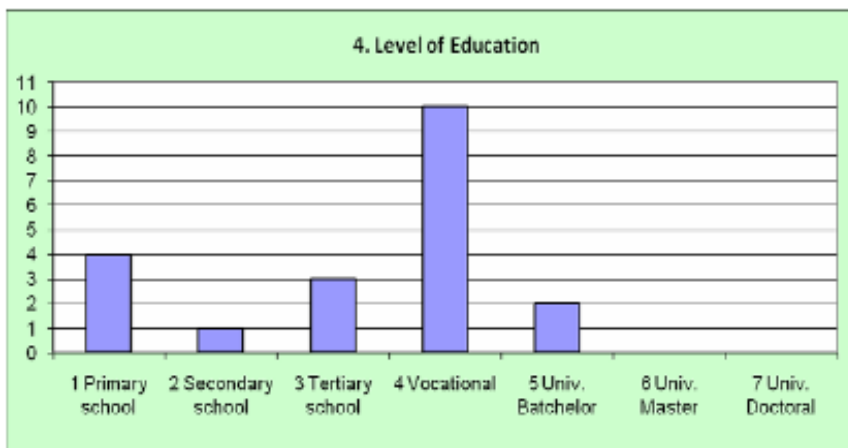


Figure 3: Education levels of trainees

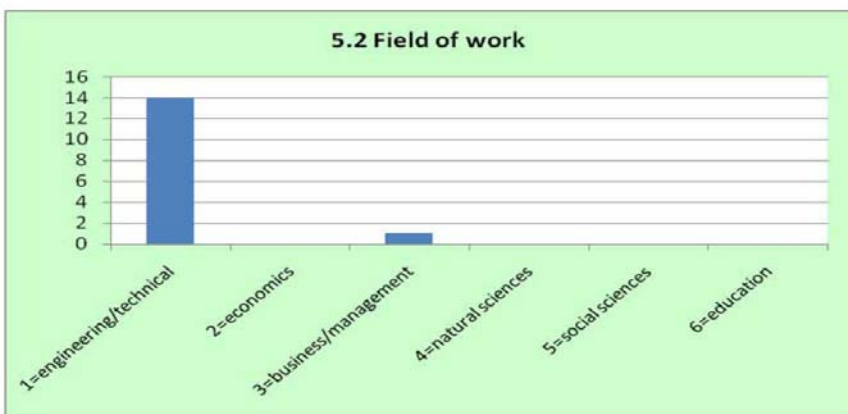


Figure 4: Field of works



Figure 5: Expectations of participants



Figure 6: Relevance to future work plan

The trainees agreed that they have got better understanding on the renewable energy devices, how they work and how to do their installation or construction (figures 7-8).

