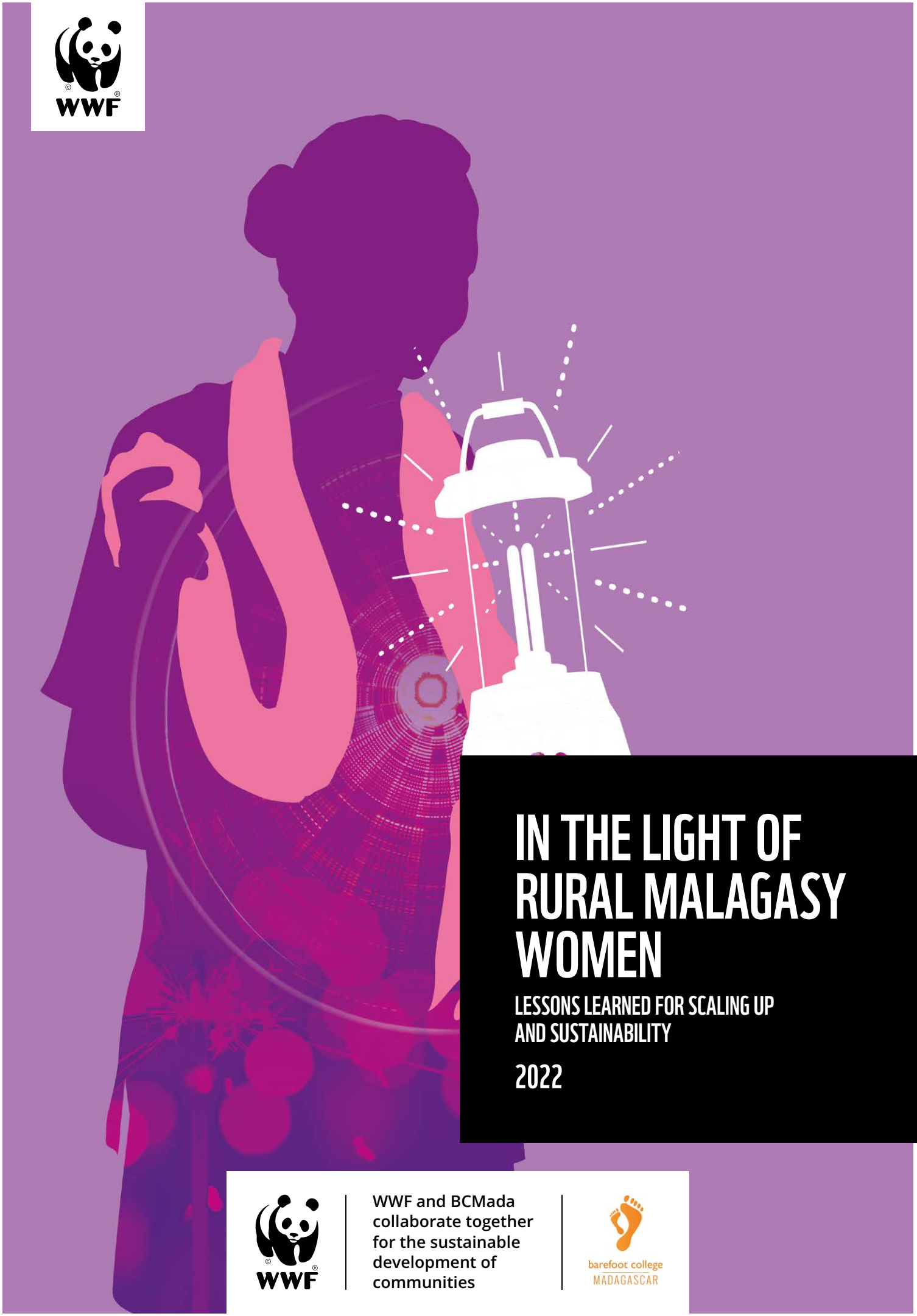


IN THE LIGHT OF RURAL MALAGASY WOMEN

LESSONS LEARNED FOR SCALING UP AND SUSTAINABILITY

2022

WWF and BCMada collaborate together for the sustainable development of communities

barefoot college MADAGASCAR

BAREFOOT COLLEGE WOMEN « SOLAR ENGINEERS »

Claire, Ambatomainty | Liva, Ambatomainty | Louisette, Ambatomainty

Bine, Ampasipohy | Rasoa, Ampasipohy | Georgette, Antafondro | Noro, Antafondro | Bahotsara, Ifanato | Rese, Ifanato | Soavoatse, Ifanato

Vitelerine, Ifanato | Merline, Beanjavilo | Solange, Beanjavilo | Zaliata, Beanjavilo | Zoarline, Beanjavilo | Deliza, Marofototra | Florentine, Marofototra

Noeline, Marofototra | Viette, Marofototra | Nihaogna, Mokotibe | Rosephine, Mokotibe | Temany, Mokotibe | Tsilifika, Mokotibe | Claudia, Andavoanemboka

Henriette, Andavoanemboka | Brigitte, Andavoanemboka | Germaine, Andavoanemboka | Mamy, Kivalo | Babaly, Kivalo | Chantal, Kivalo | Olivienne, Kivalo

Charline, Ranovao | Victorine, Ranovao | Adéline, Torotosy | Emilienne, Torotosy | Soa, Ampohagna | Solange, Ampohagna | Ellene, Analalatsaka

Hajija, Analalatsaka | Marizety, Analalatsaka | Natacha, Analalatsaka | Lanto, Efoetse | Odette (Feu), Efoetse | Pieta, Efoetse | Soateza, Efoetse

FOREWORD

It has already been ten years since the beginning of the Barefoot College "Women Solar Engineer" initiative in Madagascar! If it hadn't been for a fervent supporter who reminded us, it would have passed by in silence, being all immersed in our daily lives with its large and small battles and successes, problems and challenges. In 2017, we marked the fifth anniversary of the initiative by releasing a publication entitled, "In the Light of Rural Malagasy Women - Five Years of Learning with Barefoot College's 'Women Solar Engineers'". This book recognized the feasibility and relevance of the Women Solar Engineer (WSE) approach for Madagascar. It concluded with a series of recommendations for its implementation at a national scale. Have we followed them?

Yes.

The Ministry of Energy adopted the National Barefoot College Programme (NBCP) after its definition. The objective of the NBCP is to establish a network of 744 "women solar engineers" to provide sustainable access to solar electricity services for 630,000 isolated rural households by 2030. The integration of villages into the NBCP is subject to defined and applied selection criteria. A methodology to implement the approach in any village included in the NBCP has been developed to facilitate the work of the actors involved. The Barefoot College Madagascar training center opened in July 2019. A supply chain for spare parts is gradually being developed, and the process of collecting and recycling waste batteries is being considered.

We have made progress and overcome obstacles. In all humility, we can congratulate ourselves. We can celebrate this progress, while not losing sight of the significant challenges that lie ahead. Funding for the National Barefoot College Program is still largely unsecured. The sustainability of the Barefoot College Madagascar training center is not yet sure. The actors involved in the program and supporting the communities through this approach are still insufficient. Management of the electricity service in the villages where the approach is already operational is still fragile and vulnerable to any socio-economic shock. The expected ripple effect through the development of solar entrepreneurship in the Barefoot College villages is not yet effective.

This book focuses on each essential aspect that needs to be taken into consideration in the implementation of the "Woman Solar Engineer" approach, highlighting key information to know, as well as good practices and points of vigilance in order to succeed. The intention of this book is to be a practical guide for any actor who wants to engage, or who is engaged in supporting isolated rural communities in sustainable access to electricity services. It is also intended to be a reference document for all of us who are committed to this initiative. We also hope that it will help us mobilize new partners and additional financial resources.

About us? The Barefoot College family has grown considerably in these ten years, and I cannot name everyone here. However, I am sure that each member of this great family, wherever they are today, will not help but smile with pride when thinking of the laughter of these ordinary and extraordinary women and men who have changed or are changing history in their communities.

A big thank you to all of us!

Voahirana Randriambola
Chairperson of Barefoot College Madagascar NGO
Coordinator of the Barefoot College initiative at WWF Madagascar

GLOSSARY

ADER	Agence de Développement de l'Electrification Rurale
BCMada	Barefoot College Madagascar
DGE	Direction Générale de l'Energie
FIS	Woman Solar Engineer
MNP	Madagascar National Parks
MPPSF	Ministry of Population, Social Protection and promotion of women
NGO	Non-Governmental Organization
PNBC	National Barefoot College Program
UNDP	United Nations Development Program
SAF FJKM	Department for the Development of the Church of Jesus Christ in Madagascar
WCS	Wildlife Conservation Society
WWF	World Wide Fund for nature

CONTENTS

This book is organized by topic for ease of reading and use.

Participation of women in training at Women's Day, in Tsiafajavona

FOCUS 1

BAREFOOT COLLEGE MADAGASCAR'S «WOMAN SOLAR ENGINEER» INITIATIVE

Enabling remote rural communities to have sustainable access to solar electricity services through the communities themselves.

WHAT IS THE BAREFOOT COLLEGE « WOMAN SOLAR ENGINEER » APPROACH?

- The approach targets isolated rural communities with no access to electricity services and which are vulnerable (over 8.7 million people in Madagascar).
- It relies on women volunteers between 35 and 50 years old, often with little or no education and from modest social status, who may be mothers or grandmothers.
- This type of woman is seen as a reliable agent of change. If these women have the opportunity to acquire skills, they value it by investing their family and the development of their community.
- The selection of the women is held during a village community meeting.
- The selected women are trained for five months at the Madagascar Barefoot College Training Center, in Tsiafajavona / Ambatolampy /Vakinankaratra Region.
- They follow two complementary training courses. The main course focuses on the assembly of electronic circuits and components into solar systems, as well as the installation, maintenance and repair of these solar systems. The "Enriche" curriculum focuses on modules that promote the empowerment of women through training on self-esteem, women's health, women and children's rights, literacy, sustainable practices, financial inclusion, micro-entrepreneurship (sewing, poultry breeding, market gardening...).
- When the "Women Solar Engineers (WSE)" return to their villages, the community is supplied with spare parts and components that WSE will use to equip one REW and approximately fifty households per "Woman Solar Engineer", with solar systems. There are three types of solar systems:
  - Solar home system of 40 watts, allowing the use of 4 LED lights and a USB port for phone charging.
  - Portable solar lantern of 5 watts allowing LED lighting, and a USB port for phone charging.
  - 300 watt solar system to power the REW which also serves as a workshop for the WSE.
- The WSE works closely with a village solar committee to ensure the sustainability of the electricity service, which is subject to a fee. More specifically, the Solar Committee is in charge of managing the fees. Households must pay a fee or "electricity contributions" ranging between 3,000 to 10,000 Ariary per month, depending on the electricity service they choose.
- When faced with a request for solar systems from new households within the village or from households outside the village, the WSE and the village solar committee can respond by developing an entrepreneurial activity on producing and selling solar systems.

The implementation of the approach started in 2012 in Madagascar. In 2017, a decision was made to develop a national program to scale up the approach to the whole country.

The National Barefoot College Program (NBCP) aims to have a network of 744 Barefoot College "women solar engineers" by 2030, enabling 630,000 isolated rural households to have sustainable access to solar electricity services.

This program would increase the electricity access rate in rural areas by 12%. The NBCP initiatives contribute to the achievement of the following Sustainable Development Goals:

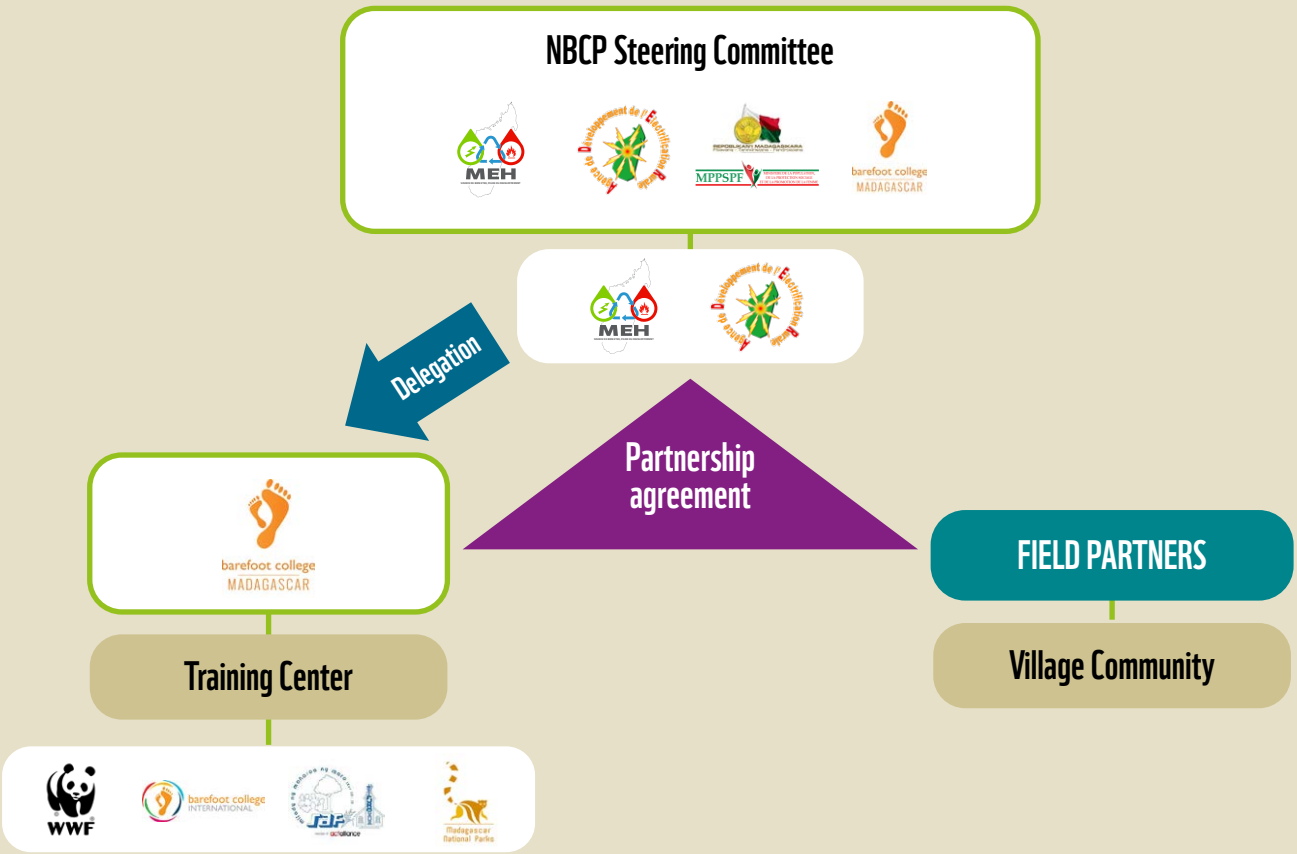
We need to support the struggling rural communities.

