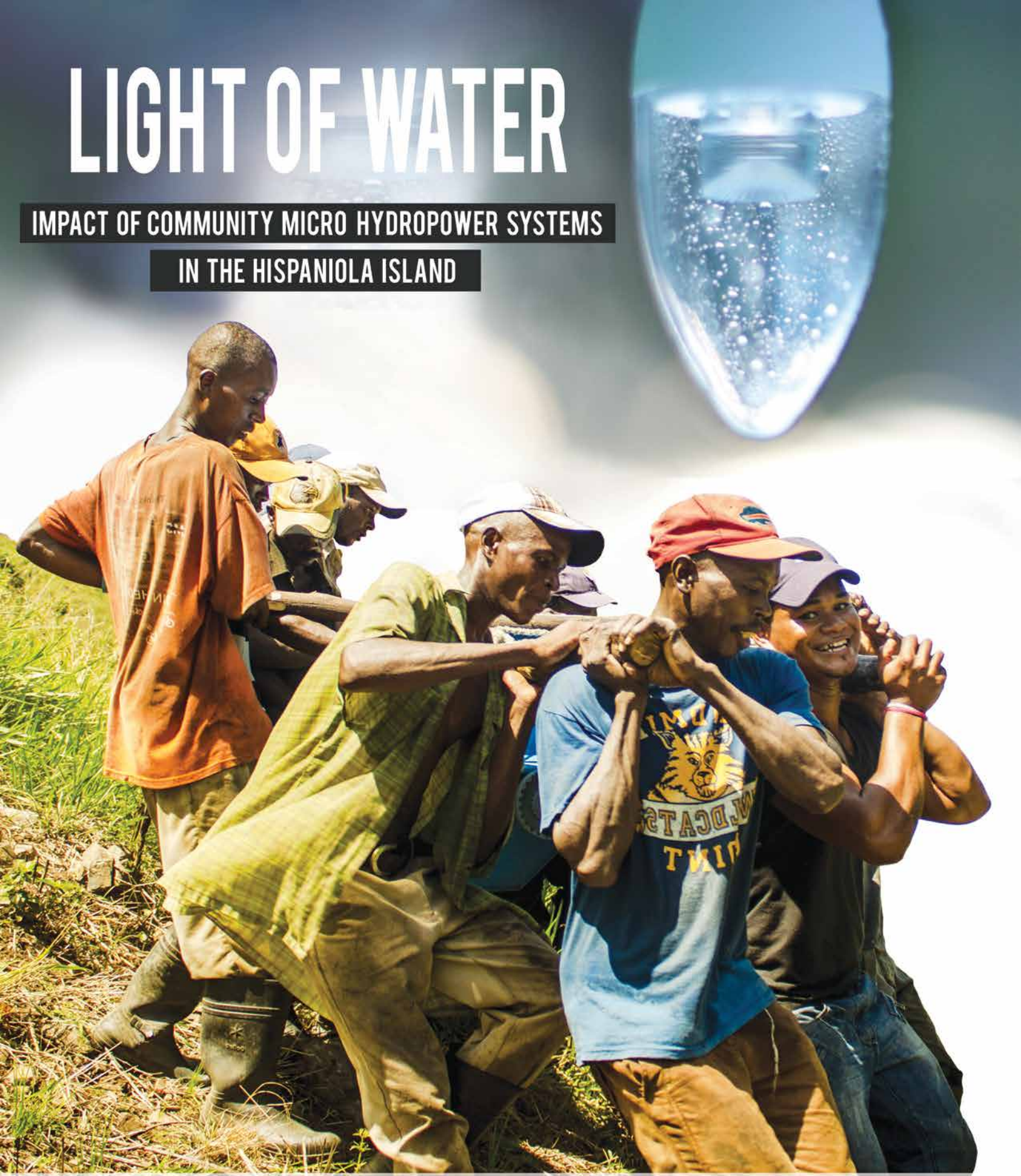
LIGHT OF WATER

IMPACT OF COMMUNITY MICRO HYDROPOWER SYSTEMS IN THE HISPANIOLA ISLAND



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Programa de Pequeños Subsidios del FMAM República Dominicana

SGP Programme de Microfinancements du FEM HAITI

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LIGHT OF WATER

Impact of Community Micro Hydropower Systems in the Hispaniola Island

Guakía Ambiente
Small Grants Programme (SGP/GEF/UNDP)
Global Environment Facility (GEF)
Interamerican Foundation (IAF)

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SOURCES OF INFORMATION:

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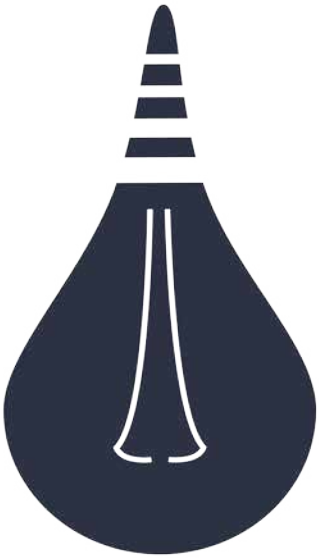
This work results from the alliance and synergy established among numerous public and private institutions, as well as international cooperation organizations, that operate together in a coordinate and effective way, with a focus on the empowerment of the beneficiary local groups, and are listed below:

Australian Embassy
Autonomous University of Santo Domingo (UASD)
Cornell University
Dominican Coffee Board (CODOCAFE)
Dominican Company of Hydropower Generation (EGEHID)
Dominican Corporation of State Electric Companies (CDEEE)
Engineers Without Borders
FALCONDO Foundation
French Embassy
General Customs Administration (DGA)
Good Neighbors
Institute of Associative Economy Development (IDEAC)
In support of the Community (Pro Comunidad)
Interamerican Foundation (IAF)
Japanese Embassy
KFW Bankengruppe
MARENA Fund
Ministry of Environment
National Energy Commission (CNE)
National Institute of Drinking Water and Sewage System (INAPA)
NRECA International
Panamerican Development Foundation
Peace Corps
Popular Foundation
Presidency of the Dominican Republic
Rotary International
Rural and Suburban Electrification Unit (UERS)
United Nations Development Programme (UNDP)
European Union
More than 70 Non Governmental and Community Based Organizations (NGO and CBO)