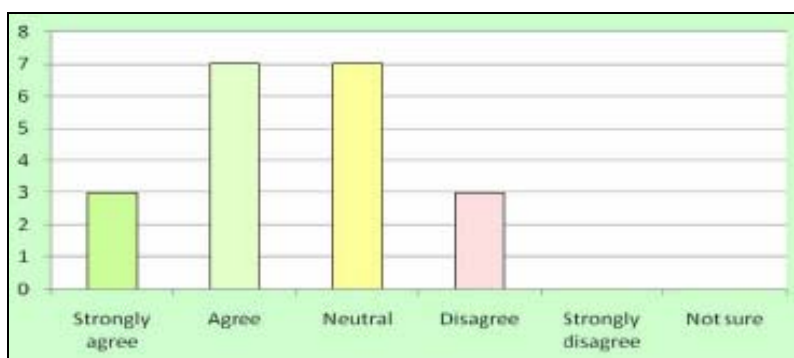


Figure 7: Device installation ability

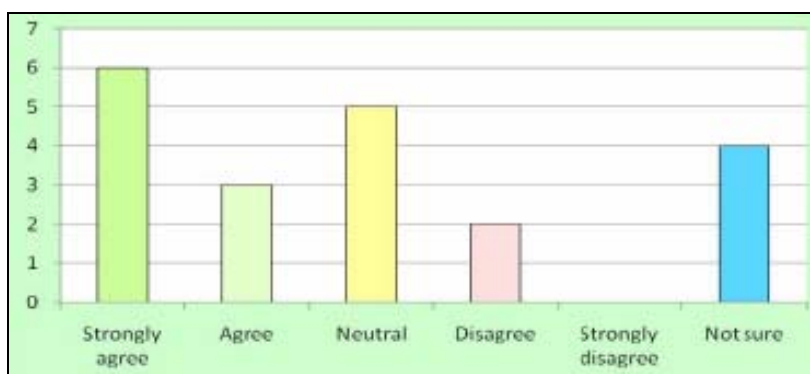


Figure 8: Understanding on device work

Interests of the participants to this REEPRO training can also be seen through their willingness to get further training on the given topics and materials, particularly in rocket stove construction and project management (figures 9-10).

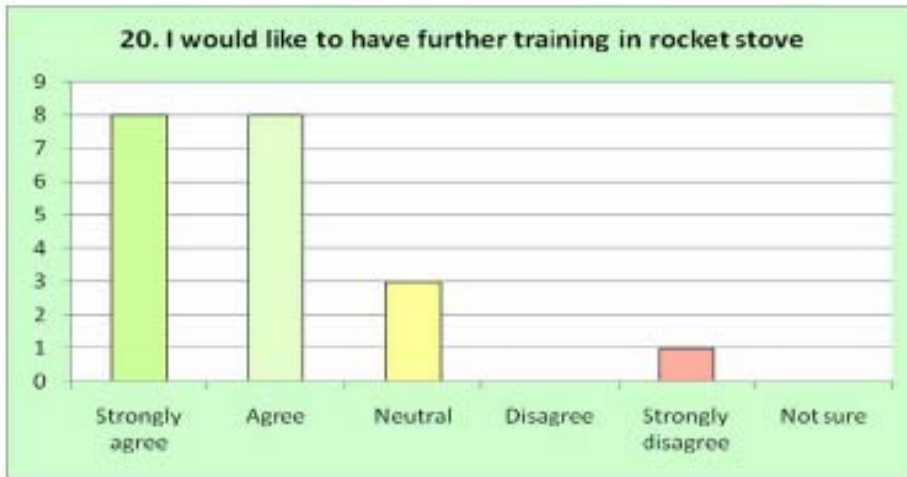


Figure 9: Needs for further training on rocket stoves



Figure 10: Need for Further training on Project management.

7. Programme

REEPRO-Saravan Provincial department of Energy and Mines Joint Training

Tentative Schedule for Level 2 and 3 Training

Subject: Solar PV system and Rocket stove

- Dates: 21-25 /7/2009
- Venue: Saravan Provincial Centre
- Tentative schedule

Date	Times	Training contents	Person in charge
21/7	8:30-9:00	Registration	Bounpone
	9:00-9:30	Introduction on REEPRO	Khamphone
	9:30-9:45	Opening remarks by Deputy director, Department of Energy and Mines, Sa- ravanh province	Mr. Thongxai Bounthisavath
	9:45-10:00	Photo session, and coffee break	
	10:00-12:00	Introduction on Solar energy and its application Solar PV system Fundamental of Electricity	Khamphone
	12:00-13:00	Lunch break	
	13:00-14:45	Solar Home PV system sizing	Khamphone
	14:45-15:00	Coffee Break	
	15:00-16:30	Solar Home PV system sizing	Khamphone
22/7	9:00-10:15	Introduction on principle and construc- tion of Rocket stove (Video show)	Sengratry
	10:15-10:30	Coffee Break	
	10:30-12:00	Rocket stove construction	Sengratry
	12:00-13:00	Lunch break	