« I have just returned from Ambovombe in the Androy region, where we monitored 6 solar power plants of about 80kW in the main towns. For the operators of these plants, it is unthinkable to sell the electricity without making profit. In the NBCP, there is a close consideration of the population. The equipment is subsidized, women from the village are trained, and the beneficiary community is in charge of operating the system. This shows that the objectives of these solar power plants and the "Woman Solar Engineer" approach are very different. If we consider a village with several hamlets, with about 150 households in all, would there be an operator ready to extend a micro electricity grid in this setting? There wouldn't be one. I visited a Barefoot College village, which is only accessible by foot, travelling hills and valleys over a distance of 30km! When I arrived in the village, there was light! The decentralized Barefoot College approach is working!

Furthermore, the lives of the women trained at Barefoot College really changed, and we see it in their attitudes and what they say when you talk to them: you can feel pride and courage. If we compared a woman before and after the five-month training, the change is radical, it is a new person. I am really convinced about this approach. It is a good thing that this program is in place, it is much needed. However, one of the problems of the NBCP is its financing. The Ministry of Energy and Hydrocarbons are making efforts to mobilize the needed financial resources: we need to support the struggling rural communities! »

Dieudonné Virginia Dalia Soatsara,
Director of Cooperation and Partnership at the Ministry of Energy and Hydrocarbons, NBCP Focal Point

WHO ARE THE STAKEHOLDERS OF THE NATIONAL BAREFOOT COLLEGE PROGRAM (NBCP) AND WHAT IS THEIR ROLE?



- A steering committee chaired by the General Directorate of Energy (DGE) of the Ministry of Energy and Hydrocarbons (MEH) coordinates the NBCP. The Rural Electrification Development Agency (ADER), the General Directorate for the Promotion of Women of the Ministry of Population, Social Protection and Promotion of Women (MPPSPF), as well as the Barefoot College Madagascar (BCMada) NGO are all members of this steering committee.
- The Barefoot College Madagascar (BCMada) NGO, governed by Law 96.030 of August 14, 1997, ensures the development and professional management of the Barefoot College Madagascar Training Center, which opened in July 2019. To this end, a service delegation agreement was established between BCMada and MEH in January 2018. WWF Madagascar, Barefoot College International, Madagascar National Parks, and SAF, FJKM are the founders of the BCMada NGO.
- Any civil society or private sector actor wishing to implement the WSE approach in one or more of the villages in which they work can become an NBCP field partner. The field partner provides support to the village community in the implementation of the approach. Its actions are framed in a four-party partnership agreement established with the DGE, ADER and BCMada.

Why integrate the PNBC?

« The Lemur Love NGO has among its objectives the protection of the "Varika" lemurs and the promotion of women. The "Solar Woman Engineer" approach is consistent with these objectives. We hope that when the women in training return to Efoetse, they will become role models for other women in the community. We also hope that they will pass on the knowledge they have acquired. The light they bring to the village will bring hope for development."

The village of Efoetse, District of Betioky Atsimo, Atsimo Andrefana Region, was integrated into the NBCP in 2021 on the proposal of the Lemur Love NGO

Dr. Seheno Andriantsaralaza,
Country Director Lemur Love NGO

The remote village of Menarano (District of Ifanadiana)

ATTENTION POINTS!

- The field partner submitting a request should not communicate any information on the WSE approach to the communities and local authorities of the targeted village(s). The only thing the field partner and the community/ local authorities can discuss is whether or not the community is interested in having access to electricity. This is to avoid unmet expectations.
- The statistical information on the number of households in the village that the field partner provides in its submission to the NBCP must be up to date.

Stakeholders	Responsibilities	
DGE/ADER	• Training of the field partner in the implementation of the NBCP methodology with BCMada, and assistance/advice to the field partner on the effective implementation	• Monitoring the implementation of the WSE approach in the field partner's village of intervention • Reimbursement of a maximum of 70% of the equipment costs for the electrification of the village[1]
NGO BCMada	• Training of the field partner on the implementation of the NBCP methodology with DGE/ADER, and assistance/ advice to the field partner on the effective implementation of the methodology • Technical assistance during the village meeting to start the approach	• Training of women at the Barefoot College Madagascar training center • Processing of monitoring and evaluation data from field partners • Management of the women's stay at the training center
Field partner	• Implementation of the WSE approach at the village level, following the methodology defined for the NBCP • Collection of monitoring and evaluation data on the WSE approach at the village level and regular reporting to the DGE/ ADER/ BCMada • Coverage of costs associated with the responsibilities of the field partner : • Participation in the training organized by the NBCP for field partners	• Organization of the village meeting • Preparing for the integration of women at the training centre • Support /coaching for the solar committee • Collection of monitoring data • At least 30% of the equipment costs for the electrification of the village[2] • Support in initiating the solar committee/ WSE in solar entrepreneurship

WHAT ARE THE CRITERIA FOR THE SELECTION OF ELIGIBLE VILLAGES FOR THE NBCP?

For the NBCP, a "Village" is defined as a "fokontany" or part of a "fokontany" consisting of one or more hamlets. The following criteria are considered:

- The electrification of the village is not yet planned by ADER.
- The village is located more than 5km from the chief town of a municipality and it is therefore unlikely that the village will be connected to a mini-electric grid in the medium term.
- The number of households in the village is around 100 to 200 households. This is the number of households targeted at the beginning. Over time and with the development of solar entrepreneurship, the number of beneficiary households in the village may increase.
- The village is isolated and difficult to access.
- The majority of households do not have access to modern lighting and electricity.
- There is good social cohesion in the village, which is necessary for any community-based approach.
- The NBCP field partner proposing the village is expected to intervene in the village for at least the next four years after the start of the approach.

1 Between USD 9,800 and USD 53,200 for 200 households, depending on the services the households subscribe to
2 Between USD 4,200 and USD 22,800 for 200 households, depending on the services the households subscribe to

A picture of the audience during the opening of the training center in July 2019

HOW TO BECOME AN NBCP FIELD PARTNER?

Any civil society organization or private sector actor wishing to implement the WSE approach in a village or villages where it intervenes may submit a proposal to the NBCP. The Terms of Reference for the submission can be requested by email at the submission addresses.

There is no submission period, applications can be submitted at any time. If the Selection Committee assesses the field partner and the proposed village(s) as eligible, the field partner is notified. It is then trained on the NBCP methodology and the four-party agreement is established. The implementation of the approach in the village can then begin.

Applications must be submitted in electronic and/or physical form to the following address:

NATIONAL BAREFOOT COLLEGE PROGRAM

Mr. Director General of Energy and Hydrocarbons

Ministry of Energy and Hydrocarbons

Rue Farafaty Ampandrianomby, Antananarivo 101

pnbarefoot@gmail.com - ader@ader.mg

From the launch in 2012 to May 2022,

The initiative has covered 22 villages in 12 regions, with the involvement of five field partners (WWF, Madagascar National Parks, SAF FJKM, Lemur Love, World Conservation Society).

The country can count on 73 "women solar engineers" working for the benefit of at least 3,700 households.

In January 2022, the Barefoot College Madagascar Training Centre welcomed its fourth class.

The community of Beanjavilo (Antsalova District) accepts the conditions of the FIS approach

FOCUS 2

ENGAGEMENT OF THE VILLAGE COMMUNITY

The implementation of the Women Solar Engineer (WSE) approach in a village is decided through a village meeting conducted in line with the principles of inclusion, transparency, and voluntary consent of the community.

The fact that a village has been included in the National Barefoot College Program (NBCP) does not necessarily mean that the approach is feasible in the village.

The village meeting establishes if the conditions are met to enable the correct implementation of the “Woman Solar Engineer” approach, and in particular if they are ready to sustain the electricity service that would be set up. The commitment or lack of commitment shown by the village community during the various stages of the village meeting will allow these conditions to be assessed.

Two outcomes may arise during the village meeting:

- The conditions are not met: the field partner has the possibility to propose another village to the PNBC;
- The conditions are met: the implementation of the WSE approach can continue in the village.

Time for change.

« I'm 40 years old, I sell silver jewellery. I live in Efoetse, near the Tsimanampetsotse National Park, in the district of Betioky Atsimo. I left school in the 9th grade. I still learned to read and write, but I have now forgotten. I volunteered to become a "solar engineer", especially because there is no electricity in our area, and it increases insecurity. I set myself the challenge that once I return to the village, I will pass on my knowledge to the people of the village so that everyone can have work and help eradicate the "kéré (famine). »

Vonimalala Lanto,
Apprentice in the 4th class of the Barefoot College Madagascar training centre

Solar committee, selected women and authorities in Andavoanemboka (District of Ambilobe)

The authorities who came to attend the village meeting in Analalatsaka (Bealanana District)

GOOD TO KNOW

- The village meeting is conducted according to a methodology developed by the Barefoot College Madagascar (BCMada) NGO. This methodology respects the principles of inclusion, transparency and voluntary consent of communities. This methodology is subject to regular improvements as the experience of implementing the WSE approach grows.
- The field partner is in charge of the logistical and material organization of the village meeting.
- The village meeting takes place three months before the start of the training at the Barefoot College International training center. This gives the field partner time to make the necessary preparations (administrative, material, logistical, and psychological) for the women before they go to the training center.
- The participants in the village meeting are:
    - The community: all adult women and men residing in the "village" selected by the NBCP.
    - Local authorities: elders, officials at the fokontany level, the mayor of the commune or his representative, and the District and/or Region representative.
    - The sectorial administrative authorities: the representative of the Ministry in charge of Energy, the representative of the Ministry in charge of Population.
    - Local authorities and sectorial administrative authorities are responsible for supporting and facilitating discussions at the village meeting when necessary.
    - Representatives of the Barefoot College International NGO participate as technical speakers. They provide guidance and facilitate the meeting. Based on the discussions, they assess whether or not the implementation of the WSE approach is feasible in the village. They then inform the Directorate General of Energy and ADER.
    - The representatives of the field partner organize the village meeting, facilitate it and lead it in close collaboration with the representatives of the Barefoot College InternationalNGO.
- The village meeting lasts about four hours. If the results of the different stages of the village meeting are conducive to the further implementation of the WSE approach in the village, it means that:
    - women are selected for training,
    - adult men and women are elected to serve on the village solar committee. The village solar committee consists of a chairman, vice-chairman, secretary, treasurer, auditor, and one or more advisors.
- A screening of pictures and videos illustrating what lies ahead for the women and the village is then shared with the community after the village meeting. Furthermore, a working meeting with the selected women, the solar committee, the village leaders, the BCMada team and the field partner team is held to prepare the next steps in the implementation of the WSE approach.

GOOD PRACTICES

- When mobilizing the community for the village meeting, it is essential to
  - Empower local leaders and authorities in mobilizing the target community, in particular those responsible at the “fokontany” level.
  - Insist on the presence of both adult women and men in the household. The household must make arrangements to make this possible.
  - Inform adult women and men in the target community to bring their national identity cards if they have one. However, this is not a condition for their participation in the village meeting.
- When the target village involves several hamlets, the hamlet where the village meeting will be held should be strategically selected. The next step is to ensure that adult women and men from the other targeted hamlets actually participate in the village meeting: appropriate choice of starting time, and arrangements to allow these people who have to travel to participate in the entire village meeting.
- The compensation for the local authorities who have to travel is covered by the field partner. If the sectorial administrative authorities who have to travel do not have the means to cover their costs, the field partner will discuss possibilities with them. However, in order to ensure the proper implementation of the approach, their presence at the village meeting is strongly recommended.

Selection of women in Ambatopilaky (Tsihombe District) with the UNDP team

- Good representation and participation of local and administrative authorities strengthen the WSE approach, reassure the community, and allows these authorities to be well-informed and become involved, thus facilitating the implementation of the WSE approach later on.
- In order to prevent possible setbacks, the field partner should allow at least one and a half days for the village meeting and its immediate next steps:
  - One day dedicated to the village meeting, taking into account the time needed to start the meeting.
  - A screening of pictures and videos, preferably in the evening.
  - Half a day for a post-village meeting working session.
- The selected location for the village meeting is decided in consultation with the local authorities. The place should be able to accommodate several people and be adequately ventilated to prevent the spread of contagious diseases. Outdoor village meetings are appropriate; however, arrangements should be made to anticipate sunlight and/or rain, as the meeting will last a long time. In addition, a sound system with a microphone is strongly recommended.
- The seating arrangement of the different members of the community is important. The women should be seated at the front while the men in the back.
- In order for the village meeting to run smoothly and efficiently, preparatory work between the BCMada team and the field partner team is required. Local authorities and sectorial administrative authorities should also be made aware of their roles and situations where their intervention is required during the village meeting.
- In addition to being inclusive, transparent and respectful of the principle of voluntary consent, the approach is participatory. Community members are invited to give their points of view and share their knowledge at all stages of the meeting, except for decisions that must be validated by a majority.
- Good relationships established before the village meeting, between the field partner and the village community will facilitate the running of the village meeting thanks to mutual trust. The credibility of the field partner towards the community will facilitate understanding and ownership.

Post village meeting working session in Antafondro with the Madagascar National Parks team

A key role in the WSE approach.

« The implementation of the WSE approach in a village depends very much on what happens during the village meeting. There is a key principle to consider: one does not force the community to accept the conditions of the approach, nor force the community to implement the approach, since the community is not the only one involved and this would pose problems of sustainability for the electricity service that would be put in place afterwards. The validator is there to assess whether the conditions are favorable for future financial management and user management, among other things. The village meeting facilitates the villagers' self-analysis of the situation with regard to their energy practices, as well as the identification of appropriate solutions. The validator also ensures that the choice of women meets the criteria defined by BCMada.

He is also there to inform and sensitize on the good collaboration between the field partner, the local authorities and the community for the further implementation of the approach. Furthermore, it would be good if the stakeholders also look at other aspects necessary for the development of the communities in a complementary way. For example, access to drinking water has always been identified as an essential need, which must go hand in hand with actions to promote sanitation and hygiene. »

Randriamahaleo Andrianajaina,
Validation officer mandated by the Barefoot College Madagascar NGO

ATTENTION POINTS!

- No information on the WSE approach should be communicated by the field partner to the communities and local village authorities prior to the village meeting. This will avoid unmet expectations as well as rumors that would hinder the smooth running of the village meeting.
- In order to mobilize the local authorities and the community for the village meeting, the only information that can be communicated is that “the village meeting will be about the development of the village and requires the presence of all because decisions will be made in the presence of all”.
- One month prior to the village meeting, the field partner should provide the DGE / ADER / BCMada with updated statistical information on the number of households in the village. This will help to anticipate the number of people expected to attend the village meeting, as well as the number of women to be selected.
- The proper logistical preparation of the village meeting (location, timing, equipment, etc.), as well as the effective and efficient mobilization of the local community authorities in the preparation of the village meeting, is a prerequisite for the smooth running of the meeting.
- If the number of adults present at the village meeting is assessed by the BCMada team to be insufficient, and/ or if the number of adults from the targeted hamlets (other than the hamlet where the village meeting is held) is assessed to be insufficient by the BCMada team, the village meeting cannot take place. When mobilizing the community for the village meeting, local authorities must be resourceful in their approaches to ensure that this does not happen. Mass participation is essential because it legitimizes decisions made by and for the community.
- Seating men next to women can be contrary to the local culture. We need to ensure that there are acceptable seating arrangements; the most important thing is that women are seated in front while men are seated further back.
- Opening speeches at the village meeting should be kept short in order to move quickly into the technical discussions, which take nearly four hours. This is essential to maintain the presence of participants and the attention of the village community.

