

Almanac of the **Future**

A STORY OF SUCCESS

Motivational experience No. 31

ENERGY IN THE OUTBACK



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For more than ten years, the Llanos region of the Orinoquia, in Colombia, has been the theater of operation of the armed conflict and dominion, first of the guerrilla and then of paramilitary groups. The violence forced the population to cultivate the coca leaf and process cocaine. Many people were killed, entire families left their farms and migrated to the city. A group of families in the areas of Murujuy, Guanape and Sunape, located in Meta and Vichada Departments, have come out of this crossroads: They process essential oils for commercialization in urban markets, 250 kilometers away, and take advantage of renewable energies to supply themselves with water and electricity, improving their well-being as farmers.

Essential oils instead of drugs

“The production of essential oils processed by rustic distillation equipment on farms is an economical alternative to get out of the coca production”. Mauricio Gnecco, an engineer and psychologist, has devoted his entire life, together with rural families, to find practical solutions based on appropriate and easy-to-use technologies. When visiting Doña Rosita Herrera with her children in the Murujuy sector, located on the border of Meta with Vichada, the brothers Beto and Cheo explain the process of distilling essential oils. They process lemongrass, citronella and mas-tranto, a typical bush of the plain. The ratio between raw material and concentrated oil is 3 out of 100. The oven, its pipelines and the distiller itself were designed by Mauricio. Beto and Cheo have perfected the equipment, using local materials. “Instead of giving them solutions, in my visits to the farm I leave always problems to Beto and Cheo. In the next visit they surprise me again and again for their recursion. They are born inventor engineers, “ explains Mauricio. Despite the enormous distances between the farms in the area, there are more than 15 families who share the two distillation facilities. The equipment is portable and allows the transfer from farm to farm, but it is usually the people who move, transporting the raw material on their bikes to the distillers. The sale of the concentrated essences, in the form of pure essences, antibacterial tinctures and capsules against gastritis, is organized by Mauricio together with a vendor in Villavicencio. The 10 milliliter bottle costs 25 thousand pesos (approximately 8 dollars). The income obtained by families from the sale is so interesting that most families have abandoned coca.

Exchange of goods back and forth

The prices of items in the basic basket that are not grown or produced in the area, such as rice, are very high in the stores of the low populated centers in the region. High prices, sequel of the drug economy and the enormous distances of up to 300 kilometers to the markets to sell the products themselves mean a strong financial pressure for many inhabitants of the region. The families that participate in the process with Mauricio Gnecco have formed an association: ASOGAGUMUY - livestock and farmers association of Guanape and Murujuy. The member families practice mingas and mutual aid, do not burn in their farms or allow the burning of the savannah in the surroundings and share their experiences in processing and using renewable energies. The income obtained from the sale of essential oils and their



derivatives flow into an account, where the contribution of each family is registered. Before embarking on his monthly tour from Villavicencio to the area, Mauricio consults by cell phone each family if they need to buy anything. Without the solar panels – and the generation of decentralized energy –, many families could not recharge their cell phones and would be isolated. A look at the trailer when Mauricio takes a trip to the plains demonstrates the importance of trade: essential oils converted into sacks of rice, edible oil, salt for cattle and other items.

Endless power lines instead of taking advantage of the sun

Murujuy is located more than 250 kilometers by road from Villavicencio. Not long ago the local government invested plenty resources to bring electricity. A 200 kilometers long power line now interconnects with the national electricity grid. But power cuts caused by falling trees or other technical problems are common and it can take a week for the workers



from the electricity company to fix the problem. For Mauricio, the electrification project is questionable: "With a quarter of the investment an autonomous solar energy system could have installed. The potential of solar energy in the Murujuy area is one kilowatt per square meter between 9 in the morning and 4 in the afternoon. If we see that the average family consumption does not exceed 44 kilowatts hour / month, Murujuy could easily be powered by the sun". Examples of

this are viable: Puerto Santander in Caquetá Region has an autonomous solar energy system, supplying 40 families, the school and even the police station. Mauricio participated in the installation of this system. "The monthly electricity bill in Puerto Santander per family comes to 12,000 Pesos (approximately \$ 4). The system is managed by a committee taking charge of the maintenance and recently the batteries have been changed, after ten years. Here in Murujuy an average of four times more is paid, also bearing the constant supply interruptions".

49% of the electricity distribution company of Meta is owned by regional and local governments, the rest is in the hands of private capital. The interest in profit prevails, at the expense of not taking advantage of renewable energies. Colombia, like many others, still does not have effective public policies that encourage the use of renewable energy. Examples that emphasize this reading are not lacking: the first renewable energy auction in Colombia, convened by the Ministry of Energy in February 2019, was declared a failure despite the participation of 15 companies in

the solar and wind energy sector; the explanation that no applicant fulfilled the requirements arouses many doubts. The interests and power held by the conventional energy sector is big. Taxis with electrical engines that circulate in the capital Bogotá can not recharge their batteries at home but must do so in electric stations. Conventional concepts and criteria prevail in the energetical sector. But beside these shadows, there are also lights around energy and its most efficient use: The first autonomous systems of renewable energy are working, energy efficiency using LED lights and refrigerators of the latest generation is increasing, and the regulations force the distribution companies that the local energy production can feed the interconnected electrical network. There are electricity distribution companies that still put obstacles to this small energy revolution but the prospects are encouraging.