CONTENT

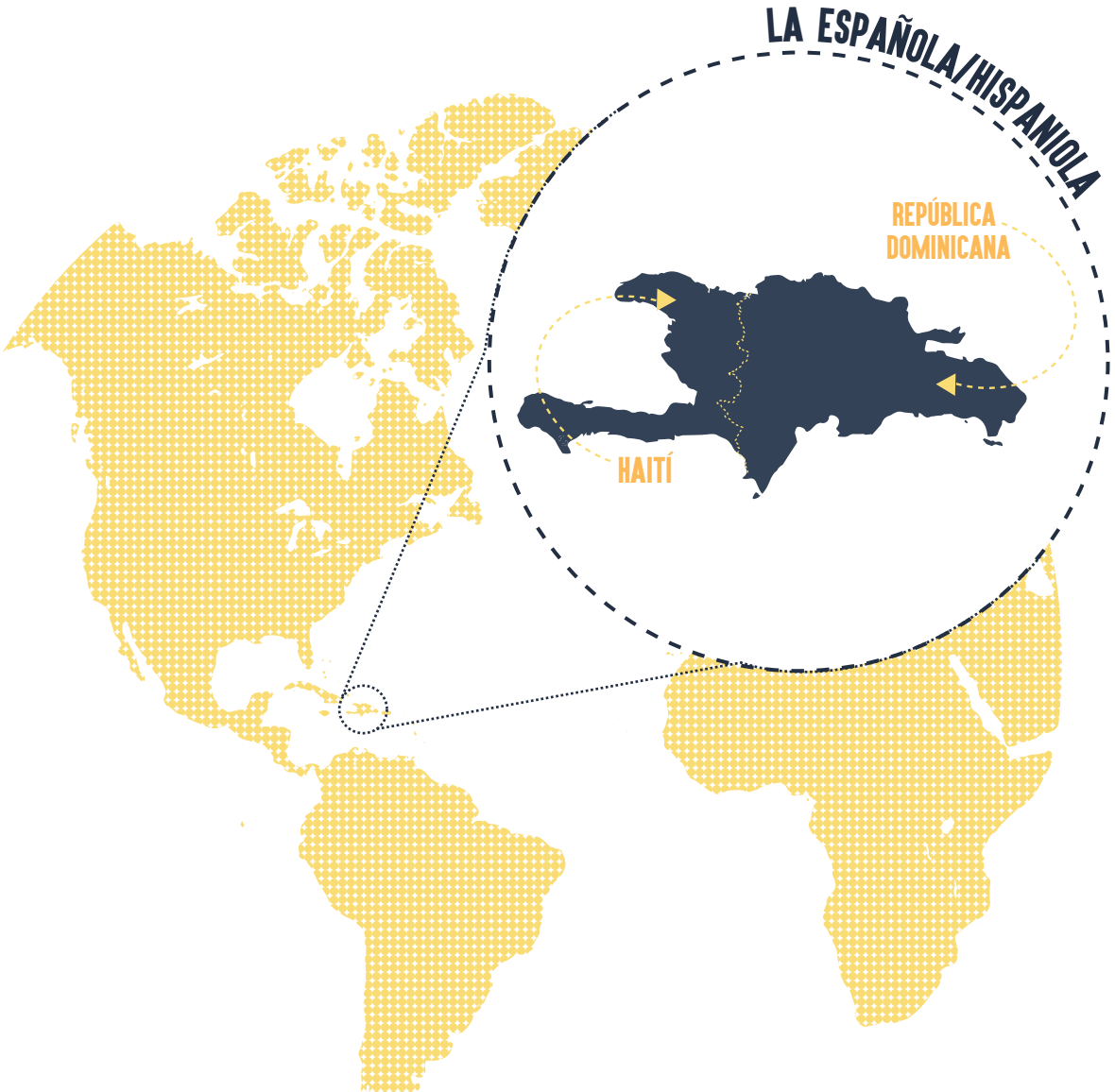


Turning on a switch is a more than usual action in many houses in the world. Nevertheless, in a lot of rural areas of economically disadvantaged countries, many families have never switched on a light bulb in their home. In the Dominican Republic and Haiti, two countries where electrical generation and supply are structural problems, however, this situation has turned into a challenge that communities in remote mountainous regions have learnt to deal with, by using little water sources for micro hydropower generation.

These systems are based on a highly sustainable model of community management going beyond the direct benefits from the use of electricity by producing significant impacts on environment and society, empowering local groups and people.

At the moment, more than forty micro hydropower systems are working in the Hispaniola island, with a total installed capacity higher than 1.2 MW and more than 4,000 direct beneficiary families.

Clean electrical generation helps to avoid the emission of more than 24,000 tons of CO_2 per year, while communities where these systems are installed conserve more than 70 km^2 of forest.



MOTIVATION

Most homes in rural areas of the Dominican Republic live in poverty or even in extreme poverty. This situation takes to the extreme in Haiti, where percentages are close to totality. These conditions depend on the lack of basic services, among which access to electricity, that limits human development of people in a significant way.

Electrical provision is one of the main structural problems in the Dominican Republic, since the country is highly dependant on imports of fossil fuels and the national electrical system is characterized by low stability, reduced quality and insufficient supply. Furthermore, the Dominican Republic has one of the most expensive electrical infrastructures of Central America and the Caribbean. In this context, rural areas are the most affected and, there, more than 5% of people do not have access to electricity. These conditions become much worse in Haiti, where rural areas are not reached by electricity and even in urban zones only 30% of population is connected to electrical grid although the service is not stable.

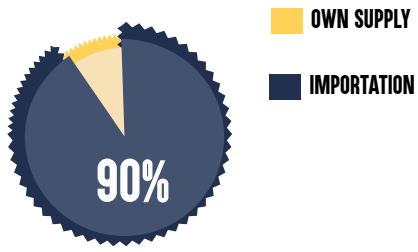
Fortunately, despite this situation, the Hispaniola island has appropriate geographical, physiographic and climatic conditions for renewable energy generation, among which hydropower generation at micro scale.

Favorable and synergic situations stimulated a process which has turned into the motor for solving the problem of the access to electricity of vulnerable populations in remote rural areas.

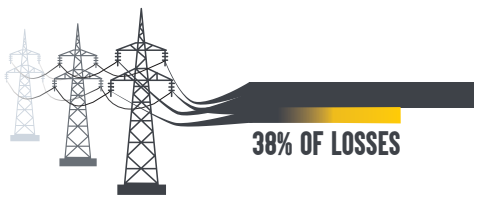
An important contribution came in 2007 from the approval of the Law on Incentive to the Development of Renewable Energy Sources, which, together with a growing interest of numerous entities, both inside and outside the national borders, drove the up-scaling of community micro hydropower systems.
These initiatives turned into a reference model of local management, which helps to generate sustainable livelihoods and, at the same time, contributes to mitigate global environmental problems, such as climate change.