Village meeting in Ambatopilaky (Tsihombe District)

The trainers in demonstration during the inauguration of the center in July 2019

FOCUS 3

TRAINING AT THE BAREFOOT COLLEGE TRAINING CENTER

The training at the Barefoot College International Training Center lasts five months and focuses on solar technology (SOLAR curriculum) and topics on the empowerment of women (ENRICHE curriculum).

The Barefoot College Madagascar Training Center is located in Ambatomainty, Commune of Tsiafajavona, District of Ambatolampy in the Vakinankaratra Region. The center is managed by the Barefoot College Madagascar NGO (BCMada).

GOOD TO KNOW

- Following their selection during the village meeting (see focus 2), the women commit themselves to comply with the discipline at the training center and to follow the training until the end.
- The field partners ensure the necessary steps for the administrative integration of the women at the center and their preparation. All the required information is to be sent to BCMada before the women enter the center: medical check-up report, residence certificate, photocopy of the National Identity Card, identity photos, authorization from the local authorities, and copy of their birth certificate. The field partners also provide each woman with a travel kit.
- The training pedagogy is adapted to the technical and intellectual capacities of the women, as most of them are illiterate.
- No diploma is delivered at the end of the training. The best way for the women to prove their skills is to put them into practice when they return to their village.
- The SOLAR training is provided by already active "women solar engineers", who were trained and educated to become trainers. The ENRICHE training is provided by the staff of the training center as well as by practitioners from the rural world.
- BCMada makes sure a balanced and nutritious diet is provided to the women during their stay at the center. BCMada also covers the health expenses during the stay (particularly ophthalmologic and dental care). Women from the same village are housed in the same room. They are provided with the necessary hygiene equipment. The center has electricity and hot water. Telephone credits are given to the women every month so that they can call their families.

A mother to the apprentices.

« Life at the center is like life in a family. The trainees are all different from each other. They don't have the same mentality, nor the same character. I am responsible for dealing with them in a fair way. My aim is to make life at the center healthy and calm. I do whatever it takes to make the trainees feel at home. If one of the women is home sick, I am there to comfort her. If there are conflicts between the women, I try to find out the reasons, and we look for a solution together in order to end the conflict. If a woman is ill, I give her the right medicine: I call the doctor when I do not know what medication to give her based on her health condition. One of the challenges at the center is sometimes misunderstanding of the various dialects as the women come from different regions of Madagascar, and sometimes this even leads to conflicts. The solution we have found to this is to explain to them that we are all Malagasy and that there is no discrimination. »

Rasoarimanga Simone,
Manager of the training center Barefoot College Madagascar

Women solar engineers receive an award from the African Union during the opening of the training center in July 2019

The women of Andavoanemboka (Ambilobe District) facing winter at the training center

GOOD PRACTICES

- The women leave for training and then serve the village community upon their return. Village departure and return ceremonies, organized by the village community in collaboration with the field partner, serve as reminders of these arrangements, where the women are given blessings and moral support, and where the community expresses their pride and thanks in advance.
- It is important for the field partner to spend time talking with the women and their families before their departure, so that both sides feel confident, are well informed and reassured. For the women, this helps them with psychological preparation for the necessary adaptation during the five months at the center, and to adjust their behavior in terms of civic behavior and hygiene.
- The field partner should plan for a sufficient budget to deal with unforeseen circumstances that may arise between that time and the women's integration at the center.
- Involving the local authorities right from the village meeting onwards facilitates the administrative preparation of the women before they enter the center. The administrative situation of the women must be known as early as possible in order to understand the time required to perform some formalities.
- Although copies of birth certificates are not so important for training in Madagascar, obtaining them is very important for women and is part of their path to emancipation. This civil status document will always be useful to them.

For a quality solar training.

« I am responsible for the solar curriculum at the training center, and I am therefore responsible for organizing the training with the solar teachers, as well as for preparing all the materials needed for the training. The choice of the best teachers among the already active "women solar engineers" is very important, in order to provide the trainees with the best training so that they have a good level. I also follow up the trainees after the training to ensure that they achieve their goal of bringing light to their village. I am also involved in the management of the solar equipment, from ordering them to transporting them to the training center. I check equipment received and test it is functioning properly before it is distributed to the villages. It is important to guarantee the best quality of training in order to have tangible results. We must also try to be well organized and anticipate well in order to help. »

Andriambololona Ony Fy,
WWF Solar specialist in charge of Solar coordination at Barefoot College Madagascar

For the emancipation of vulnerable women.

« Most of the women joining the center cannot read or write. Taking this into account, we use suitable teaching methods to transmit knowledge and ensure that it is understood: games, drawings and illustrations. The subjects that are covered during the training are unusual for them, and even, regarding certain subjects, they did not even suspect their existence. The goal as a teacher is for apprentices to have knowledge and skills. As a result, we are always very happy when we see that they have appropriated what we have taught them because it will help them to change positively, to emancipate themselves. They can bring this knowledge back to their villages and share it with their communities. »

Rakotondrazafy Julie,
Enriche Coordinator at the Barefoot College Madagascar Training Center

Repair work by the "women solar engineers" of Ambakivao

- The Field Partner should also inform BCMada of any "taboos" and/or medical dietary restrictions for each woman, so that BCMada can take them into account in the meals prepared at the center.
- The field partner must regularly inform the families about the progress of the training, by staying in touch with the Manager of the training center.
- **About the SOLAR training:**
  - The training of trainers can be tailored to the levels of the future trainers, this can be done for example by extending the duration of the session, which usually lasts three weeks. This allows some WSEs to do more practical exercises.
  - Choosing WSEs from different villages to become solar trainers allows them to share their experience and skills in solving technical problems that arise in their villages, which are sometimes the same.
  - Conducting the training in Malagasy is an advantage for the apprentices as they can understand more easily compared to those who were trained in India.
  - A well-defined training program is established at the beginning of the training. A weekly follow-up is done to adapt the training depending on what has been acquired or not by the apprentices.
  - Although some trainers and trainees cannot write properly, it is always better to provide them with the same note-taking tools (notebook and pen) that are provided to those who are more proficient in writing. This allows them to better assimilate the lessons by adapting their note taking to their understanding and their ability.
  - For apprentices who have difficulties in learning and assimilating calculations, rote learning is imperative.
- **About the ENRICHE training:**
  - The distribution of training hours over the five months allows to cover all the modules in a satisfactory manner.
  - The availability of the necessary training materials enables the proper delivery of all modules.
  - Women's capacity building does not stop in the training room. It continues when they watch the news or TV programs, when they cook or bake during the days of rest or when they participate in community events in Tsiafajavona.
  - The educational tools are regularly updated to be increasingly effective.

An exemplary ongoing progression.

« I am one of the "solar engineers" from the village of Iavomanitra, in the district of Fandriana, in the Amoron'i Mania region. I also work as a teacher trainer, or "master trainer" at the training center in Madagascar.

My adventure started in 2013, when I was chosen with three other women from my village to participate in the solar energy training at Barefoot College in India. We were women with different levels of education, some of us were even illiterate. We successfully completed the training in India. One year after our return to Madagascar, the villagers back home were able to benefit from solar electricity. In 2019, when the Barefoot College training center opened in Tsiafajavona, I was called in to train the first class of women apprentices. This was a great advantage for me, as our trainers in India came to help us to do our job as teachers and they answered all our questions as well. It was also easier to understand them (compared to when we were in India) because there was someone who translated the explanations into Malagasy. Later, I became a master trainer for the second class of the center, and I am still motivated as a trainer. Sharing my skills and experience, helping others and finding solutions to problems are my motto. »

Rasoamampionona Florette Vonjiniaina,
« Master trainer » at the Barefoot College training center

- Differentiating between real literacy beginners and false beginners helps women to progress well in the program.
- The Health and Hygiene module is one of the most useful modules in which apprentices show a lot of interest.

- The most successful women at the center are generally those who are most motivated to bring development to their village, those who pay attention to all the teachings provided in the center, and those who are serious, hard-working and dynamic. The training atmosphere is motivating, with various entertainments.

School work is made easier by modern lighting

- The support of their families is paramount during the women's stay at the center, including their pride and support in helping the women with the family burdens during their absence.
- The majority of the apprentices are motivated at the end of their training and are keenly waiting for the moment when they can practice in the village, despite the fact that it is a great challenge.
- The stay at the center develops mutual aid capacities between learners from the same village. Those who are more skilled always support their colleagues.
- When they return to the village, a new life begins for each woman. Solidarity between "women solar engineers" is generally seen. With their new skills, the women receive more consideration and are listened to more. They have a better self-image, which gives them a sense of pride. Some of them become leaders when they arrive in the village, and are models for others in terms of development. Thanks to them, perspectives of opening for the women and for the village are possible.
- Upon returning from their training as trainers, the WSE also share their additional knowledge with other WSEs in their village.

Some recipes for the implementation of the ENRICHE know-how in the villages

(visit exchange between communities in December 2021):

Vegetable gardening

- Practice of « Voly rakotra »(use of vegetation cover) to protect from the sun and heat.
- Learn to manage time well, to get crops, to prioritise watering in the morning at sunrise and at the end of the day
- For permanent drip watering, use a water bottle with a syringe.
- Use «Gasy » methods to repel unwanted insects: Aloe, coffee, spices

Breeding of local chickens

- It is mandatory to vaccinate all poultry and separate the sick chickens
- Soak a coton pad in petroleum mixed with oil on poultry that have fleas in their eyes, and use «K-othrin » in the yard

Sewing

- Learn to do it oneself: frequent and repeated use of the sewing machine allows you to understand by yourself the workings of the machine and the appropriate solutions

ATTENTION POINTS!

- The solar committee, with the support of the field partner, must ensure that the community is well informed about the WSE process in order to avoid false rumors and malicious comments that could discourage women before they leave for training.
- Concerning the travel kit, it is essential that the field partner respects the minimum list recommended by BCMada. This will avoid frustration and discomfort when the women arrive at the center and compare themselves to others. Purchasing warm clothing adapted to the climate of Tsiafajavona is also important as the area is known for its temperatures which are among the coldest in the country.
- The medical examination is essential, and the aspects to be considered by the doctor are specified by BCMada. The center does not admit women with significant health problems that could lead to serious situations that would be difficult to manage during their stay at the center. Pregnant women are not admitted to the center; some of them may be reluctant to undergo a medical examination when checking their condition.
- Psychological and behavioral preparation of women by the field partner prior to their departure should also address diet and discipline at the center. A balanced and nutritious diet is not part of their habits and they need to be prepared to accept it in order to maintain good health during their stay.

The Enriche training

- Field partners must ensure that women travel safely to and from the center, in particular by taking the necessary health measures related to any ongoing pandemics. Field partners are advised to take out insurance for each woman related to their trip. During their stay, insurance is taken out by BCMada for each woman.
- The field partner must communicate well with the families during the women's stay at the center. Indeed, the relatives must make efforts in terms of communication with the women so as not to unnecessarily disrupt the women's concentration during the training. Telephone calls between the family and the women must be made outside of class hours. Moreover, during the training, a discipline is established: telephones are not allowed into the training room to allow the women to concentrate on the courses.
- When a woman displays behaviors that are difficult for the training center team to manage because of her character, the center manager can call on the field partner to help talk to the woman to improve her behavior. If this happens, it is good to keep reminding the woman of the commitments she accepted as a result of her selection; she is also accountable to the community that trusted her.
- In the process of selecting women, particular attention must be paid to their motivation. Some of them were not really motivated to bring about change in their village. Some are only motivated financially (prospects of remuneration when they are back in the village), and find excuses to be absent during the training. It might also be useful to conduct a survey at the level of the community, as some of them were thought to have learning problems because they were not able to learn anything by the end of the training.
- Field partners must be strict with women and forbid them to bring their "charms" to the center as this causes disruptions in the life of the center. In addition, the field partners must explain to the learners that they must not impose "prohibitions" on the center because of their possible mystical practices in the village.
- It is important to ensure that there is good cohesion between apprentices from the same village before they leave for the center because they will always work together. If there are personal disputes between them, we must work to ensure that this does not impact their cohesion as "Women Solar Engineers".

What Enriche taught me.

« Enriche taught me about poultry farming techniques. I was already doing it but it was not working well. What Enriche taught me was very appropriate. Some time after I had set up my chicken house, I had to go to the center to be a 'master trainer' and 'trainer'. '. So my son is looking after it at the moment and we talk on the phone; but I'll be more confident when I can look after it myself. Four hens have already produced about ten chicks each. I'm thinking of selling my chickens for extra income. We will also eat some of them. We will sell the chickens that are big enough, when the price is higher. Apart from raising chickens, learning to sew has also been beneficial. It is now that I greatly appreciate knowing how to sew, because at first I was hesitant to learn; now I can say I know how to sew and I apply my skills. It will also allow me to have additional income. I will also sew for my own needs but not every day. I can take orders and sew for people. Otherwise, as I live in the coastal area, I cannot grow vegetables because the soil is not suitable, unlike other women who live inland. I also educate my grandchildren about health, family planning, and women's and children's rights. There are things happening in my village that we see are not good at all, so we raise awareness by explaining the negative impacts of this behavior. Also, I can now bake cakes: it's better than buying, it's easy to make and you can eat it as much as you want, especially on holidays. When I come back to the village, so that the children are happy, I'm going to bake them cakes! »

Yollande acted as trainer for the class 4. She was due to return at the end of June 2022.

Randrianambinina Yollande,
« Woman solar engineer » in Ambakivao

The Enriche training

- In relation to the SOLAR training:
  - It is a good thing to give a chance to every "Woman Solar Engineer" who wishes to become a trainer. This opportunity allows them to develop their technical skills as well as their self-confidence. However, this should not impact the quality of the training provided to the apprentices; the WSE should be fully aware of the challenges and obligations associated with the responsibility of being a trainer before committing themselves.
  - It is important to identify the most suitable trainers (motivation and technical capacity) so that the entire training does not rely on one or two trainers.
  - It is preferable to not have two women from the same village serve as trainers, as one may not make enough effort to the detriment of the other.
  - Differences in the skill levels of the trainers should not be highlighted during the training sessions: those who are considered more competent should not denigrate the other trainers, especially in front of the trainees. The education of the trainers should be established at the beginning of the training, and should be repeated throughout the stay at the center.
  - Good psychological management of women, whether trainers or apprentices, is necessary. For example, it is important to avoid correcting a trainer who made a mistake in the presence of the other trainers and the apprentices.
  - To ensure a good practical mastery of the lessons by the apprentices, assembling the maximum electronic circuits during the training is necessary.
  - If the solar equipment for the training is not available in time, for example due to delays in the clearance of the equipment, it is necessary to be able to adapt the training, such as extending the length of the women's stay at the center or shifting the initial schedule. Having the equipment available on time at the center is a big challenge for the training. BCMada must ensure that the trainees master the assembling techniques, therefore BCMada reserves the right to extend the duration of the stay at the center or to postpone the planned training schedule if there is no other solution.
- **In relation to the ENRICHE training:**
  - It is important to help apprentices to acquire a sewing machine. Indeed, although they are interested in sewing, it would be difficult for them to apply the training back home if they do not have a sewing machine.
  - The training on raising poultry at the center is for the moment still theoretical as there is no organized practical application.
  - Digital literacy is also limited due to the absence of an internet connection in the area where the Center is located. Digital technology is only used to show the digital mediums in the training modules.
  - It is not easy for the apprentices to understand the notions of micro-entrepreneurship.
- It is important to conduct a mid-term review of the training: discussions between the leaders at the center, the trainers and the apprentices on life at the center. This helps to make appropriate adjustments for the rest of the stay.
- The solar programs and the Enriche activities must be carefully balanced so as not to overload apprentices (homework/solar lessons and literacy).
- Physical activities are important during the stay to maintain the good health of the women.
- The "women solar engineers" should be regularly encouraged to pursue their efforts as part of their responsibilities once they return to their village.