Date	Times	Training contents	Person in charge
	13:00-14:45	Bricks making	Sengratry
	14:45-15:00	Coffee break	
	15:00-16:30	Rocket stove Assembling	Sengratry
23/7	9:00-10:15	Project development	Khampha
	10:15-10:30	Coffee break	
	10:30-12:00	Business Administration	Khampha
	12:00-13:00	Lunch break	
	13:00-14:45	Business Administration	Khampha
	14:45-15:00	Coffee break	
	15:00-16:30	Business adminsitraion	Khampha
24/7	8:30-16:30	Field trip to Solar PV spot (VOPS)	all trainers and level 2's trainees
25/7	8:30-16:30	Field trip to Brick making community to demonstrate rocket stove production and use	all trainers and level 2's trainees
26/7	8:00	Travel back to Vientiane	Trainers

8. List of Participants

No	Title	First Name	Last Name
1	Mr.	Sangthong	Inthaparkdee
2	Mr.	Khambone	Dokfangdeang
3	Mr.	Bounleud	Vangvichith
4	Mr.	Khongchai	Dadivong
5	Mr.	Khamsay	Luangkhamxay
6	Mr.	Xayadeth	Duangkhamchanh
7	Mr.	Souksamlee	Singsavanh
8	Mr.	Somsong	Phuangaphay
9	Mr.	Phimmavong	Xuangmanee
10	Mr.	Vanxay	Keokhampha
11	Mr.	Soukanya	Sihavong
12	Mr.	Khammanee	Vanthasouk
13	Mr.	Bounthavee	Sisomphone
14	Mr.	Khamponh	Souliyachak
15	Mr.	Thanousin	Maniboth
16	Mr.	Bouaphanh	Bounthisavat
17	Mr.	Khamlae	Chanthaboune
18	Mr.	Keoaudone	Aoupasith
19	Mrs.	Soudthaphasouk	Photjaleun
20	Mrs.	Khanthavixay	Phetsisomphou

9. Signed List

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມການຝຶກອົບຮົມກ່ຽວກັບແຫຼ່ງພະລັງງານສົດແນວລະດັບ 2 (ສຳລັບເມັດຊາຕານ) ທີ່ເຂດວງສາວານ

List of participants of renewable energy sources training programmes level 2 in Saravan Province

№	ຊື່ ແລະ ນາມສະກຸນ	ຕຳແໜ່ງ	ບັນດາອົງການ	21/7/2009	22/7/2009	23/7/2009
No	Name and Surname	Position	Organization	Signature	Signature	Signature
1	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
2	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
3	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
4	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
5	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
6	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
7	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
8	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
9	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
10	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
11	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
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16	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
17	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
18	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
19	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]
20	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	[Signature]	[Signature]	[Signature]

ຜູ້ຝຶກອົບຮົມ:

ຜູ້ຝຶກ:

[Signature]

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມການຝຶກອົບຮົມກ່ຽວກັບແຫຼ່ງພະລັງງານສົດແນວລະດັບ 2 (ສຳລັບເມັດຊາຕານ) ທີ່ເຂດວງສາວານ

List of participants of renewable energy sources training programmes level 2 in Saravan Province

№	ຊື່ ແລະ ນາມສະກຸນ	ຕຳແໜ່ງ	ບັນດາອົງການ	ເບີໂທລະສັບ	ສະເໜີ
No	Name and Surname	Position	Organization	Telephone No.	Signature
1	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	0800000000	[Signature]
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3	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	155 8150	[Signature]
4	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	6855 5468	[Signature]
5	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	6000 0000	[Signature]
6	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	8000 0000	[Signature]
7	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	8000 0000	[Signature]
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20	ທ່ານ ສິມສິມ	ຊ່າງ	ບັນດາອົງການ	8000 0000	[Signature]

ຜູ້ຝຶກອົບຮົມ:

ຜູ້ຝຶກ:

10. Photo



Figure 11: Group photo and Training room



Figure 12: Trainers level 2 doing exercise on rocket stove assembling and brick making



Figure 13: Level 1 and 2 Trainers on Level 3 training



Figure 14: Villagers learning how to use brick mould and how to prepare clay-sawdust mixture (level 3 training)