Energy autonomy and well-being

The vast majority of small farms have installed solar panels. The lights of the rooms during the night and the electric fence in the pastures of the cattle work the same way as the television or radio and blender, thanks to the autonomous generation of electricity based on solar energy. Mauricio

says that the maintenance of small solar systems still shows problems, often shortening the battery's life; In order to solve this situation, Mauricio, with the support of third parties, is initiating training courses in renewable energies, covering solar and wind potential. Beto and Cheo are safe participants. "For rural areas," according to Mauricio, "it is urgent to have peasant universities, located in rural areas. With a little theoretical basis in physics and mathematics, people like Beto and Cheo can develop effective, sustainable and friendly technologies, achieving an integral well-being that exceeds the living conditions of majorities in cities".

Summers are dry season in the plains. "Since November," says Doña Rosita "it does not rain or rains just a moment. We are in March and the rain is needed". The phreatic level is decreasing in the area, as a result of the industrial plantations of rubber trees, of the African oil palm for the production of biofuel and pine. To guarantee the minimum supply of water, some families have water pumps, others pump water from their wells and others, like Doña Sonia and her family in Guanape, bring water in buckets, walking more than one kilometer. With the technical support of Mauricio, Beto and Cheo have installed a windmill to pump water from their well. The novelty is that the mill, with the help of a small compressor, compresses air that, driven by a hose to the bottom of the well, pumps water. Mechanical



pumps, submerged in the bottom of the well, are easily damaged by sand. The pumping with compressed air, besides not generating operating expenses such as motor pumps, avoids these problems. 8 hours of wind are enough for the Herrera family windmill to pump 1200 liters of water; In times of drought this amount of water is a blessing."During the winter, when the water pipe near the house has a stable flow, we use our water pump," explains Cheo. A small intake in the channel of the pipe conducts the water through a pipe. The gravity allows the water to generate a water hammer, generating compressed air that pumps the water to the house, 500 meters away and 20 meters height. The cost of such a pump varies between 1.1 to 1.5 million pesos (approximately 350 to 500 dollars). Once installed, it pumps, without cost of operation, up to 5 cubic meters of water per day.

Peasant engineers

Beto and Cheo are constantly optimizing their rustic equipment of technology: they use dried mud from nests of termites, as a coating for the distiller's burner, reducing the consumption of firewood; placed a second chamber of cooling water in the same distiller, which accelerates



the distillation process. Not long ago, the brothers got a car injection pump, turning it into a sprinkler that, powered by the energy of a solar panel, serves as an irrigation system in the semi-shade orchard of the farm. With Mauricio they are doing tests, placing float fins under the bow of a canoe. The first trials are promising; using a small engine with low fuel consumption, placed in a plastic floating boat as rear traction of the canoe, at very low speed the front of the canoe stays above the surface of the water, floating on the fins. The search for greater energy efficiency in the motorized traction of canoes can have an enormous relevance on a global scale, being the canoe the main means of transport of millions of human beings in various parts of the world.

Closed opportunities

The National Institute of Food and Drug Surveillance, better known by its abbreviation INVIMA, is the regulator to authorize the sale and circulation of medicinal substances and food in general. ASOGAGUMUY, supported by Mauricio, has been trying to subscribe the different

derivatives of essential oils for 2 years. Mauricio remembers: "The requirements, analysis and procedures are endless. The necessary investment easily goes up to more than 150 million Pesos (approximately 50 thousand dollars). It seems that the regulations are made to not be able to comply with it". The families together with Mauricio have decided not to insist anymore and have changed their strategy: instead of producing in scale, they have opted for a diversification, producing many different ingredients with few quantities, instead of a few ingredients and a lot of quantity.

The regulations in Colombia are not an isolated case; In many countries, the regulation points to a degree of protection that benefits the pharmaceutical and food industry, systematically excluding small producers and processors. Public health is undoubtedly the responsibility of the state; but serious doubts arise before a panorama where industrial production is privileged, authorizing the sale of harmful and even carcinogenic products for health, and closing, at the same time, categorically the opportunities for family farming and its processed products.



Messages to the future

The use of renewable energy autonomously, with accessible and manageable technology, allows us to reach a level of well-being that makes the rural area attractive as a place of life.

The prevalence of conventional concepts colors even the visions and decisions of the public and business sectors, but it has to gradually adjust to the horizons of the future: energy autonomy based on renewable sources and in a decentralized manner.

The challenge is to connect from our own autonomy: energetic and in the mental.

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