THE SOLAR TRAINING

Duration of the training

The solar training lasts 15 weeks, 5 days a week from 9.30 a.m. to 5.00 p.m. with three breaks (two breaks and one lunch break).

The trainers

The solar trainers are “women solar engineers” who are already active. They receive a three-week preparation session before they start working as trainers. This session is given by two “master trainers” chosen among the most successful “women solar engineers”. The session focuses on theoretical and practical reviews and teaching techniques.

During the training of the apprentices, for the theoretical parts, the trainers take turns coordinating each module per week, with the other three assisting her when necessary. For the practical parts, one trainer supervises three apprentices, and the trainers help each other as necessary.

Content of the training

The solar training focuses on the assembly of electronic circuits, assembly of photovoltaic solar system components, their installation in households, repair, and maintenance. The training modules can be summarized as follows:

- Names of tools and spare parts used
- Equivalence of resistor color codes
- Calculation of resistor values
- Assembly, testing, and maintenance of LED lamps circuit
- Assembly, testing, and maintenance of regulators circuit
- Assembly, testing, and maintenance of DIVA lanterns circuit
- Assembly and installation of home solar lighting systems
- Installation of solar system for the rural electronic workshop
- Review of the training and visit to nearby electrified village

Langage of training

The “master trainers” are women who have been trained at the Barefoot College International Training Center. Therefore, when they transfer their knowledge to other women, they do so in English for the names of tools and components of a solar system. For the color codes of resistors, English, official Malagasy, and dialects are used. All other explanations are given in Malagasy

Training methodology

According to the Barefoot College approach, learning is based on the principle of repetition and the use of easy-to-memorize materials. A training manual with illustrations is given to each woman at the beginning of the training.











THE ENRICHE TRAINING

Duration of the training

The training lasts about 750 hours, including 180 hours of literacy, 250 hours of sewing, and 320 hours of various modules.

Literacy training is important because it helps to assimilate the various modules (financial inclusion, entrepreneurship, use of modern technology such as the telephone and the calculator, sewing, etc.) while meeting the needs of the learners. The mastery of sewing requires a certain amount of experience, hence the length of the training.

The more technical modules require a good grasp of numbers and a certain method of reasoning that learners who cannot read or write cannot understand. They are therefore scheduled at the end of the five-month period to allow learners to acquire a certain level before they can tackle them.

The trainers

The trainers are BCMada staff at the centre as well as practising partners from the rural world. The partners enrich the modules by their direct interventions or by tools belonging to them. Local skills, at the level of the commune of Tsiafajavona, are also valued: collaboration with the local basic healthcare center, and participation of local people.

Content of the training

The training modules can be summarized as follows:

- Personal development: self-confidence, aspirations, manners, civic education
- Health: hygiene, common diseases, nutrition, reproductive health, body knowledge, general hygiene
- Human rights: gender, children's rights, gender-based violence
- Financial inclusion: basic arithmetic, savings and budgeting, bank accounts, credit, mobile banking
- Microenterprise: sales and marketing, setting up a business, pricing, record keeping;
- Environment: waste management, composts, "bozaka" coal, "fatana mititsy", rainwater harvesting, ecological services
- Literacy: traditional and digital
- Income-generating activities: raising "gasy" chickens, sewing, permaculture
- Cooking

Langage of training

Malagasy.

Solar committee and future women solar engineers of Torotosy

FOCUS 4

THE ELECTRICITY USERS' ASSOCIATION

The electricity users' association is a formal and legal entity that brings together all the households in the village that have subscribed to the solar electricity service provided by the "women solar engineers" and the village solar committee. The purpose of the association is to ensure sustainable access to a reliable solar electricity service for its members.

GOOD TO KNOW

- The initial list of households that are members of the electricity users' association is compiled after the village meeting and before the women leave for the training.
- Household membership is voluntary, and each household is free to choose the solar electricity service that suits them from among those offered, based on their needs and their means to ensure regular payment of the electricity service. Joining is equivalent to a commitment to respect the rules of the electricity service and the life of the association.
- The households of the "women solar engineers" and the members of the solar committee are automatically part of the electricity users' association.
- The number of households that can register is 100 to 200 households. This is the basis for covering the costs of the equipment for the electrification of the village in its initial phase, between the field partner and the Ministry of Energy.
- Beyond 200 households, the field partner can still pursue the subsidy on the costs of the equipment, but it must cover the subsidy at 100%. Furthermore, the development of solar entrepreneurship is a complement to the subsidized electrification phase.
- The association of electricity users must be legally constituted in accordance with the provisions of Ordinance 60.133 of October 3, 1960 of the general regime for associations. The statute and internal regulations of the association have to be adopted during the General Assembly. It is also during the General Assembly that the solar committee is confirmed as the Bureau of the association. The association must be formalized at the level of the "fokontany", the commune and the district.
- According to the provisions of the Electricity Code that governs electrification in Madagascar, the solar committee assumes the role of manager of the customers (members of the association) of the electricity service in return for payment; the electricity service can thus be assimilated to a public service. Still according to the provisions of the Electricity Code, insofar as the total power produced in the village is less than 10 kW, the solar committee is subject to the regime of declaration of the electricity production and supply to the Ministry of Energy. The Declaration template is currently awaiting approval at the level of the Ministry of Energy.

General meeting of electricity users in Andranomilolo

The future users of Kivalo electricity

GOOD PRACTICES

- The listing of households is done through a transparent process conducted by the solar committee in collaboration with the “fokontany”, the hamlet leaders and local elders. Good public communication must be put in place so that each household can seize this opportunity, and so that those who sign up can fully understand the benefits and rights, as well as the conditions and obligations, of their commitment.
- The principle of “first come, first served” is applied to get on the list. The number of households retained is between 100 and 200 households, which may cover all the requests, depending on the case. In the case of too many applications, the solar committee, in consultation with local authorities and the elders, can apply a prioritization system that is transparent and accepted by all (e.g. prioritize those who do not yet have solar systems, prioritize those who are members of the community organizations in charge of the sustainable management of natural resources, etc.).
- The internal regulations governing the electricity service mention:
    - Conditions for becoming a beneficiary
    - Procedures for the organization of the Electricity Users’ Association General assembly
    - Financial terms and conditions related to the electricity service (contributions, salaries, allowances, savings, expense management .....)
    - The responsibilities of electricity users
    - Responsibilities and roles of the members of the Solar Committee
    - The responsibilities and role of solar technicians (“women solar engineers”)
    - Processes and penalties for non-compliance to the internal regulations
    - Any other social or environmental provisions (e.g. obligation to return batteries at the end of their life and prohibition to dispose of them irresponsibly)
- In addition to the internal regulations that apply to members of the Electricity Users’ Association, a village “Dina” (local rules) may be needed to prevent theft and vandalism of solar systems, whether by association members or non-association members. It is also possible to introduce these solar provisions into existing Dina.
- Involving the local authorities (“fokontany”, commune, and district) from the start of the approach, i.e. during the village meeting, facilitates the formalization process of the association.

ATTENTION POINTS!

- Households may be reluctant to sign up for the electricity service due to a lack of trust in projects in general or because of unfulfilled past promises. Good communication is essential, including regular reporting on the status of the implementation of the approach when delays are encountered.
- In order to avoid confusion, it is important to explain that a house or “tafo” is different from a “tokan-trano” or household. In one house there can be several households, or a household can be spread over several houses (huts). It is the households that register.
- Communicate/explain clearly the process of establishing the list, the reasons for the limited number of households that can register, possible prioritization criteria, and what can be considered for those who are not included on the list because the limit is exceeded.
- Between the time the list is drawn before the women leave and the time the equipment is available to equip the households differs, there may be a significant period of time that causes people to drop out. It is, therefore, possible for the list to change, but the changes must be made transparently, and always with the involvement of “fokontany” officials and the local elders.
- When organizing the installation of solar systems at the household level, the list of households known to all must be scrupulously respected (and not misused) by the solar committee, in order to avoid conflicts and social disorder. The “fokontany” officials and village elders should be involved in checking the list at the time of equipping the households to reassure the community.
- Elders and local authorities do not always cooperate due to personal motivations and depending on the personality of each person. It is therefore better to inform all the elders and local authorities as fully as necessary to gain their support for the project.
- During the life of the electricity service managed by the solar committee, the list of households using electricity changes: some withdraw during the course of the service or are removed (see Focus 8) and are replaced by new ones. It is most important that the solar committee can always clearly identify the electricity users (members of the association) at any given time, and that these users are clearly listed along with their situation.

> *« I joined the list because I think it's good that there is electricity in Kivalo. It will reduce the cost of batteries and also the time needed to buy batteries. And the village will be lit. I signed up like the others, because lighting is necessary. I would have liked the battery to be able to use powerful devices, which is not allowed in the plan".*
>
> **Solonirina Alson,**
> **membre de l’association des usagers de l’électricité de Kivalo.**

- In order to prevent theft, vandalism, embezzlement and non-payment of electricity service fees, the internal regulations and if necessary the Dina must be very explicit about the associated sanctions.
- The high illiteracy rate in isolated rural villages can be a constraint to members’ good understanding and ownership of the statutes and internal regulation of the association. The solar committee must adopt the most appropriate approach to ensure that the content of the statutes and internal regulations is well understood. Organizing literacy activities for adults in the village can help them better understand the information communicated during the General Assemblies.

The inhabitants of the village of Ranomafana

Role and responsibilities of the various members in the electricity users'association

Member	Roles and responsibilities
Solar Comittee	**Before the women go to the training** • Establishes the list of households using electricity • Helps in preparing the integration of the women at the center **Before women's return from the training** • Legally constitutes the electricity users' association • Mobilizes the community and local authorities for the construction of the REW/women's workshop **Upon women's return from training** • Facilitates the decision of the level of remuneration of the women • Mobilizes the community for the transport of solar equipment • Conducts an inventory of the equipment • Organizes the programme for the installation of solar systems in households and facilitates women's work **Once households are equipped** • Ensures the sustainable management of the electricity service
Solar technicians (WSE)	• Ensure the assembly of electronic circuits and components, as well as the installation of solar equipment in households and in the solar house • Train users to use and follow the technical instructions • Carry out maintenance and repairs • With the solar committee, conduct scheduled or unannounced household visits to ensure that installations are used in the proper conditions
Electricity users	• Follow the internal regulations and the conditions of use of the solar equipment

Scene of life in Tsiafajavona, Ambatolampy

The illustrated manual, very useful during electrification work

FOCUS 5

ELECTRIFICATION OF THE VILLAGE

The “women solar engineers” are responsible for the technical work. The solar committee organizes the electrification of the village. The field partner helps build the REW and finances the equipment jointly with the Ministry of Energy. BCMada NGO facilitates the acquisition of equipment from suppliers.

GOOD TO KNOW

- The REW is a building built with the community and for the community. It has at least three rooms: (i) a lockable storage room for materials and spare parts, (ii) a well-lit room used as a workshop for the WSE, and (iii) a room that can be used by the community for various activities agreed upon with the solar committee. The REW is equipped with a 300Wp solar system; this allows the WSE to use electrical appliances requiring some power (e.g. soldering irons), and it also allows the use of various electrical appliances in the common room (TV, video, etc.)
- The list of households in the electricity users' association, as well as the services to which each household subscribes, is communicated by the solar committee/ field partner to BCMada NGO. BCMada is in charge of establishing the equipment and spare parts needed as well as the estimate associated with this list.
- The cost of purchasing equipment and spare parts is covered by the field partner (minimum 30%) and by the Ministry in charge of Energy (maximum 70%). The BCMada NGO facilitates the acquisition of equipment and spare parts from suppliers once funds are available.
- The solar systems manufactured by the WSE are of the BINDI brand, which is the registered trademark of Barefoot College International. These systems are designed to be robust, rural-friendly, and suitable for the WSE training program. The systems include components or standard spare parts for solar systems, and components that are specific to the BINDI brand.
- The field partner is in charge of transporting the equipment from the training center to the village, with the help of the village community.

All households opted for the solar lantern in Vorojà, taking into account the typology of the habitat

Lydia, solar technician at Iavomanitra, explaining the principle of electronic circuits

BINDI, a brand of solar products designed by women for rural communities.

« BINDI solar systems are designed by women for women. The BINDI brand aims to promote rural women and entrepreneurship development. The brand has several ranges of solar products that are suitable for rural communities. These solar products are easy to repair, maintain and manufacture by illiterate women. All products are in line with international standards, and are competitive with current solar competitors. All parts of the products can be repaired locally by women. They all have a good life span. They are environmentally friendly and inexpensive. »

Joy Banerjee,
Coordinator of Shipping Operations at Barefoot College International

The electricity services that households can access

Service 1	A portable (mobile) light and a USB port for phone charging
Service 2	Four fixed lighting points and a USB port for phone charging or for connecting a small radio
Service 3	Service 1 + Service 2

Les caractéristiques des différents systèmes solaires BINDI

Portable solar lantern DIVIYA and DIVA

Older generation (DIVIYA)

- Solar panel 12V / 10 Wp
- Lead acid gel battery 12V / 7 Ah/
- 1 solar lantern with 3 LEDs
- 1 USB port for phone charging
- Recharge time: 7 to 8 hours in sunny weather
- Usage time when fully charged: 6h in normal mode

New generation (from 2021 - DIVA)

- Solar panel 5V / 5 Wp
- Lithium-ion battery 3*2,6 Ah
- 1 solar lantern with 12 LEDs and 3 lighting levels (night light, normal (one side on), strong (360° on))
- 1 USB port for phone charging
- Recharge time: 7 to 8 hours in sunny weather
- Usage time when fully charged: Approximately 100h in night mode, 15h in normal mode and 8h if all LEDs are on

40 Wp solar home system LAKSHMI 40

- Solar panel 12V / 40 Wp
- 12V / 40 Ah lead-acid gel battery
- 4 LED house lights
- A charge controller with USB port to charge a phone or small radio

300 Wp Solar system REW (Rural Electronic Workshop)

- 4 Solar panels 12V /75 Wp
- 3 Gel lead-acid batteries 12V /100 Ah
- Charge controller, inverter
- Women's work tools (DC adjustable power supply, soldering station, sockets, etc.)
- Two years' worth of spare parts for the village

GOOD PRACTICES

- The NBCP field partner can help the community in the construction of the REW, especially by providing material that is not available locally (metal sheet, etc.). This support complements, but does not replace, the contributions of the beneficiary community
- It is not always necessary to build a new REW. It can be a building that needs to be renovated or be fitted out. There are no specific plans. Each community can design the most relevant plans with the support of the field partner, taking into account the local skills and resources.
- To date, the Ministry of Energy does not have a specific budget for the National Barefoot College Program. The Ministry's mobilization of financial partners is slow, and there are delays in the availability of funding from theMinistry of Energy. Therefore, if possible and if the field partner has the means, it is preferable that it covers as much as possible of the equipment costs in order to avoid delays at the community level. It is always best to ensure 100% of the financing of the equipment as early as possible.
- The field partner's support in transporting the equipment from the training center to the village usually stops at the nearest truck-accessible point in the village. The community then covers the rest of the trip, either on foot or by canoe.
- The speed of electrification in villages varies according to the communities. In some cases, the WSE takes on the challenge to install the household solar systems as quickly as possible given the high expectations. Households also help women in their work, especially when it comes to installing solar panels on roofs or transporting the components.
- In some villages, an arrangement has been agreed within the community for each household to allocate one of the house lights for outdoor lighting to improve security in the entire village.