BASIC DATA

DEPENDANCE OF ELECTRICAL SUPPLY

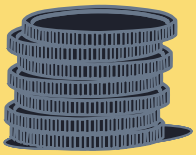


ELECTRICAL GRID IN THE DOMINICAN REPUBLIC (PERCENTAGE OF DISTRIBUTION LOSSES)



INPUTS

ESSENTIAL ELEMENTS
FOR PROJECT DEVELOPMENT



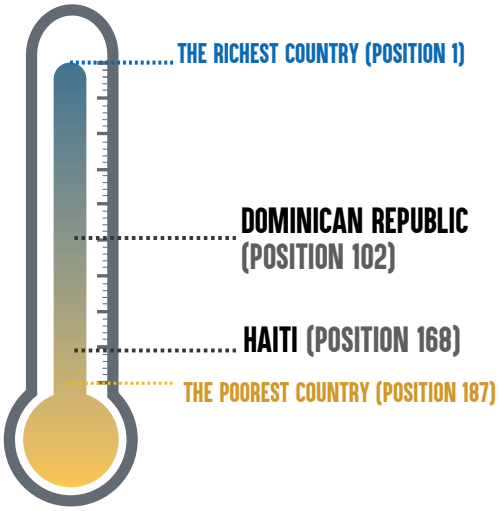
NON-REFUNDABLE FUNDS

A SIGNIFICANT PART OF EXPENSES FOR MATERIAL AND CONSTRUCTION OF THE MICRO HIDROPOWER SYSTEM IS COVERED BY NON-REFUNDABLE CONTRIBUTIONS OF NUMEROUS INSTITUTIONS AND COMMUNITIES THEMSELVES.

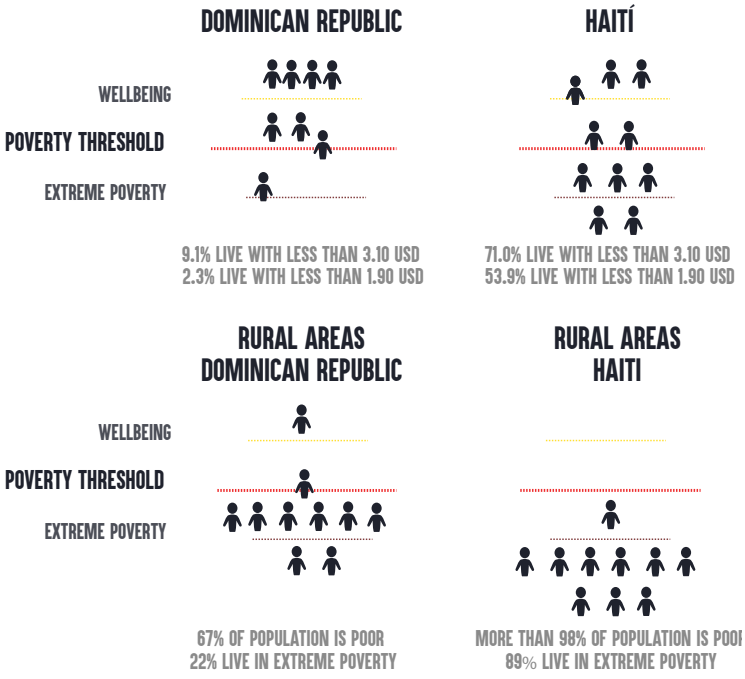
MICRO HYDROPOWER SYSTEMS: AN INSTRUMENT CONVERTED INTO THE MOTOR OF CHANGE TO BOOST ALL THE PROCESSES FOR THE DEVELOPMENT OF RURAL COMMUNITIES. LOCAL ACTIONS PRODUCE IMPACTS WHICH CONTRIBUTE TO SIGNIFICANT GLOBAL TRANSFORMATIONS.

BASIC DATA

LEVEL OF ECONOMIC DEVELOPMENT



POVERTY LEVEL WITHIN POPULATION

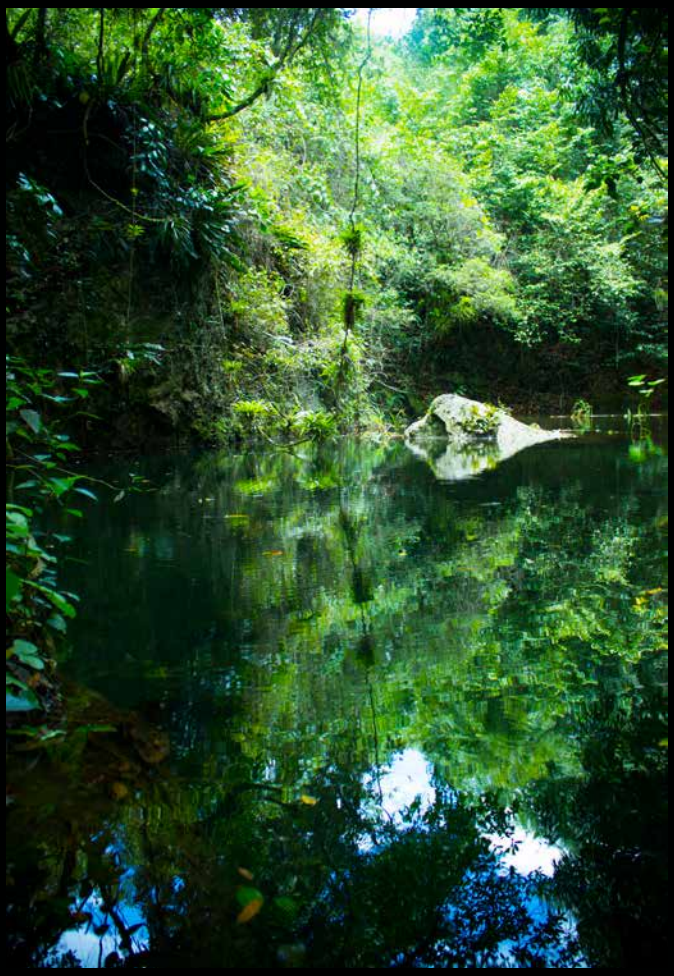


TECHNICAL ASSISTANCE

ALL THE STEPS (FEASIBILITY STUDY, AS WELL AS DESIGN, CONSTRUCTIONS, INSTALLATION OF COMPONENTS, AND TRAINING) REQUIRE TECHNICAL ASSISTANCE.
ACCOMPANING INSTITUTIONS PROVIDE IT AND SO DO THE COMMUNITY TECHNICIANS WHO WERE TRAINED DURING THE CONSTRUCTION OF THE SYSTEM IN THEIR OWN COMMUNITY.