Following coastal erosion, new solar house under construction in Ambakivao

ATTENTION POINTS!

- The REW should be located in a safe place, in or near the village. This is in order to avoid theft, and is also more convenient for the WSE who reside in the village. In addition, the location of the solar house should be safe to meet the needs of the electricity users' association.
- The solar house must be weatherproof, and must be protected from the intrusion of pests (rats, etc.) that may damage the stored equipment, especially the cables.
- The REW must be ready and operational before the arrival of the equipment intended to equip the households. The DGE/ADER should follow up with the field partner to ensure that the actions are done in the right order for the correct implementation of the "Woman Solar Engineer" approach.
- So far the acquisition of equipment was managed with two suppliers: (i) a supplier based in Madagascar for batteries, solar panels, and cables, (ii) with Barefoot College International for BINDI branded supplies. In order to better manage the supply (organization, customs clearance, after-sales service), it would be preferable to use a single supplier based in Madagascar who would liaise with Barefoot College International for specific equipment. This would allow warranties to be given on the equipment, which is not feasible when the equipment is directly acquired by BCMada from Barefoot College International.
- When transporting the equipment by truck, on foot or by canoe, it is necessary to be very careful not to damage the equipment, in particular the batteries and the solar panels. Damage (even a simple crack on the panels) may lead to lesser functionality or non-functioning of these components.

Dealing with the challenges in acquiring the solar equipment.

« There are several constraints related to the acquisition of solar equipment. The process is long. It starts when the field partner communicates the needs of the villages so that BCMada can draw up an estimate. Ordering the equipment from suppliers can also be delayed because advanced payments are required and there is a need to consider the cash flow situation at the BCMada level, which is linked to the payments by the field partners. The Covid pandemic caused considerable delays in international logistics .After placing an order, it can take up to 2 months for transport by plane, and up to 3 months for transport by boat before equipment arrives in Madagascar. Then, there are the procedural delays related to customs clearance (for the most recent order, we had to wait for nearly six months). The challenge for the Barefoot College NGO is to be able to entrust all procedures and logistics for acquiring and importing solar equipment to a professional and competent organization based in Madagascar. This will allow BCMada to focus on its training mission, and perhaps better control the mentioned deadlines ».

Randriamanalina Solo Thierry,
WWF Energy Project Officer providing technical assistance to Barefoot College Madagascar NGO

- Ideally, all the equipment should be available in the village when the women return. However, there are often challenges: delays in the availability of funding for the acquisition of equipment, unpredictable delays in the acquisition and transportation of equipment to the training center (including unpredictable delays in customs clearance). It is therefore important to manage community expectations and to keep people regularly informed of the situation so that they do not lose motivation.
- If not all equipment intended for the households is available at the same time, the field partner must decide whether it is better to wait until all the equipment is available, or to equip some households with what is available. In the latter case, it is important to work with the community on the prioritization of the households to be equipped.
- The equipment intended for one village should not be installed by the solar committee / WSE in households in other villages. This is considered a misappropriation of funds and assets, as the financial support of the field partner and the Ministry of Energy (especially in relation to the coverage of import duties) is clearly specified for the village where the WSE comes from.
- When organizing the installation of solar systems at the household level, the solar committee must scrupulously abide by (and not misuse) the list of households that is known to all, in order to avoid conflicts and social disorder. The “fokontany” officials and village elders should be involved in checking the list at the time of equipping the households to reassure the community.
- When the equipment arrives, there is often great excitement. It is very important to keep a cool head and do things in order, starting with a thorough inventory of the equipment before storing it at the REW. The solar system of the REW should be installed first, as this will allow the WSE to proceed with the various household works. Then, the households can be taken care of.

Women technicians working in the solar house

Transport of equipment on the back of a man, after a trip by boat

- "Women solar engineers" are often concerned when waiting for materials to arrive for a long period of time. They worry that they no longer know how to do the right thing when it will be time. They need not worry as they remember quickly (even after more than a year of waiting). Despite delays at the start of the electrification, the women have always performed their tasks well. If necessary, refresher courses can be provided by BCMada.
- The equipment is of good quality and is adapted to rural conditions. However, in some settings, special features may be required for the operation and maintenance. In situations where the sky is often overcast, the recharging time may be longer or more powerful panels may be required, reducing the use time of equipment. In coastal areas, air salinity must be taken into account and proper maintenance of electronic circuits is required to avoid rusting.
- The after-sales service at the level of the suppliers of the BCMada NGO must be well established in order to solve problems with defective components which short-change the users of electricity. The solar committee/WSE must be able to receive replacements of defective components, and BCMada must be able to organize this replacement with the supplier. Testing the components before sending them to the village also helps to avoid such problems.

Having everything you need and helping each other.

« I took part in the training in India in 2018. The solar equipment arrived in 2019. While waiting for the equipment to arrive, we, the women technicians, kept reviewing what we had learned. So when the equipment arrived, we were ready, we knew what we had to do. We first made an inventory of the equipment when it arrived, in the presence of the solar committee. We then noticed that there were not enough 'resistors', which is an essential part for the charge controller, and we informed WWF about this. Once the missing parts arrived, we helped each other and were able to assemble the solar systems. We could remember everything we learned. The solar committee took care of organizing the distribution/installation in the households, with the condition of paying the first 3 months in advance. »

Rasoanantenaina Modestine,
Solar Technician in Ranomay

Ony and Soavoatse detecting a lantern problem at Ifanato

FOCUS 6

TECHNICAL MANAGEMENT OF ELECTRICITY SERVICES

The technical management of electricity services is done through close collaboration between the “women solar engineers” and the solar committee. It aims for the technical sustainability of the solar electricity services provided to the households.

GOOD TO KNOW

- The “women solar engineers (WSE)” train, monitor and give advice to households on the proper use of the solar systems. The WSE work in the REW workshop and also visit beneficiary households to carry out any necessary maintenance and repairs.
- The level of remuneration of the WSE is defined in each village as part of a consultation between the association of electricity users, the solar committee and the WSE.
- In order to carry out the necessary maintenance and repairs on the solar equipment, the WSE draws on the stock of spare parts. It is therefore necessary to keep track and conduct a regular inventory of the stock (entry and exit); It must be done in close collaboration between the WSE who knows the materials, and a member of the solar committee appointed (generally the Secretary). This regular follow-up will enable the solar committee to submit orders for spare parts when the stock runs low.
- The solar committee/ WSE communicates requirements for spare parts to replenish the stock or for non-storable materials (such as batteries) to the BCMada NGO. The latter establishes the estimate and informs the solar committee/WSE, who must then consider their financial situation, and decide whether to place an order with the BCMada NGO. BCMada then facilitates the purchasing of spare parts from suppliers when payment from the solar committee is received, and sends the equipment to the solar committee/WSE as agreed.
- The WSE can repair all the components except for the solar panels, solar batteries, and the inverter and controller of the solar home. When these components fail, they must be replaced by placing an order with BCMada.
- Components that are out of use should be collected from the users and should be stored at the REW (storage warehouse). As for waste batteries, BC Mada with the solar committees/ field partners are testing a collection system; collected out-of-use batteries will be stored in Antananarivo before being handed over to entities that will give them a second life or recycle them.

As an indication, the price of components to be renewed at supplier level in 2020 was as follows:

Components to be renewed	Approximate price at supplier level (2020)	Estimated lifespan in normal conditions of use
7 Ah battery (DIVYA)	45,000 Ariary	2 years and more
3*2,6Ah battery (DIVA)	42,000 Ariary	2 years and more
Batterie 40 Ah (LAKSHMI)	567,000 Ariary	5 years and more
100Ah*3 battery (REW)	3,718,000 Ariary	5 years and more
800 VA Inverter (REW)	1,500,000 Ariary	7 years and more

Do-it-yourself batteries by households

Informing the user household.

« As a solar technician, when equipping households, I explain to them that the solar system does not support the use of a television, because most users want to use a television. It also doesn't support the use of speakers or other large equipment. I explain to them that the system is for lighting, charging a phone and using a small bomber radio. I also tell them that the battery of the lantern can last three years. For the system with the "charge controller", the battery can last five years. I repair solar systems that are damaged

We also have to follow up with each household regularly, to check the situation and if they are using the solar systems correctly. People don't always follow the instructions.

When a household comes to have their solar system repaired, I check their booklet to see if they have paid their electricity dues. If the household has not paid, I explain that it is necessary to pay because the parts needed to repair his system must be purchased (resistors, wires, switches, etc.). I explain clearly that the membership fee allows us to repair the broken system, but that it is not money that the technicians or the president of the solar committee use for their personal needs. It is so that the household can always have light.

Rasoanantenaina Modestine,
Solar technician in Ranomay

Women solar engineers doing assembly work

GOOD PRACTICES

- The way the women organize their work varies according to the village. In some villages, they work in rotation at the workshop of the REW, with one rotation per week. In other villages, the WSE always works together to complement each other, whether in the workshop on set days or during household visits. The women technicians' workshop should be open at least twice a week.
- Depending on the village, the mode of remuneration of the WSE is either on a daily basis or a monthly flat rate. The amount is set based on the estimated work needs per month, which means that it can vary between the equipment of the first household and during the life of the electricity service.
- The WSE keeps a technical logbook of the work carried out. This provides a record of the solar systems that have problems, the users who encounter these issues, and the undertaken maintenance or repair work. It allows the solar committee to have a good idea of the history of household equipment use, and to control the work of the WSE, as well as identifying breakdowns or technical problems. This is very useful for BCMada, especially to help highlight possible improvements in the training of the WSE, and the necessary adjustments to be made when purchasing equipment from suppliers.
- The solar committee / WSE keeps a logbook for the stock of spare parts. It records the equipment going in and out, as well as the regular inventories that are undertaken.
- The BCMada NGO provides a brochure with each component and the price to each solar committee / WSE to facilitate the ordering of spare parts.
- The WSE is very resourceful and finds adaptive solutions when spare parts are not available. However, these temporary solutions must be replaced as soon as spare parts are available.
- It is important to encourage exchanges between WSE from different villages. This can be done through telephone exchanges between WSEs (especially between trainers and WSEs); WSEs can call other WSEs when they are faced with problems that they cannot solve with the WSE of the same village. Exchanges can also take place as part of exchange visits organized by the field partner. Moreover, the fact that the solar trainers are already active WSEs allows these WSE trainers to refresh their knowledge. The women are given the opportunity to learn about solar energy and to complete their training during their stay at the training center as a trainer. Finally, refresher sessions for women are organized, especially when new technologies are introduced.
- BCMada now tests the components (especially batteries and solar panels) at the training center before delivery, in order to avoid defects in the equipment delivered to the solar committee. If needed, BCMada NGO sends them back to the supplier for replacement of the faulty components.

ATTENTION POINTS!

- The women's level of remuneration must take into consideration the projected operating accounts of the association, and the fact that they are women with a level of skill that is rare in the village. It must be fair in order to motivate the WSE, but reasonable for a balanced operating account.
- The follow-up of the stock situation must be regular and rigorous so that the solar committee / WSE can anticipate shortages of spare parts. Otherwise, this could lead to inconsistencies in the electricity service while waiting for the spare parts to be ordered and to arrive. In addition, the time required for BCMada to purchase the spare parts after receiving an order from the solar committee and the associated payments varies depending on the availability of the stock at the supplier level.

Correct use is key to the sustainability of the solar system.

« As a result of the training, the "women solar engineers" are able to manage the technical problems of solar systems in the village, but with limitations. They can solve technical problems with electronic circuits, but not technical problems with batteries or solar panels. Each member of the electricity users' association is responsible at all times for the solar equipment that they use.. Most importantly, each member must respect the maximum time of use of the solar system to avoid the rapid deterioration of the battery. »

Andriambololona Ony,
WWF Solar Specialist providing Solar Coordination at Barefoot College Madagascar

Functional test during the training in Tsiafajavona

- It is common that households do not respect the technical instructions of the WSE, especially after a few months of use: they tinker with the solar systems and use them for purposes other than those intended. This leads to the rapid deterioration of the equipment, especially the solar batteries. Regular monitoring of the situation at the household level by the WSE with the support of the solar committee is very important, reminding users and applying sanctions in line with the internal regulations when necessary. Indeed, after the euphoria of the first months, the households forget the efforts made by the whole community, the commendable commitment of the women and the respect due to them. Without these reminders, households behave as if they were entitled to everything and as if they have no responsibility.
- The solar committee / WSE should conduct a regular census of the solar systems in use so that they can be located at any time. Monthly household visits are essential for technical follow-up (at least once a month). WSE needs the support of the Solar Committee for these visits.
- In line with the internal regulations and with the support of local authorities, installations must be removed from households that do not comply with the technical instructions for use or which do not pay.
- BCMada should develop audiovisual tools and posters to facilitate regular household awareness and education on the proper use of solar systems. Audiovisual tools also need to be developed for WSE so that they can refer to them as much as necessary, apart from the training manual; this is particularly necessary when detecting failures and implementing the associated measures.
- WSE's skills and dynamism in a village are generally not equal. It is therefore important to see how the more competent and dynamic WSE can work with less competent and dynamic ones to complement each other and to encourage less dynamic WSEs to improve. The solar committee must be careful about this, as it can lead to frustrations and disagreements between WSE, especially if they receive the same pay regardless of the effort made. A contract between each WSE and the solar committee is recommended to define the work of each WSE.
- Over time, some WSEs grow old and may not be able to fully do their job anymore. The solar committee must be attentive to this and if necessary, ask BCMada to send a replacement woman for training at the center: conditions relating to this matter must be discussed with BCMada.
- Theft of solar panels has become frequent. The community, along with the solar committee and the local authorities should make proper arrangements to prevent this.

Demonstration of the proper functioning of the solar system

Below is a list of technical problems mentioned during the monitoring carried out in 2021, most have now been solved (repaired):

Solar lantern (DIVIYIA model)

General	• Insufficient instructions to households on its use • Tinkering by users (connection of overpowered radios or other electrical appliance	• Lack of maintenance, dirtiness • After too long exposure to sunlight and high temperatures, the lanterns become faded
Solar Panel	• Defective or faulty panel • Solar panel not charging the battery properly • Short-circuited panel (cable probably damaged by rats) • Solar panel clogged with sticky dust (not maintained, dirty)	• Pulling out the cables of the solar panel (poor handling) • Junction between panel and solar lantern plug fragile, comes loose (Jack pin and Johnson plug, male/female input)
Batteries	• Fragile battery terminals • Battery sulphation	• Deep discharge of batteries reducing their capacity over time • Battery no longer charging (usually near or at the end of its life)
Other components	• Loose, broken, insecurely connected wires (bagged insulation)	• Blown fuse following a fault in the electronic circuit • Fragile lantern switch

Solar home system

General	• Abuse of use by households and/or misuse • Household tinkering: direct battery connections, connecting unauthorised appliances, changing original components (other regulator, other bulbs, connection wires that are not up to standard)	
Solar Panel	• Panel damaged from the start due to transport	
Batteries	• Batteries that fail from the start due to shocks during transport (cracks)	• Batteries that no longer charge • Direct connection to use the remaining charge
Other components	• Malfunctioning of the regulator lights: current flowing even when the light is red. This is due to the components and connections in the electronic circuit	• Early cut-off of the use by the regulator leading to direct connections between the batteries and the uses

Solar system for Rural Electronic Workshop

General	Nothing to report	
Solar Panel	• One or more non-functional modules	
Batteries	• Deteriorated battery terminals needing adjustment (soldering and replacement), or wiring), or not properly attached, which results in batteries not charging properly	
Other components	• Power supply malfunction • Display of the charge controller not working • Screwdriver not adapted to the charge controller	• Cord extensions not meeting standards • Lack of mastery of use of the power supply and the multimeter

© Justin Jin / WWF-Madagascar

Household chores are made easier with modern lighting

FOCUS 7

MANAGEMENT OF THE ELECTRICITY SERVICE

The transparent and rigorous financial management of the electricity services by the solar committee is an essential condition to ensure the sustainability of the services.

Fishing, main activity in Kivalo

GOOD TO KNOW

- The financial revenues of the Electricity Users' Association are primarily made up of association membership fees, and households' regular payments of fees related to the electricity service ("electricity contributions").
- The financial expenses of the electricity users' association relate to the payment of salaries ("women solar engineers (WSE)", guards, treasurer...), travel costs of the solar committee, office supplies, communication expenses (telephones) and other operating expenses (printing, etc.), as well as the acquisition of spare parts and solar components that need to be replaced.
- The level of remuneration of the WSE is defined in each village as part of a consultation between the electricity users' association, the solar committee and the WSE.
- Depending on the balance of the operating account, the Solar Committee shall decide on any compensation for work performed by the members of the Solar Committee
- The amount of the "electricity contributions" to be paid by each household is 3000 Ariary per month, 6000 Ariary per month, or 10000 Ariary per month, depending on the electricity service to which the household subscribes (See Focus 5). The contributions are collected by the solar committee and are used to cover the various financial expenses. Apart from the daily operating expenses, savings are set aside for the purchase of spare parts and solar components that need to be replaced.
- The minimum financial management tools required are:
  - The logbook to monitor the payment of "electricity contributions" by user households,
  - Invoices and payment receipts
  - The cash flow book (income/expenses - cash and bank outflow/inflow)

BEST PRACTICES

- The collection of "electricity contributions" from households is done in close collaboration between the solar committee and the local authorities.
- The solar committee and the households decide on the frequency of payment of "electricity contributions", as it depends on the period when households get their income, which varies according to household activities (fishing, vanilla campaigns, etc.).
- The prepayment method is preferable to the post-payment method when collecting "electricity contributions" from households: households pay in advance for the period of electricity use (the coming month or any other period depending on the terms agreed upon with the solar committee).
- The members of the solar committee must lead by example, and must pay their regular "electricity contributions" on time.
- In order to encourage households to pay their "electricity contribution", it is important to explain how these contributions will be used and why they are necessary. It is also essential to regularly and transparently inform households of the financial situation of the association.

A "woman solar engineer" proud of her solar lantern

Modern lighting benefits the whole family

Example of an operating account

- 200 electricity user households: 10% on service 1 - 40% on service 2 - 50% on service 3
- Amount of the annual contribution per household for membership in the association: 1000Ar/year/household
- Amount of the « electricity contribution » :
  - Service 1 : 3000 Ar/month
  - Service 2 : 6000 Ar/month
  - Service 3 : 10000 Ar/month
- Amount of salaries :
  - « Woman solar engineer » (4) : 5 000 Ar/day – 6 working days per month
  - Treasurer (1) : 5000 Ar/day – 4 working days per month
  - Guard (1) : 80000 Ar/month
- Amount of the other operational expenses (travel costs, office supplies, telephone…): equivalent to 30 000 Ar/month
- **Financial situation :**

	Ariary equivalent/per household/year		
	Household Service 1	Household Service 2	Household Service 3
Revenue	37,000	73,000	121,000
Operational expenses	15,000	15,000	15,000
Balance	22,000	57,000	106,000
Cost for the renewal of components	20,800	59,500	77,800
Margin for other expenses	1,200	-2,500	28,200

The costs for the renewal of components represent 56% of the revenue for service 1, 81% for service 2, and 64% for service 3.

Physical exercise necessary during training at the center in Tsiafajavona, Ambatolampy

Electricity management is going through a difficult period.

« I was elected Chairman of the Solar Committee in September 2021. I volunteered to be elected when the association decided to change the composition of the solar committee as there were problems in the management, such as misappropriation of funds. Currently, there are households that have debts on the payment of electricity; During the COVID period, the solar committee was not very active in senstitizing households. The solar committee is looking for what approach to adopt for those who have debts, as some have debts of almost eight months.

Some people pay, others do not. On the other hand, some users tend to argue all the time and don't want to pay, under the pretext that the batteries are weak so they don't want to pay. The solar committee decided to remove the solar systems from people who do not pay and install them in other households who want to have electricity and are ready to follow the rules. As for the batteries, they no longer have enough charge to support the original bulbs; but we can use lower voltage bulbs, and they can still last until the morning according to our tests.

When I took over the management, the financial situation in the bank was 14 million Ariary. Since then, we have spent money on the construction of the new solar house with additional support from WWF, because due to coastal erosion caused by climate change, the solar house has to be moved. The community could not contribute to this costly construction as households have difficulties in earning income, so the expenses for the construction were covered by the association's funds. Two large batteries were also purchased for the solar house. So there is about 7 million Ariary left in the bank.

We are going through a difficult period of management, especially since we only have one technician, and there are many things to repair. The two best ones are not here, as one is at the training centre in Tsiafavona as a trainer. With the only technician present, it doesn't work too well, we need at least one of the two best to be here. »

Joseph René Geneviève,
Chairman of the solar committee in Ambakivao

- The solar committee organizes initiatives, sometimes with the support of a field partner, that aim to increase the purchasing power of households, in order to facilitate household payments of their "electricity contributions". For example, actions aiming at reducing the cost of purchasing water allow households to save on this expense and help them to ensure the payment of their "electricity contribution".
- Different options for the payment of the "electricity contributions" for solar lanterns can also be considered. Indeed, this solar system is the most affordable and allows for options such as monthly payments, daily rental, lease-purchase, etc.
- The concept of an "electricity contribution" may not be accepted in some areas due to past negative experiences with contribution systems. Therefore, the appropriate term should be used depending on the area: electricity bill, etc.
- The level of remuneration of the women must take into account the association's projected operating accounts and the fact that they are women with a level of skill that is rare in the village. It must be fair so as to motivate the WSE, but reasonable for a balanced operating account.
- The solar committee should be free to decide whether or not to compensate its members for their work depending on the financial situation they are managing. In order to motivate the members of the solar committee, the committee often opts to compensate the work of its members.
- Actions that aim at increasing the revenues of the association of electricity users are organized by the solar committee with the possible support of the field partner. This enables payments as compensation for the work of the solar committee members. For example, video projection sessions are organized in the REW.
- The adult literacy rate in a village might be so low that it is difficult to identify the right person to take on the role of Treasurer. In such situations, it is important to consider literacy training for the entire solar committee and any adults in the community who wish to participate.

ATTENTION POINTS!

- The financial management of the electricity service can be described as sound when:
  - Operational expenses do not exceed the revenue.
  - Savings accumulate. The savings cover the cost of replacing components at the end of their life (batteries, inverters in particular), and renewing the stock of spare parts.
  - Households regularly pay their "electricity contribution": there is no significant difference between the contributions paid and the contributions to be paid.
  - Financial accounting is clear: the information recorded in the various management tools is consistent and up to date, as well as reflecting the numbers given by the bank and in the cash box.
  - Members of the electricity users' association are well aware of the financial situation.
  - Additional activities that are carried out by the electricity users' association to increase revenue.

Water point for women in Torotosy, Ifanadiana District

- Solar committees' mastery of financial management tools is essential. It is important to have tools that are appropriate for the solar committee and therefore tailored to their level of understanding and their ability to use them, so that they use them daily.
- Opening a bank account is essential, especially for building up savings. This bank account must be specifically for the electricity services and not integrated into a bank account that is used for other things. Bank deposits must be done regularly to prevent misappropriation of funds. The principle of dual signatures is essential.
- The role of the Treasurer is vital. The selection of the Treasurer should be based on competence (literacy, numeracy) and integrity. To prevent resignations for various reasons, it is preferable to have a substitute treasurer in place. The association's internal regulations must clearly stipulate the role of the treasurer and the financial management procedures.
- Poor collection of "electricity contributions" leads to significant difficulties in the management of the electricity service, including insufficient revenue to pay "women solar engineers". Sanctions for non-payment of the "electricity contribution" as stipulated in the internal regulations of the electricity users' association must be strictly applied. When necessary, a recovery committee composed of the solar committee and local authorities ("fokontany", commune, district and region if necessary) can be set up to assist the solar committee in enforcing the internal regulations at the level of households. Indeed, the sanction to "remove the solar system from the user's home" must be applied and support from local authorities may be necessary to avoid a situation of conflict.
- The organization of collections must be very clear to users, to avoid "collections" by unauthorized and ill-intentioned persons. The persons mandated by the solar committee for collections must be clearly identified and made known to all, as well as the collection methods (payment at the REW, collection from the household, schedule).
- Non-paid "electricity contributions" must be recovered and not forgotten about to avoid precedents: if there are debt write-offs, households may become complacent and not pay, always hoping for debt write-offs.
- Malpractices in financial management must not be tolerated and must be subject to firm sanctions. Transparency in financial management is imperative, and at each General Assembly, the solar committee must report the financial situation to the members of the electricity users' association.
- As bank accumulate, the solar committee may be reluctant to use this money. It is important that the solar committee use these savings for any spare parts and component replacements needed.
- The solar committee may tend to favor households that can afford to pay for the electricity services to the detriment of those who are more vulnerable. This is not in line with the spirit of the WSE approach. With the support of the field partner, the solar committee should consider equitable approaches to ensure that the most vulnerable households can also benefit from solar systems; for example, a system of daily rental of the charged solar lantern may be the appropriate solution for the most vulnerable households.

The dance of the women of Zafindravaly, Tsihombe District, Androy Region

Representatives of the Vorojà community in consultation during the exchange visit to Iavomanitra, December 2021

FOCUS 8

MANAGEMENT OF ELECTRICITY USERS

The solar committee's main challenge in relation to electricity users, is to ensure ongoing user compliance with the proper maintenance for the electricity service. Communication is key, and the solar committee must work closely with local authorities.

GOOD TO KNOW

- General Assembly of electricity users is the regular event during which the solar committee communicates and exchanges with the members on the situation of electricity management in a transparent way. It is also the occasion to remind the members of the internal regulations and to sensitize them to follow them. The periodicity depends on each solar committee, it is usually held once or twice a year.
- The solar committee along with the solar engineers must regularly visit beneficiaries. The aim of these visits, in addition to raising awareness, is to check that users comply with the proper maintenance instructions for the use of solar systems. These visits can be scheduled or unannounced.
- The solar committee ensures that the regulations are followed by all without exception.
- The main tools used to manage electricity users are: the internal regulations, the users' list, the logbook to record households' payments of the "electricity contributions" and the user's logbook for each user.

Typical habitat of Iavomanitra (District of Fandriana)

Tips for a successful General Assembly

(set up during a community exchange visit in December 2021) :

Preparing the General Assembly

- Meet with the solar committee to define what should be discussed in the GA
- Identify the venue for the GA and the date/time of the GA
- Define who will speak
- Prepare the convocation form for the GA two weeks before the GA (convocation to be distributed per hamlet or posted in market places)
- Prepare in advance the report to be made at the GA: financial reporting, internal regulations
- Confirm everyone's participation

During the General Assembly

- Report on the finances: revenues / expenses/ financial balance - supporting documents – etc.
- Report on the status of beneficiaries: level of payment collection - number of users who are members of the association
- Report on the situation of solar materials: stock situation - solar systems used at household level
- Remind people of the rules and regulations and raise awareness on the proper use and maintenance of solar systems by everyone
- Draw up the minutes to be signed by the chairman of the solar committee, the secretary, the fokontany chief

After the General Assembly

- Report the proceedings and results of the GA to the local authorities - Minutes to be signed by the mayor and the district chief
- Apply and implement the aspects discussed with the possible support of local authorities.

GOOD PRACTICES

- After the General Assembly, communication must continue at every opportunity between the solar committee and the users. Raising awareness of compliance with internal regulations must be done regularly.
- Organizing the General Assembly in the presence of local authorities reinforces its importance as well as the legitimacy of the solar committee vis à vis the electricity users.
- In addition to the internal regulations that are applicable to the members of the electricity users' association, a Dina (local customary law) on the electrification of the village can be established by the local authorities and is applicable to any person, including non-members of the association. This Dina is a deterrent and deals in particular with sanctions in case of theft and vandalism of solar systems. The enforcement of the Dina automatically involves the local authorities.
- When the solar committee applies the internal regulations effectively, the management of the electricity service functions better. Similarly, the management of the electricity service works better if the local authorities are involved in raising awareness among electricity users and in enforcing the sanctions related to non-compliance with internal regulations.
- Regular communication between the solar committee and electricity users should go both ways. It is important that the solar committee informs the electricity users on the management situation, but it is also important that the users express their points of view (recommendations, impacts of electricity on their lives) in order to guide the solar committee in making improvements.
- A regular census of electricity users is necessary because of changes over time (some are no longer users, new users come to replace them). As the names of the users on their national identity card are not the same as the names that are used and known in the community, it may be relevant to have a regularly updated list with the photo of each user opposite each name. This allows the solar committee to effectively manage the list of electricity users.
- With the support of the field partner, the solar committee should consider actions to improve the financial capacity of electricity users: improved management of household expenses, income-generating activities.
- The community hall in the REW can be used to carry out workshops for the benefit of electricity users, for example organizing training courses or providing useful information.

Raise awareness first, sanction as a last resort.

« The NBCP enables rural households to move away from using candles or lamp oil by allowing them to have access to solar electricity, which is better for development. One of the major constraints in the implementation of the NBCP, especially in the southern part of the country, is the very low literacy rate. There are also not many sources of income. Therefore, when you want to sensitize a person to go solar and abandon lamp oil, for example, you have to think carefully about the most appropriate method. You also have to gain the person's trust: in this context, respecting traditions and adopting the right language is important. When there is a problem with the management of electricity, or when a household does not pay, it is necessary to first raise awareness. Otherwise, the abusers will become angry. We need to train and inform electricity managers from the outset, because problems often come from them; management must be transparent and management must be monitored to avoid problems. It also happens that abuses come from local authorities. »

Général Auguste Bruno
Interregional Director of Energy for the province of Toliara

A household using a lantern in Ambatomainty

ATTENTION POINTS!