COMMUNITY WORK

HOURS OF WORK IN THE CONSTRUCTION OF THE SYSTEM ARE THE MAIN COMMUNITY CONTRIBUTION.
LOCAL PEOPLE ORGANIZE THEMSELVES IN BRIGADES, EACH ONE DIRECTED BY A FOREMAN, AND WORK IN AN EQUITATIVE WAY IN THE DIFFERENT PHASES OF THE MICRO HYDROPOWER PROJECT.
MEN AND WOMEN WORK TO REACH COMMON GOALS.



INITIAL STEP

The starting point of each intervention is the genuine interest of beneficiaries, who have prioritized electricity as one of the problems needed to be solved in their communities.

Local group is the first in promoting the action, requesting a reconnaissance visit to the site and a preliminary evaluation of micro hydropower potential in the basin where the community resides.

Starting from this first intervention, the community participates in each one of the following steps: feasibility study, implementation, start-up, and management of the installed system: by this way, the process turns into a school of learning, where both beneficiary community groups and accompanying institutions improve their knowledge and intervention capability, promoting a different land policy.

In the first phase of intervention, two of the most important events happen, i.e. the creation of a management committee and work brigades, who are key actors in the development of intervention and the success of the model.
Starting from the first meeting, the work is carried out in a way that each person feel at ease with the process, participates actively in it and develops a sense of ownership and responsibility towards community action and the system. By focusing on the union which is essential to reach the common objective and by encouraging the discovery of community capitals, empowerment of local group is promoted.

During the whole process of construction of the different system components, technical and administrative abilities grow strengthened inside local groups. The starting point is a financial and business vision that encourages entrepreneurship which can improve family incomes and promote alternative jobs.

One of the fundamental elements of this process is the principle of "learning by doing", since we the human beings learn from what we do. The success depends mainly on the development of a self-consciousness which is materialized in a space of solidarity, at the service of common good, in a context where both an individual and the organized group are masters of their own destiny.

In this context, mistakes have a great importance, since they are not perceived as a defeat, but as an opportunity to assess the road walked and correct those things which prevent the group from obtaining the expected results: recognizing mistakes is an important step which allows local communities to learn and go on with the process. In this way, people and organizations meet an ideal space where they can use their attitudes and skills to reach a common goal.

As part of promoting sustainability, environmental awareness of community is stimulated, at different scales. First of all, beneficiaries become aware of the importance of preserving forest cover in the area where they live, since it guarantees the stability of water flow for electrical generation. Secondly, from the local, people are educated with a global vision, so that they can see their actions projected in a wider context, where they are relevant and contribute to mitigate global problems, such as climate change.

ACTORS

ENTITIES WHICH PARTICIPATE
IN THE DEVELOPMENT OF THE PROJECT

COMMUNITY AND MANAGEMENT COMMITTEE

COMMUNITY IS NOT ONLY THE BENEFICIARY BUT THE MAIN ACTOR OF THE PROJECT, TAKING ACTIVE PART IN ALL THE STEPS. THE COMMITTEE, ELECTED BY COMMUNITY AMONG THE BENEFICIARIES, IS IN CHARGE OF MANAGING THE PROJECT SINCE ITS BEGINNING.

LOCAL NGO

LOCAL NGO IS FREQUENTLY THE FIRST INSTITUTION WITH WHICH COMMUNITY TAKES CONTACT. IT ACCOMPANIES THE LOCAL GROUP DURING THE DAY-TO-DAY OF THE PROJECT AND HELPS TO SOLVE CONFLICTS AND DOUBTS. IT IS A KEY ACTOR IN THE COORDINATION WITH OTHER ENTITIES.

“HAITI PEUT CHANGER”

TONTON AND POLITO. COMMUNITY LEADERS OF MAGAZEN, HAITÍ

“Up to now, we have had to light our houses up with ‘cuaba’” [pieces of wood with high content of resin, which are extracted from pines]. “This caused even more deforestation of our forests, which are already damaged, and also it used to fill our houses with smoke, affecting our own health. But now that we have electricity, all these problems will disappear. We have succeeded in starting to change our lives for the better in Magazen.

Everything started when we saw what our neighbor in the Dominican Republic, the community of Fondo Grande, was doing: people were working on the construction of their own micro hydropower project. Considering the precariousness of our situation, we decided to meet with them in order to know about the steps we had to take to reach a similar goal in our community. This is how we now have got our opportunity.”

“Once we got light, life of all the people in Magazen is going to change, since each person plans his or her actions: to buy a television, a washing machine, or a refrigerator to produce ice and sell it. This way, we can have better incomes, women will have an easier life and can take better care of our children:”

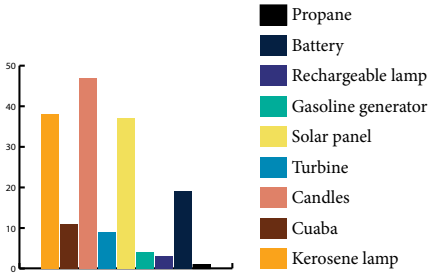
BASIC DATA

INVOLVEMENT OF BENEFICIARIES IN THE PROJECT

MORE THAN 98% OF THE BENEFICIARIES SAY THEY HAVE FELT FULLY INVOLVED IN THE PROCESS

EMISSIONS AVOIDED BY MEANS OF MICRO HYDROPOWER GENERATION

SOURCES OF LIGHTING BEFORE THE MICRO HYDROPOWER SYSTEM (% OF HOUSEHOLDS)



REFORESTATION OF BASINS

REFORESTED IN MOUNTAINOUS AREAS

COOPERATION ENTITIES AND PRIVATE FOUNDATIONS

EACH PROJECT REQUIRES A LOT OF WORK AND RESOURCES, SO SUPPORT AND SINERGY OF NUMEROUS INSTITUTIONS ARE INDISPENSABLE, FROM CIVIL SOCIETY AND COOPERATION (AT NATIONAL AND INTERNATIONAL SCALE), AS WELL AS FROM PRIVATE SECTOR.

GOVERNMENTAL INSTITUTIONS

GOVERNMENT RECOGNIZES THE VALUE OF COMMUNITY MICRO HYDROPOWER SYSTEMS AND TAKE PART IN THEIR CONSTRUCTION, PROVIDING TECHNICAL AND ECONOMICAL SUPPORT, THROUGH ITS INSTITUTIONS, SUCH AS THE RURAL AND SUBURBAN ELECTRIFICATION UNIT (UERS) IN THE DOMINICAN REPUBLIC.

NETWORK OF COMMUNITY COLLABORATORS

SOLIDARY COLLABORATION AMONG PEOPLE AND COMMUNITIES IS A KEY ELEMENT FOR COMMUNITY EMPOWERMENT AND SUSTAINABILITY. A NETWORK OF MUTUAL SUPPORT CONTRIBUTES TO TRAINING, ASSISTANCE IN MANAGEMENT, AND MONITORING PROGRESS.