- It is usually difficult to get all electricity users to attend the General Assembly. Often only a few representatives are present and they are always the same ones. The others then complain because they are not aware of the situation, and do not have enough information. The solar committee should work with the local authorities to encourage members of the electricity users' association to attend the General Assemblies.
- Over time, the list of the members of the association changes. Some leave the association, others enter. Some users may leave due to lack of means or because they moved, others are sanctioned according to internal regulations and the solar systems are taken away from them. The important thing for the solar committee (and if necessary with the support of the local authorities) is to know at all times who the beneficiaries are and where the solar systems are; the changes have to be registered at the level of the solar committee.
- After the euphoria of the first months of electrification, many electricity users, if not sufficiently informed, sensitized, and supervised, no longer respect the internal regulations: not respecting the rules for the use of solar systems (in particular use for something other than what is allowed), non-payment of "electricity contributions". Some people then express their disappointment with the electricity service. Users need to be educated on an ongoing basis on the use of solar systems. A regular information/education/sensitization approach to user households is required. Thus, BCMada is developing posters and audio-visual tools to raise awareness among users on the use of solar systems.
- In addition to the non-compliance with the internal regulations, some households take on the role of technicians without having the skills and do whatever they want with the solar systems. This causes the system to deteriorate quickly.
- The solar committee together with the local authorities must regularly raise awareness of the internal regulations, and insist that the internal regulations are applicable to everyone without exception.
- The behavior of solar committee members is key to gaining the trust and respect of beneficiaries. Solar committee members should lead by example in respecting the internal regulations and must not abuse their power. Regular communication by the solar committee also helps to avoid false rumors and mistrust from users.
- The solar committee must make a regular and transparent report to the users on the management situation, in particular on financial management.
- It may be difficult for the solar committee to enforce the sanctions in the internal regulations as they are part of the community; they may be stuck by the need to maintain good relations with their peers. To enforce sanctions, they must call on local authorities to help them when they feel unable to do so.
- If the planned sanctions are not enforced on the first occasion, this information spreads quickly in the village: more and more users no longer comply with the internal regulations and the situation gets out of control. If the sanctions provided are not dissuasive enough, they may need to be reviewed and strengthened.
- Sometimes a local authority or community leader, out of personal motives, sets a bad example for the community. It happened once that a local authority or a community leader incited users not to pay the "electricity contributions", by claiming legitimate assistance. In such a case, the solar committee should quickly refer the matter to other authorities to help resolve the situation.

The inhabitants of the village of Tsaratànana

Follow-up visit to Ambakivao of DIREH Toliara, ADER and DGE, to the solar committee and local authorities

FOCUS 9

ORGANIZATIONAL AND RELATIONAL MANAGEMENT

The members of the solar committee must assume their full responsibility, must be united, and must collaborate with the authorities and partners. The implementation of the WSE approach and the resulting sustainability of the electricity service can only be achieved through the cooperation of several actors.

GOOD TO KNOW

- The Solar Committee comprises a Chairman, a Vice-Chairman, a Treasurer, a Secretary, an Auditor and one or more Advisors, with time-bound mandates. Changes within the Solar Committee shall be made during the General Assembly of the members of the Electricity Users' Association.
- The collaboration of the solar committee with the local authorities is essential: "fokontany", community, and even with the gendarmerie when necessary. The local authorities are close and are thus best placed to support them in case of difficulties. They are also in the best position to advise and supervise them, particularly when the field partner is no longer active in the area.
- Local authorities, therefore, support, accompany and help the solar committee in their work through advisory support, sensitization and mediation actions to resolve conflicts. Local authorities must also ensure the follow-up and control of the management of solar electricity services and the associative life of the electricity users.
- The solar committee's collaboration with the authorities that are not in the vicinity is also very important: District, Region, Ministry of Energy (provincial and/or central representation), and the Rural Electrification Development Agency (ADER). These authorities must ensure the regular follow-up of the management of the electricity service by the solar committee, and in this context advise the solar committee so that it progresses in the right direction.
- The Barefoot College Madagascar NGO is an essential partner of the solar committee and the "Women Solar Engineers" on all technical issues. The BCMada NGO ensures the follow-up of the WSE, and facilitates the supply of spare parts.
- The field partner is responsible for ensuring the supervision of the solar committee by fostering its autonomy. In this context, the field partner must promote the solar committee's collaboration with the authorities, BCMada and any other relevant affiliate.

Follow-up and recommendations

« I am mayor of my Commune Delta since January 2021. The solar electrification in Ambakivao helps the people a lot; before the village was in complete darkness. With the arrival of electricity, I noticed that households are developing because they were able to refrain from using candles, lamp oil, and the village itself has developed. Our responsibility in the approach is to follow up on the management, on the situation of the equipment, the progress. We are also there to make recommendations for the improvement of this management. I personally notice that the solar committee does not fully assume its responsibilities, because there are recommendations that have been made during the quarterly meetings between the committee and the commune, and which have not been followed until now. For example, the solar committee should have already carried out a census of users and equipment used, but this has not been done; I do not know why. The new solar committee has been in place for about a year now. »

Randriantsoa Jerry Keith,
Mayor Commune Delta / District Belo sur Tsiribihina

ADER, on a follow-up visit to Iavomanitra, Fandriana District

GOOD PRACTICES

- For good management of the electricity service, the members of the solar committee must organize themselves to meet regularly to resolve problems together, so that everyone has the same information and assumes their responsibilities while being accountable to the others. When the members of the solar committee are far from each other because they are spread over several hamlets, it is necessary to find the appropriate organization and facilities to make these regular meetings feasible. Minutes of these meetings must be kept regularly.
- When electricity users are scattered over several remote hamlets, the solar committee sets up a representative in each hamlet to facilitate communication and exchanges.
- For good team cohesion within the solar committee, having solar committee members participate in community exchange visits, or organizing team building activities is helpful.
- In addition to the initial training, and as a complement to the ongoing supervision , it may be necessary for the various members of the solar committee to enrol in specific training, such as in leadership and communication.
- To help solar committee members stay motivated (as they volunteer their time , unlike the « women solar engineers »), they need to be given the freedom to decide on their compensation, while taking into account the financial balance of the management. It is also important to help them develop activities that will allow the association to have financial income in addition to the electricity contribution, and which can be used to partially compensate for their work such as organization of paying for video sessions, etc.
- Local authorities act responsibly when they advise the solar committee, facilitate their actions, support them in sensitizing electricity users to follow the internal regulations, and support them in the settlement of disputes. When the local authorities are well involved, they are able to support the solar committee when the field partner withdraws.
- There is a hierarchy of intervention to be respected in the role of accompanying, facilitating and monitoring by local authorities. The fokontany leader, being the closest local authority, plays the above-mentioned roles first. The mayor and his team also play these roles, especially when the fokontany leader has requested their support or has not been able to fulfill his role properly.

Loving your work

« I have been the Secretary of the Ambakivao Solar Committee since April 2018. I am married, I have three children and four grandchildren. I enjoy my work as a secretary. I make a lot of efforts to make sure that my work is well done. In particular, I keep track of the materials and equipment that go in and out of the solar house storage. However, I notice that the management of solar electricity does not work well because of the difficulties with the population. There are also problems with certain materials such as batteries that can no longer provide the desired lighting. »

Andrianirina Emilson Francis, Ambakivao Solar Committee

General assembly in Iavomanitra: explanations by the Secretary of the Solar Committee

The DGE, ADER and DIREH Toliara on a follow-up mission in Ifanato, District of Betioky Atsimo

Monitoring, a necessary condition to ensure sustainability.

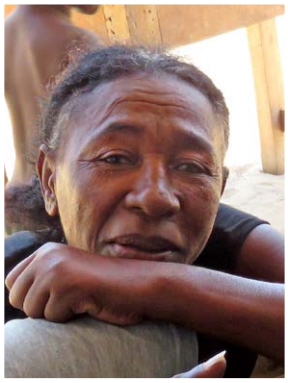
« ADER has defined a program, a strategy and objectives for rural electrification in the country. Thus, before integrating a village into the National Barefoot College Program, ADER verifies that the electrification of the site is not already planned, and that the field partner proposing the site is reliable. Throughout the process, ADER monitors and controls the implementation of the WSE approach in the field. Monitoring is the best way to verify the impact on the beneficiary villages. It also allows us to identify problems and to bring effective solutions, which is very important to ensure the sustainability of solar electrification. »

Rakotoarimanana Mamisoa,
Executive Secretary of the Agency for the Development of Rural Electrification (ADER)

- When representatives of the Ministry of Energy monitor the situation, it is an opportunity to sensitize electricity users to follow the internal regulations and consequently the legal framework governing solar electrification in Madagascar. It is also an opportunity to remind local authorities of their responsibility to monitor and assist the solar committee being in proximity to State representatives. The Ministry of Energy should also ensure that it has the budget to perform this monitoring, as it is the coordinator of the National Barefoot College Program.
- The involvement and support of the authorities are a motivating factor for the solar committee. They feel better supported when faced with the challenges of managing the electricity services.
- A socio-organizational analysis of the solar committee and/or a regular self-assessment can be helpful when considering necessary improvements, including the restructuring of the solar committee members.
- The activities of the solar committee, as well as the visits, must be recorded in a logbook. All correspondence must be duplicated and archived at the solar committee level.
- When the field partner works with other community leaders on a daily basis and the implementation of the WSE approach is part of the collaboration with these community leaders (e.g., the President of the Community organization in charge of natural resource management), the community leader's role is to provide day-to-day advisory support to the solar committee and facilitate its actions.

ATTENTION POINTS!

- Changes in membership occur over time within the solar committee regardless of the defined mandate. Some members of the solar committee do not fulfill their responsibilities, others move on, or others demonstrate a lack of integrity and dishonesty. When there are changes in the membership of the solar committee, it is very important to ensure that there is a proper handover between the outgoing and incoming member(s); the other members of the solar committee and the local authorities must ensure this. The handover should include training by the outgoing member to the incoming member, under the supervision of the other members and the local authorities.
- The spirit of constructive continuity must be instilled in the members of the village community; otherwise, it will be very difficult for the solar committee to achieve autonomy if changes are not managed and mastered. It may therefore be necessary to include this aspect of continuity and spirit of handover in the internal regulations where the responsibilities of each member of the solar committee are described.
- Members of the solar committee must be united, and should not be related to each other to avoid internal family complicities and prevent family disagreements from interfering in the management of the solar electricity service.



The covid pandemic made management more difficult.

« I was chosen by the community to join the solar committee. I have a very clear objective for the village: to bring improvements. That is why I volunteered to join the solar committee. The solar committee meets at the end of each month to discuss the management of electricity in Ambakivao. However, the covid pandemic complicated things, buttt it did not prevent the solar committee from raising awareness of the population on hygiene measures and individual protection with masks. We are going through a difficult period in the management because the electricity users are struggling and consequently want to be treated fairly in line with their difficulties. »

Adija Florine,
Advisor, Ambakivao Solar Committee

The village of Andavoanemboka, District of Ambilobe

- The chairman of the solar committee must provide good leadership for the program to succeed. When his or her leadership is weak, the management of the electricity service won't work.
- It is necessary to ensure that the people who perform key functions within the solar committee (Chairman, secretary, treasurer in particular) spend the majority of their time in the village to ensure operations run smoothly.
- Good collaboration and mutual respect between the solar committee members and the women solar engineers must be established. They are interdependent, and any conflict between them has an impact on the management of the solar electricity service.
- It is important to avoid overlapping responsibilities among the members of the solar committee. Similarly, it is important to avoid that some members accumulate several tasks while others do nothing. Each member must master his or her role, even if it means organizing specific supervision according to the strengths and weaknesses of each member.
- Regulations must be put in place with regard to the members of the solar committee. This can be both an internal control system (reporting obligations from one member to the others, monitoring by the chairman, etc.) and external control (monitoring/control by the municipality and/or by the Energy administration).
- Any flagrant theft or misappropriation of funds in the management of the electricity service must be reported and the perpetrators prosecuted to prevent further wrongdoings.
- In a situation of socio-economic crisis, as was the case during the acute period of the COVID pandemic with lockdown measures, there was a general tendency to relax in the management of the solar electricity service, which had a significant impact on sustainability. The solar committee, in consultation with the local authorities, must adopt the appropriate measures to ensure adequate services are maintained.

Market day in Tsiafajavona

Representative of the municipality of Miarinavaritra speaking during the AGM in Iavomanitra

- It is important to know how to collaborate with the various local authorities to avoid being dependent on one person. Indeed, it might happen that someone who is part of the local authorities works in a way that goes against the sustainability of the solar electricity service. In this case, the support of other local authorities to the solar committee is more than necessary.
- Fokontany and Community officials need to know the manner in which the solar committee operates through the periodic reports of the solar committees. In order to establish good local governance, periodic coordination/ evaluation meetings involving the fokontany leaders and the Community officials should be scheduled by the solar committees. In addition, the monitoring/support missions of the local authorities to the village are not the responsibility of the solar committee but must be integrated into the daily work of these local authorities.
- The field partner must have a supervision approach that promotes decision-making and accountability by the solar committee, as the field partner will not always be there to coach the solar committee.
- It may be necessary for the field partner to facilitate discussions between the solar committee and the local authorities of "raiamandreny" should any challenges arise.
- If problems or conflicts arise in the management of the solar electricity service, the solar committee with the local authorities must organize meetings to settle them quickly, even if it means convening a spontaneous General Assembly of electricity users.

The light obtained with the DIVA lantern

FOCUS 10

SOLAR ENTREPREUNEURSHIP

Solar entrepreneurship - the production and sale of solar systems in or outside the village of “women solar engineers (WSE)” - allows more households to benefit from solar electricity. It also helps hone the women’s’ skills over time. Furthermore, it enables the solar committee to generate financial income other than “electricity contributions”.

There are still a few villages that are in the solar entrepreneurship" phase. 4 out of 22 have initiated entrepreneurship through the implementation of a first production and sales operation. There is currently little feedback but is already informative.

GOOD TO KNOW

- The solar committee is in charge of advertising the solar products and searching for customers in collaboration with the "women solar engineers (WSE)". Together, they decide which equipment to order from the Barefoot College Madagascar (BCMada) NGO.
- The WSEs manufacture and assemble the solar systems that will be for sale once the equipment is acquired. The solar committee manages the sales contracts with the customers, and manages the entrepreneurship as a whole.
- Given the relatively low payment capacity of households in remote rural areas, the DIVA solar lantern is the product promoted for solar entrepreneurship. This does not prevent the promotion of other products with higher power.
- The cost of a DIVA solar lantern must include: the cost of the spare parts kit delivered at the Barefoot College Madagascar Training Center - the transportation cost of the kit from the center to the village - the cost of the work of a WSE for the manufacturing/assembly - plus the cost of the work of the solar committee for the search and management of customers. In May 2022, the cost of the kit of spare parts for the DIVA solar lantern delivered at the training center was between 180,000 and 210,000 Ariary depending on the cost of transportation for the import (air freight or boat).
- The solar committee / WSE sets the selling price of the DIVA solar lantern to the customer by considering the cost price and the estimated ability of households in the area to pay. The solar committee / WSE decide whether or not it is appropriate to include a profit margin, or to opt for a selling price below the cost price. In the latter case, in order for the entrepreneurship to continue, it will be necessary to identify financial support to take over the subsidized part.
- Before the DIVA solar lanterns, the promoted product was the DIVYIA solar lantern, which is much more expensive and therefore less attractive.Le comité solaire / FIS fixe les options de paiement qu'il juge le plus opportun et faisable. Par les options : location journalière, location-vente, paiement en une seule fois.