© Marta Pascua

WORK PHILOSOPHY

Once beneficiaries are fully involved in the work, the project stimulates capacity building, especially those abilities which are fundamental not only for the construction of the system, but also for the development of future initiatives.
Capacity building at a local level has opened successful paths to many young people. Naturally talented for electrical matter and animated by a profound interest in learning, many of them have turned into experts in installing micro hydropower systems and their work is being reconized both nationally and internationally.

Reaching a common goal requires the interaction of numerous actors, who do not compete, but collaborate synergically, and each person, valued in his or her uniqueness, play a role which is coherent with his or her attitude and ability. In this way, governmental and non-governamental actors, at local, national and international level, cooperate and work under commonly accepted rules, in order to reach a common objective.

With the idea of continuing to promote synergy and interaction, the Dominican Network for the Sustainable Development of Renewable Energy (REDSER according to its Spanish acronym) was created. It gathers all the community initiatives, presenting themselves as a local interlocutor in the panel discussion table of the national energy policy. Synergic work and networking directly contribute to create a space of respect and mutual trust, which allows to establish a constructive and positive focus, based on concrete actions which are oriented to solve real needs of people.

The success of this synergy is strictly linked to the establishment of a connection with the essence of nature itself, where connected organisms produce an autonomous development in an apparent chaos. In the Dominican Republic and Haiti, these initiatives constitute a concrete expression of the subsidiarity principle, according to which local actions are a priority, inside a framework arranged at a wider scale: decisions are taken by local groups, promoting choices which are considered as the most appropriate for their development, without imposing hierarchical schemes, fundamented on external powers.

People actively participate in decision making, educating themselves on the responsibility which comes from the freedom of choice. In order to reach this aim, during the whole process, beneficiaries become more and more aware of actions and develop a sense of appropriation towards them. They are trained on rational and efficient use of energy, as well as on the need of paying for the electricity they will receive. Each beneficiary gives both cash and in-kind contribution during the project, calculated in terms of days of work he or she provides for the construction of the system.

Thanks to the connection with land and people, the actors who participate in the process become aware that a unique recipe of intervention does not exist, but you need to carry out an adaptive management, where flexibility is the key principle. Each initiative is based on solid, but not rigid rules, which allow people to make the changes they need to make, so that the project can be a successful experience.

PRINCIPLES

FUNDAMENTAL CHARACTERISTICS OF THE PROJECTS

COMMUNITY COMMITMENT

HUMAN CAPITAL

ENVIRONMENTAL PROTECTION

"A JOINT EFFORT OF PEOPLE"

ESTEBAN. INTER-COMMUNITY COORDINATOR

"According to our work philosophy, the starting point is a vision of integral development, where the focus is on human being. If we had not begun from that, the model would not have worked at all.
People in the communities we work for are poor in terms of economical resources, but we have to do the best we can so that they are not poor in knowledge, since this is their first step to get out of poverty.

You have to begin from raising awareness, a change of mentality. Definitely, everything starts from organization, identifying a vision and mission, and working according to them. When a strong and solid organization exists, it does not need crutches to work with, since it is able to manage its own development and can deal with the real needs of people. It will be less vulnerable to pressures or external influences.

Another key element in our way of work is to build a process that allows us to use local resources for the sustainable maintenance of people, without damaging surrounding ecosystems, at different scales.

Furthermore, our work is not just a theoretical process. We are in front of projects which are a product of a joint effort of people, rural men and women of the countryside.
As accompanying institutions, we just propose: respecting the specific context, we do not impose anything, but we suggest alternatives that local group evaluates. In this way, a functional discipline is set up, where rules come out from real experiences, being established and modified as a joint decision of within the group.

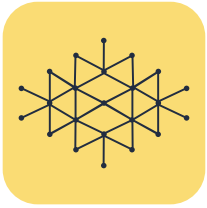
Finally, these projects are based on volunteering, as a sublime and, at the same time, concrete answer from a society that deals with economical limitations and, nevertheless, is willing to struggle until it reaches its development goals.

This flow of volunteering and mutual support that has emerged around micro hydropower projects lets barriers fall down and significantly contributes to the success and sustainability of these initiatives."

PARTICIPATORY PLANNING

METHOD BASED ON "LEARNING BY DOING"

CREATION OF NETWORKS



FLEXIBILITY

START-UP

The start-up of the system is a community celebration, performed together with all the actors who took part in the process. With it, they celebrate the arrival of the "light of water", which implies a before and after for families and the community as a whole.

First of all, access to electricity directly improves life conditions of people, who can access other services based on the use of electrical energy, among which: domestic technology, such as washing machines, refrigerators, blenders, and so on; communication technology, including Internet; entertainment technology.

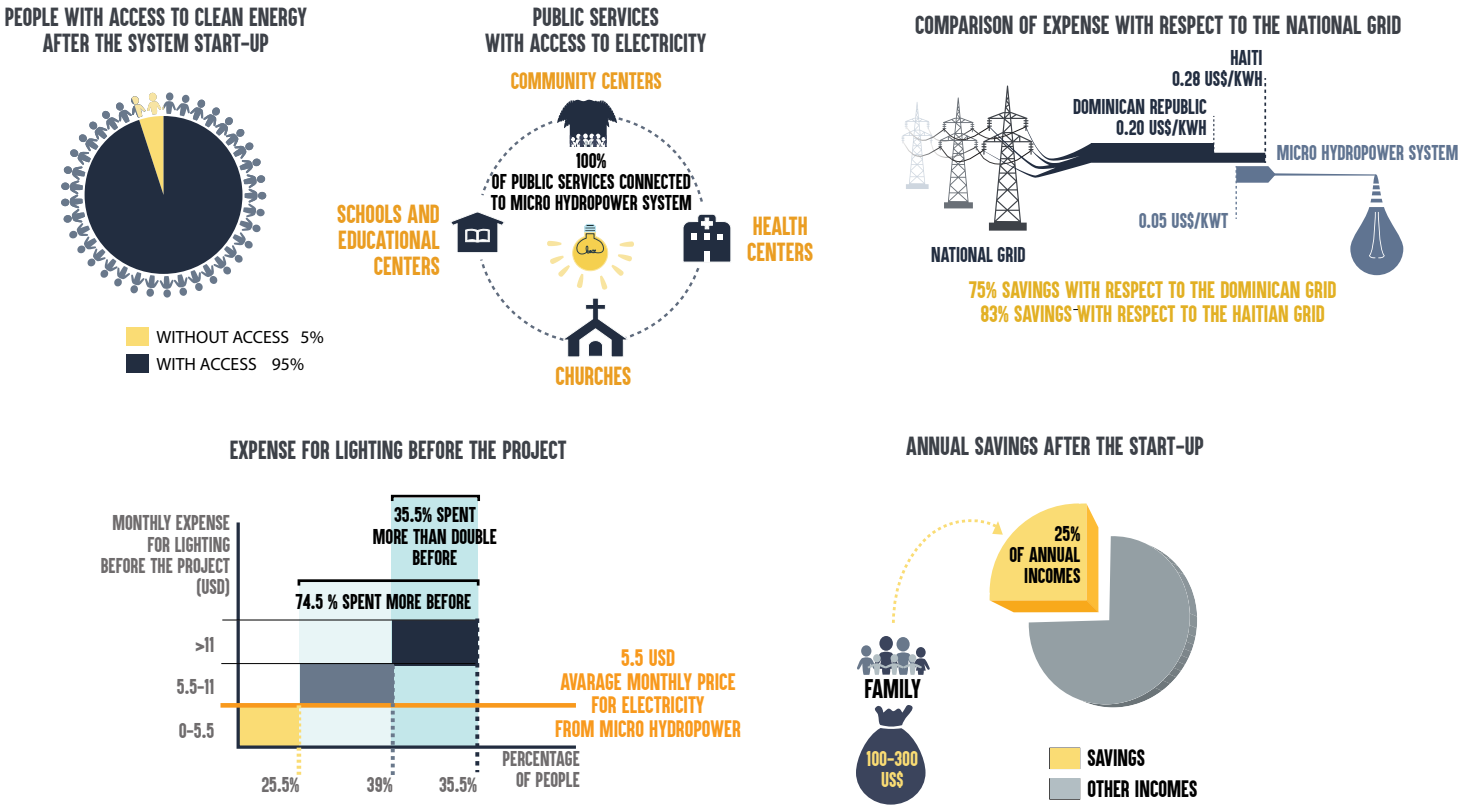
At the same time, micro hydropower systems produce significant savings in family energy expense: before the project, each family spent between 12 and 30 dollars per month on avarage to buy kerosene for lamp, candles, batteries, among others; at the end of the project, family expense ranges between 3 and 6 dollars per month, with a saving between 100 and 300 dollars annually.

After the micro hydropower system start-up, an improvement has been observed in the academic level of the local people, who can devote more time to educational activities, as well as have more alternatives to access courses and communication media.

From an environmental point of view, after the project start-up, communities continue to take care of basins, where normally a significant improvement of forest cover can be observed, as well as the recovery of water flow, which, in some cases, allows people to increase the capacity of their system.

Finally, the diffusion of knowledge of these initiatives has been promoting replication, encouraging other community groups to start similar projects.

DATA



“WE GOT IT THANKS TO CONFIDENCE”

FRANKLIN AND VÍCTOR. SPECIALIZED TECHNICIANS

“Everything began with the construction of a micro hydropower system in the community where Víctor comes from. Since that moment, we have been working together in many projects, installing turbines and providing technical support in different phases of the process.”

“Our personal and professional trajectory has been something really beautiful. It has been a large path: many projects, a lot of work... But always at ease and satisfied with what we have been doing. The most beautiful thing is that you have to get involved with people. Each group is unique, but all the communities are determined and hard-working. The most gratifying thing is to see how people feel when they discover that they, all together, are, step by step, reaching their goal.
Regarding the generation systems, all of them look like at first sight, but each one of them actually has its peculiarities that makes it unique, as the community itself.”

“I would like to say that learning by doing is a way to acquire knowledge all at once. During our work, we have faced big challenges and important obstacles. Nevertheless, together, we have been able to overcome all the issues up to now. That is how we have been trained to reach where we are.

At present, more than 80% of our work comes from installing micro hydropower systems. And we got it thank to people who trusted in us.

While working, you have to overcome many obstacles, but none of them is impossible. At this moment, I am not afraid of saying that, once I say ‘I do it’, I really will end up doing any type of micro hydropower installation, since I am now confident in my capability and I am able to do it. Anyway, we do not settle with the experience and knowledge we have already acquired up to now: we want to learn much more and keep developing ourselves.

I think that these projects are the best things that have ever arrived here in the Dominican Republic, and personally speaking I would like to say that, if I am who I am, I must owe it to the project.”


PNUD

FIRST IMPACTS (+1 YEAR)

In order to properly evaluate what change the arrival of light has brought to the community, it is useful to observe how life has changed in households over the time.

Most of the savings generated during the first year thanks to the micro hydropower system start-up is generally invested in purchasing electrical appliances: refrigerators, which allow people to preserve food safely for longer; washing machines, which radically reduce time women devote to wash clothing; televisions and computers, which reduce the communication gap, especially for young people.

In a few months period, this turns into an improvement of quality of life and in a perspective of a much better future for all the family members.

The household faces a deep transformation when light arrives, and people who spend most of the time there, like women and children, are the first in experiencing significant change.

Students, for example, use night-time hours to carry out their homeworks and frequently obtain better accademic performance.
Young people are those who are more rapidly benefited from the access to information technology, cultural opportunities and distance learning.

In this context, REDSER is working on developing a communication network based on wireless Internet, which aims to connect community groups who have a micro hydropower system, and, by this way, reduce the systems vulnerability and, at the same time, cut down communication gap existing in numerous rural communities of the Dominican Republic and Haiti.

After a micro hydropower system start-up, women do their domestic duties more rapidly and, on average, can count on 5 additional hours for other activities in comparison with the past. In this way, they have more opportunities to devote themselves to education and leisure, and take part in social and political life. For this reason, the installation of these systems is a step forward towards gender equality in rural areas.

Household environment generally becomes cleaner and healthier, not only because families stop using candles and kerosene, but also because they invest more to improve it.

Furthermore, electricity opens the way to local entreprises, which contribute to increase income generation and job alternatives for local people.

In this way, after the micro hydropower system start-up, a reduction, and even an inversion, of migration rate towards urban areas and abroad is observed.

PROCESS

STEPS OF THE PROJECT
RELATIONSHIP AMONG ACTORS

"NOW WE CAN TAKE A REST FROM BUYING GAS"

TITA. COMMUNITY LEADER FROM LA ENSENADA, PIEDRA BLANCA

"We did a great thing! This was something really nice and beautiful. I jumped a lot of joy and I was almost beside myself!... since we thought: 'Well, ¡now we can really take a rest from using candles and buying gas!'.

Regarding washing clothes, we worked hard to hand wash, with a brush on a stone in the river, or at home, with great effort. But now we have a washing machine, and we use it, and, in the blink of an eye, we can wash a lot of clothing, without getting exhausted and without using the brush and this kind of things.