Training on the assembly of the DIVA lantern

- The Solar Committee/WSE determines the payment options it considers as most appropriate and feasible. Options include: daily rental, lease -purchase, one-time payment.
- When the customer wants to have their solar system repaired, they go to the solar house and the repair work, including the cost of the spare parts to be changed, is charged to the customer by the solar committee.
- In order to allow the solar committee/WSE to start the entrepreneurship, subsidizing the first production and sales operation allows the solar committee/WSE to generate a working capital.
- The financial management of the solar entrepreneurship must be separate from the financial management of the village electricity service.
- Management tools for the solar entrepreneurship should include: Logbook to follow the stock, technical book for the women technicians on entrepreneurship, customer logbook (order, payment, delivery, repair), contracts with customers, cash flow booklet on the solar entrepreneurship.

GOOD PRACTICES

- To promote the solar products, an exhibition during market days is an appropriate marketing approach. Households in remote rural areas are interested in the DIVA solar lantern.
- Validating sales contract with the local authorities (fokontany or mayor) is a guarantee that the buyer will respect the payment clauses. This allows the local authorities to get involved in following up payments from buyers. In the event of non-payment, the local authorities can get involved on the settlement of the dispute.
- Engaging in solar entrepreneurship is a great motivation for the solar committee and the ”women solar engineers”.
- Some solar committees already have a waiting list of households interested in having a solar system.

ATTENTION POINTS !

- The solar committee/ WSE need to have appropriate support for the development of solar entrepreneurship. Calling on an organization that specializes in microenterprise incubation can be helpful.
- It is necessary to identify the capacity building needs of solar committees / WSE in relation to solar entrepreneurship, because even though they have the willingness to develop this activity, it is not necessarily going to be easy.
- It is important to identify the acceptable selling price. It is always possible to try and fail, starting with a selling price that is above the cost price and then decreasing it. The opposite is harder to manage.
- Managing easy payment terms or a lease- purchase system requires that the solar committee can follow up the client with the local authorities. If not, there is a significant risk of non - payment.
- The strategy for promoting the solar product must be well thought out. The solar committee /WSE will be able to encourage customers to buy the solar lantern based on this.

Handicrafts for tourists in Ampasimpohy

The team from Iavomanitra and Tsaratanana during the exchange visit to Ambakivao in December 2019

FOCUS 11

SUPPORTING THE SOLAR COMMITTEE

In order for the “Women Solar Engineer” approach to truly enable sustainable access to electricity services for the targeted community, sustained and time- limited support by the field partner is essential. The main challenge is to support the solar committee so that it can ensure the sustainable management of the electricity service.

GOOD TO KNOW

- Support to the solar committee begins immediately after the village meeting and continues until the capacities of the solar committee are deemed satisfactory for it to sustainably manage the electricity maintenance on its own. Capacities include those needed for good organizational and relational management, good management of the electricity users, good financial management, and good technical management.
- The support is ongoing but must gradually decrease: coaching missions should be held at least once a month in the first year of management, then once every two months in the second year, and so on.
- Several additional trainings are needed beyond the ongoing, decreasing coaching: training on relevant life skills, training on electricity service management. This may also include leadership, communication, or other training depending on capacity building needs.
- The support must include establishing collaboration between the authorities and the solar committee, which will facilitate the withdrawal of the field partner when the time has come

Many challenges to overcome.

« The Barefoot College clean energy program is in line with households' real needs. However, there are many challenges in its implementation.

First of all, it is important to build the capacities of the solar committee members, whose level of education is low, especially with regard to the use of solar equipment. The living standards of the households also causes a problem of payments, which impacts on the management of electricity when there is a need for maintenance or replacement of materials. In addition, the migration of the population due to coastal erosion in Ambakivao requires more efforts from the solar committee. The distance between the hamlets makes regular meetings of the committee difficult. Selecting one hamlet as a target for the implementation of the Barefoot approach could guarantee a better management of the solar electricity, because the smaller it is, the more cohesion there will be within the targeted community. »

Abdoul Zandry Prisca,
WWF socio-organizer in the Manambolo Tsiribihina Landscape.

Group work of authorities and presidents of solar committees - Exchange visit to Iavomanitra December 2021

Visiting women's soccer team - Ambakivao exchange visit December 2019

GOOD PRACTICES

- Management mistakes made by the solar committee are part of the learning process, as well as mistakes in the training approaches. The most important thing is to learn from them (whether at the level of the solar committee or at the level of the field partner), and to persist in effective training practices. It is a job that requires perseverance and the ability to adapt to situations and changes.
- Exchange visits between solar committees/WSE from different villages is a very effective method of support. It allows for peer-to-peer learning, and allows the solar committees / WSE to network and feel solidarity when facing daily challenges
- For one-time training sessions for solar committees, it is preferable to organize them outside the village to encourage maximum concentration of participants, for example in the nearest town. One-time training should be as pragmatic as possible, with hands-on applied exercises and role plays. Indeed, many participants are not very receptive to theoretical and overly conceptualized training.
- The solar committees must be trained and supervised in the use of the minimum tools required for the management of the electricity service. It is important to be flexible and to adapt according to what the members of the solar committee think are most suitable as tools to enable real autonomy, as they are the ones who will use these tools on a daily basis.
- Coaching must be adapted to the identified needs as they arise, and must take into account the capabilities of each member of the solar committee.
- The high illiteracy rate in the villages (which is also reflected in the solar committee) can be a constraint in the teaching methods. It may be appropriate to establish a system of literacy training in the village, by training village volunteers to become literacy facilitators and to conduct ongoing peer literacy trainings in ways agreed upon within the community.
- Support should include facilitating synergy between access to solar electricity and other needs /development actions. It is about facilitating and supporting the development of activities that value accessibility to solar electricity and that are useful for the community by the solar committee and with the community: organization of useful trainings in the REW (development of income generating activities, literacy, awareness on health, etc.), provision of the electrified community space for extracurricular activities for children, etc.
- At the level of the field partner, it is important to have a “point of focus” to provide the support, with the required availability and capacities. The person who provides the support must also have a good understanding of local social dynamics. To limit the logistical costs of reaching the village, the closer this person is to the village, the better.
- Exchanges between field partners on their respective support experiences are very useful. There is no singular model of support because the assimilation capacities of communities are all different. But there are good practices to learn from and approaches to avoid that are worth sharing as they can be useful to others.

Late working session with the Vorojà solar committee, 2021

What impressed me and what I learned.

« As we know, women technicians are of a certain age, and some of them have not been to school or have very little education. However, this has not prevented them from successfully completing their training: they have retained what they were taught. They do a good job in manufacturing, assembling, maintaining and repairing the solar systems once they are in the village. At the beginning of the implementation of the approach, I was skeptical. Then I realized that it was possible: it is not only those who attended school who can develop in life; if you could not attend school but you have the will, then everything is possible!

However, it was quite difficult to convince the women and especially their families about their departure and their absence for the training, especially when the training was still taking place in India. This is also due to the fact that in the southern part of Madagascar, there are many stories of kidnappings and organ theft. In order to convince them and reassure them, I took the time to go to the village almost every month to discuss with them. I also showed them pictures of the center so that the women and their families could see how things were done. I don't hide that it was difficult: When some arrived in the capital they wanted to return to their village. I took care of them like children, and their husbands also helped when they came to accompany them to the capital before they returned. I also facilitated communication between the women at the center in India and the family in the village, to help encourage both sides.

The communication was always maintained and that helped. The equipment for the electrification arrived almost a year after the women returned.

And I was really surprised to see how well they were doing with a book that seemed very technical, in English, and with lots of pictures. They used color sets, especially for the electronic components. They didn't have any problems.

At the very beginning, around 2017, my time only allowed me to conduct monthly visits to the villages. Then my workload increased and I did not have as much time. I am in the process of adjusting my schedule to conduct supervision visits at least every two months. If the visits aren't regular, you can get very quickly lose track of what's going on.

Finally, although there is a solar committee and women technicians, we must not forget that we are talking about small communities of more or less 200 households, where everyone is more or less from the same family. It is therefore very difficult for them to apply the DINA, to apply the sanctions on family members even though everyone knows the provisions of the DINA; this is one of the main obstacles. If they were all very enthusiastic when the light was not yet there with motivation that reached 1000%, when they received the light and had to manage it, it was difficult. »

Randriamampionona Solohery Jean Patrick,
WWF socio-organizer in the Mahafaly landscape

ATTENTION POINTS !

- The sustainability of the solar electricity service depends on the solar committee, and therefore depends on how the training is conducted. Training is not just to observe or monitor what has or has not happened. It is targeted training for each identified need, it is ongoing adaptive capacity building. It needs to be given the necessary time.
- When face-to-face training is not possible, as was the case during the Covid pandemic lockdown periods, it is important that the field partner maintains regular distance communication and monitoring as much as possible.
- Training should be particularly strong in the first year of the solar committee's management of the solar electricity service.
- The field partner must keep in mind that they will not always be there to supervise the solar committee. Therefore,they must work so that the solar committee can, as soon as possible, ensure the independent management of the electricity service. Above all, it should not do things in place of the solar committee or make decisions for it!
- The training should only end once the solar committee is considered sufficiently independent to manage the solar electricity service.
- The training also includes sensitizing the authorities so that they play their role and facilitate the work of the solar committee.
- The Covid pandemic has had very important consequences; beyond the associated socio-economic crisis, the lack of monitoring/supervision has been an opportunity for challenges of many kinds at the level of some solar committee members.

Ifanato's team in reflection - exchange visit December 2021 in Iavomanitra

BAREFOOT COLLEGE WOMEN « SOLAR ENGINEERS »

Monique, Marimbe | Saida, Marimbe | Hanitra, Ambakivao

Kingeline, Ambakivao | Remeza, Ambakivao | Yolande, Ambakivao | Malaindia, Ambararata | Miariline, Ambararata | Nazemina, Ambararata | Antoifa, Andilamoko

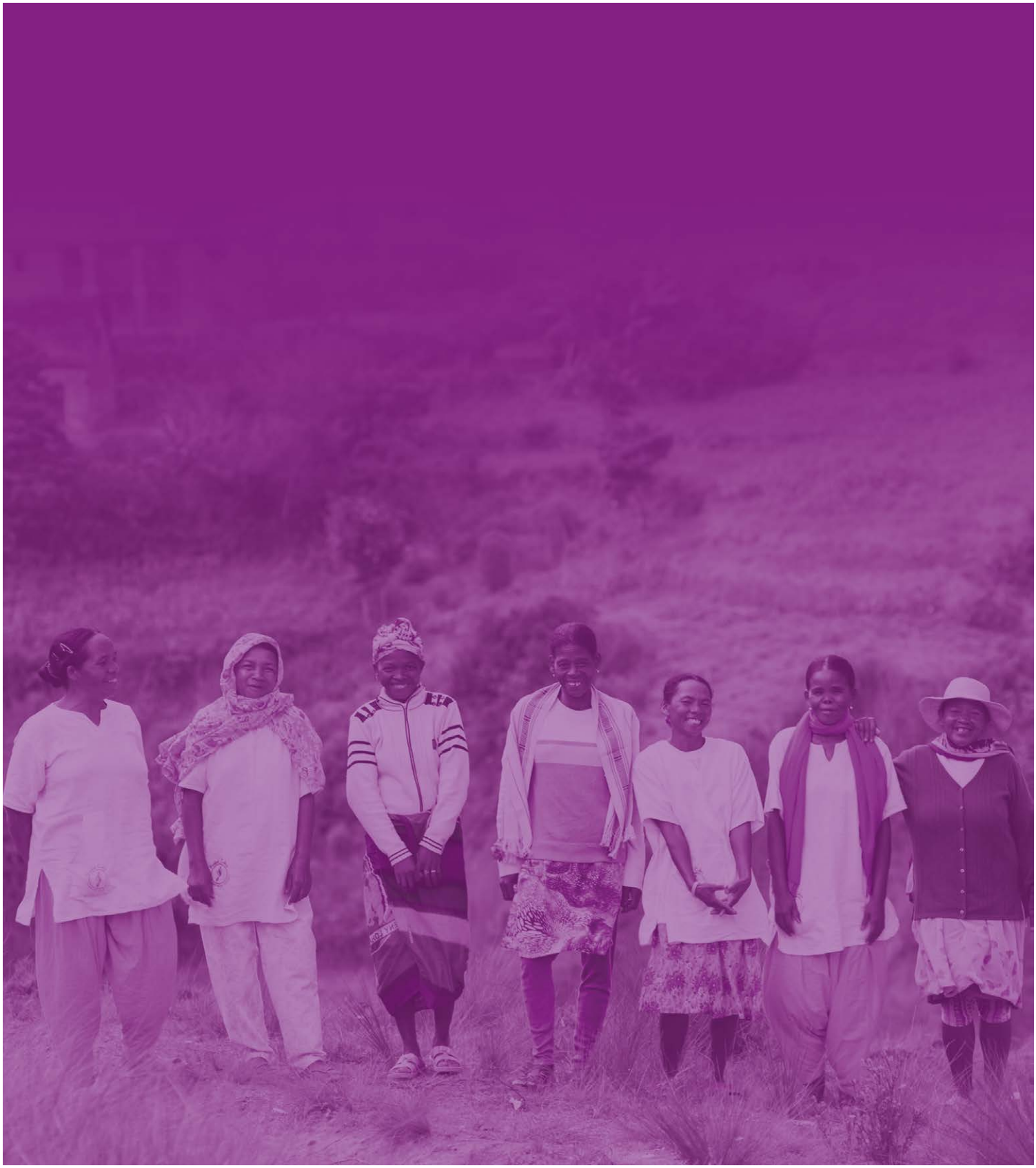
Kamardine, Andilamoko | Mbotizara, Andilamoko | Volanjara, Andilamoko | Kalozandry, Andranomilolo | Madeleine, Andranomilolo | Soaviniera, Andranomilolo | Berthe, Iavomanitra

Florette, Iavomanitra | Germaine, Iavomanitra | Lydia, Iavomanitra | Hernestine, Marohatà | Mantine, Marohatà | Joceline, Ambatopilaky | Liamaree, Ambatopilaky

Arlette, Ambatopilaky | Soavinonje, Ambatopilaky | Tovonazy, Zafindravaly | Tsazee, Zafindravaly | Vonjisoa, Zafindravaly | Zenarosee, Zafindravaly | Modestine, Ranomay

Marie, Ranomay | Marinasy, Ranomay | Tsiampoizy, Ranomay | Iamma, Satrapaly | Nantenaina, Satrapaly | Dotiny, Tsaratanana | Philomène, Tsaratanana

Zafitsiha, Tsaratanana | Akintsoa, Vorojà | Armandine, Vorojà | Vadindraza, Vorojà | Voahanginirina, Vorojà



Working to sustain the natural world for the benefit of people and wildlife.

together possible™

panda.org

This publication is funded by the French Development Agency and the Norwegian Agency for Development Cooperation