As for refrigerator: some of us have one, others don't, but those of us who have a refrigerator help the others. And when we arrive tired from work, all drenched in sweat, we can drink a glass of juice that is always in our refrigerators and we feel relief.

I'm really happy for the arrival of light, not only for me, but also for other families whose members got sick and frequently had headache because of the smoke from gas lamp. All of this has gone far!

If we spent 300 pesos monthly to buy gas, now we can save these 300 pesos and use them to buy electrical appliances and furniture for our home, as well as school uniforms for our children and many other things.

For all of this, we feel really happy: all the effort and work we did during more than three years, with the support of many institutions that helped us, was really worth it!"

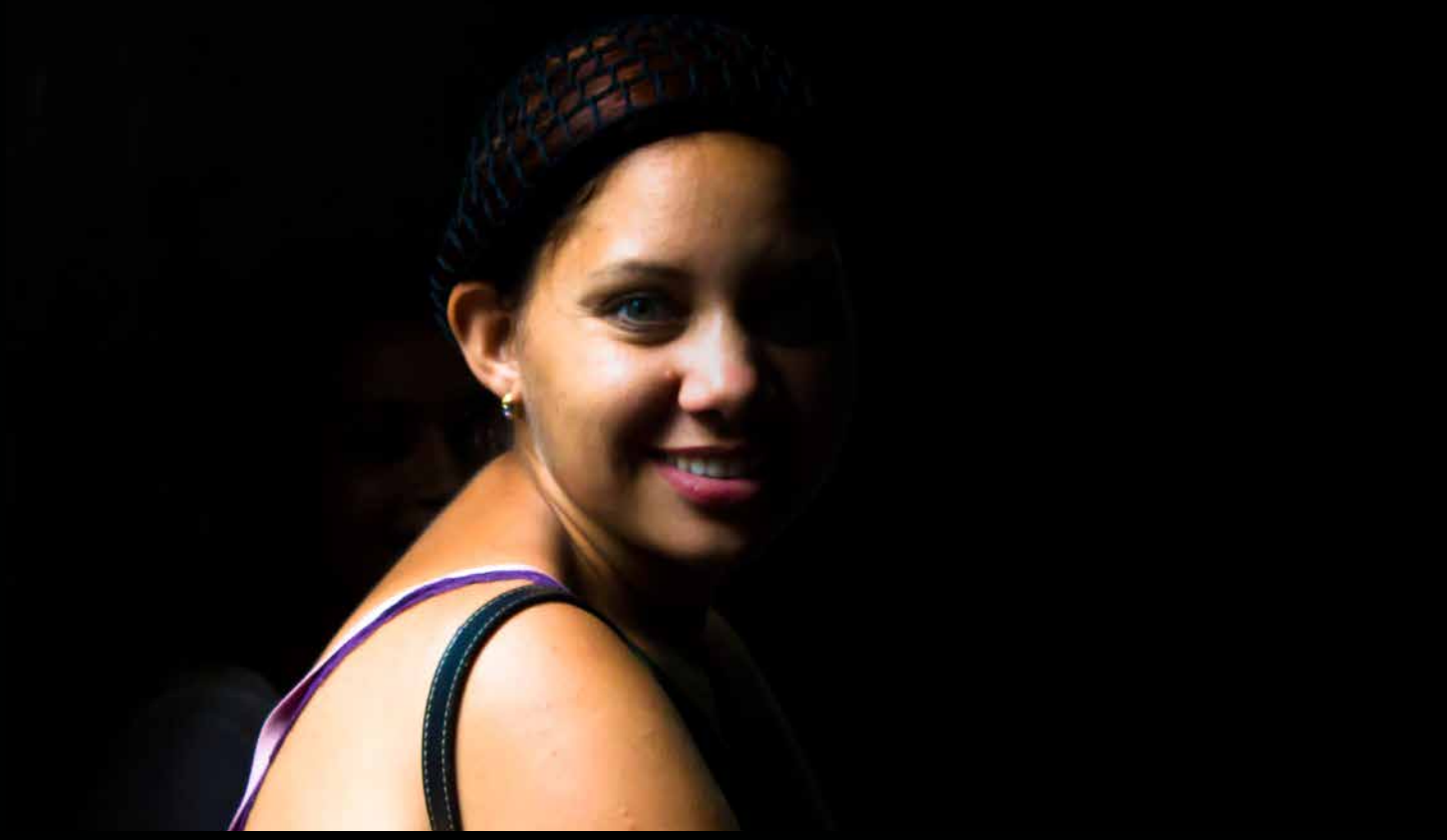
5. TECHNICAL TRAINING

6. SUPERVISED WORK AND LEARNING BY DOING

7. ELECTRICAL INSTALLATION

8. REFORESTATION CAMPAIGN

9. MAINTENANCE AND SELF-FINANCING



OTHER IMPACTS (+5 YEARS)

After 5 years, with a much higher saving capacity and better equipped households for the use of electricity, deeper impacts can be observed, which turn into a higher economic development of families: saved money is invested in secondary needs, such as communication, entertainment, transport and clothing.

Access to electricity and higher economic resources encourage a productive use of energy, promoting enterprises inside the community, which adds value to local resources, integrating a business with a focus on the protection of environment.

One of the enterprises which benefit from the electricity produced by the micro hydropower system is rural turism, which has recently turned into a significant alternative to conventional tourism in the island.

Ecotourism centers were born as an alternative source of income for community residents, through the promotion of natural, gastronomic, hystorical, and agricultural, attractions existing in their territory.

The start-up of enterprises that are managed by local people and whose profit directly reaches the residents in the community, promotes a real socio-economic development of people, which is sustainable in time and reduces dependance from external funds.

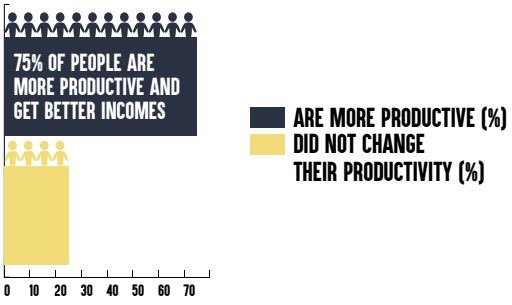
At the same time, this reduces and even revert migration rates towards urban areas and abroad, getting many young people to remain in their community, where they can continue to study and start enterprises that allow them to maintain their families.

Obtaining benefits from a sustainable use of natural resources lets people develop environmentally virtuous behaviors, contributing to biodiversity conservation and the mitigation of global problems.

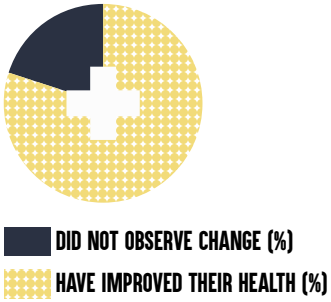
Through common management of limited resources, communities demonstrate they are able to play an active role in seeking for a solution to different issues, even issues like extreme drought that challenges the generation capacity of their systems.

BASIC DATA

PRODUCTIVITY IMPROVEMENT



HEALTH IMPROVEMENT



ACHIEVEMENTS

SYNTHESIS OF IMPACTS GROUPED BY INDICATORS

IDENTITY/DEFINITION

- HEALTH IMPROVEMENT
- INCREASE OF SCHOOL PERFORMANCE
- IMPROVEMENT OF LIFE QUALITY
- INCREASE OF SPARE TIME OF WOMEN
- POPULATION GROWTH

BEHAVIOR

- ENTREPRENEURSHIP
- MANAGEMENT CAPACITY
- RESPONSIBILITY
- ENVIRONMENTAL CONSCIENCE
- PREJUDICE ERADICATION
- SAVING HABIT
- COMMUNITY ENTERPRISING INITIATIVES

"OUR COMMUNITY HAS GREATLY DEVELOPED"

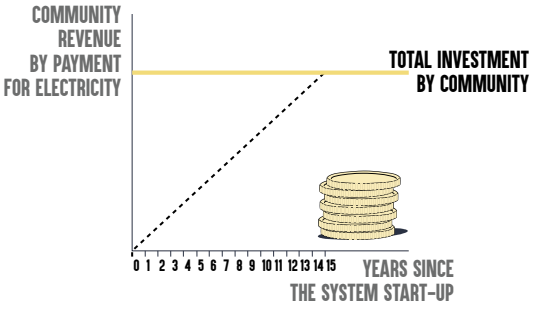
CENSA, MANAGER OF THE ANGOSTURA ECOTOURISM COMPLEX

"Thanks to electricity, our community has greatly developed.
Now much more visitors arrive here: when we didn't have light, outside visitors were not so many, since people are generally afraid of darkness. Nevertheless, since the micro hydropower system started to work, the number of visitors has been growing a lot, and a lot of people have made their investments here.
Now we have more tourists than before, more trainings and opportunities.

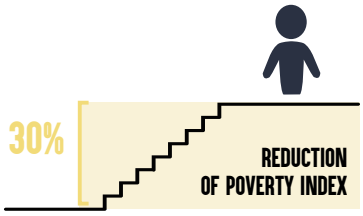
Furthermore, new enterprises have been set up by locals: there are young people who opened barbershops or launched other enterprises. And, in general, life has improved. After the arrival of electricity, we, the women, have gained more time for activities other than domestic duties, and our health has improved as well, since we stopped using of kerosene lamp. Children can now study during night-time. Many people have money in the bank, and are saving some money in case of any disease or something unforeseen happens.

Thanks to the micro hydropower project, we got the idea to start our own enterprise, the Angostura Ecotourism Complex, to promote the sustainable development of our community: we, especially women, are obtaining significant incomes and are conserving environment. All of this was possible thanks to the access to electricity and the process we had to live with to obtain it."

COMMUNITY SELF-FINANCING



IMPROVEMENT OF SOCIOECONOMIC INDICATORS



PARTICIPATION

- INCLUSION AND PARTICIPATORY MANAGEMENT
- TECHNICAL TRAINING
- KNOWLEDGE TRANSFER
- PROFESSIONALIZATION OF COMMUNITY MEMBERS

PROTOCOL

- ORGANIZATIONAL DEVELOPMENT
- TRAINING OF COMMUNITY TECHNICIANS
- TECHNICAL INDEPENDENCE
- SYNERGY AMONG COMMUNITIES
- MULTIPLIER EFFECT OF DEVELOPMENT
- COMMUNITY ENTERPRISES

SUSTAINABILITY

- EMPOWERMENT
- IMPROVEMENT OF ENVIRONMENT
- TECHNICAL EFFICIENCY AND MONITORING
- ECONOMIC EFFICIENCY
- FINANCIAL SELF-MANAGEMENT

CONCLUSIONS

Community managed micro-hydropower systems have shown to be very effective as models for sustainability, demonstrating that human activities are compatible with environmental protection and climate change mitigation, through CO_2 reduction and sequestration.

This kind of interventions empowers local communities and encourages them to choose their own development processes, according to the best use of the territory where they live.

Lessons Learnt

Whenever local groups are directly involved in their own development, there is an improvement in their living conditions, which also benefits the protection and conservation of nature.

Sustainable common use of natural resources promotes the sense of ownership towards them, and prevents negative externalities from happening in local communities.

The main key factors in this process are the following ones:

- Skill generation at a community level.
- Improvement of social capital at different scales, inside communities as well as among the different actors who participate in the process, both horizontally and vertically. A key element is the promotion and establishment of a productive dialogue among local organizations and governmental institutions.
- Implementation of a community based mutual support methodology, where local groups strengthen each other.
- Local empowerment, which allows people to decide autonomously about their future, as individuals and as organized groups as well.
- Trust based schemes, which boost collaboration and synergic behaviors, improving the peoples's capacity to collaborate for common objectives.
- Continuous learning, where people learn from each other regardless the academic level.

Major Challenges

Looking forward, the Dominican Republic and Haiti have the potential for further upscaling of these successful experiences, and for continuing their contributions to solve the problem of electrical supply, as well as disseminating innovative and sustainable models based on local community groups empowerment.
The experience which comes from the initiatives developed up to now demonstrates that a significant and high quality human capital exists in rural areas, which countries are frequently missing, due to the lack of effective participation schemes.
Its recovery is essential not only for a real development of countries, but also for climate change mitigation and adaptation, since any effective solution passes through local sustainable actions.
Local production of electricity from renewable sources of energy is an effective way to reduce pressures associated to the use of fossil fuels. Decentralized systems of electrical generation, which are based on a local management system, constitute a significant measure in terms of sustainability and adaptation to climate change, since they cause local people to develop an integral care of the environment where they live.
Furthermore, the implementation of this kind of initiatives implies a process of empowerment that results in local development, with significant consequences in terms of the reduction of migration rates to urban areas.

The experience demonstrates that the arrival of electricity is just one of the goals, since it introduces new challenges in the beneficiary local group, promoting further improvement of living conditions.
National and international policies generally focus on urban development and look for solutions of problems linked to a growing urbanization, disregarding that land management needs the adoption of an integral perspective, where the complex relationship which exist among all the components, both physical and human ones, is taken into account.
A different focus is a key step in climate change adaptation, which needs models that reduce the pressures that human systems, especially the urban ones, are producing on natural resources.

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