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SEEKING TECHNOLOGIES FOR SOCIAL AND ENVIRONMENTAL CERTIFICATION

Every day, we consume food offered in different points-of-sale – supermarkets, restaurants, street markets. But have you ever thought of all the way the food traveled to reach your table?

Every food has a unique story. Who produced it? How? What were the labor conditions? Were agrochemicals properly handled? Or weren't agrochemicals used at all?

Thus, social and environmental certifications emerged, trying to answer those questions. Labels aim at ensuring best practices in production, all the way from social to environmental aspects.

They can, for instance, ensure there were no unhealthy conditions affecting workers dur-

ing production. Or ensure food production complies with practices that do not degrade the environment.

One of the most famous certifications is the organic product certification. You must have seen the label in some products. There are two ways to get the label. You may get it through an audit conducted by companies or NGOs. Or through PGS, a Participatory Guarantee System, which establishes mutual supervision.

But access to certifications is not so easy, specially for smallholders. Conducting an audit costs money, and even an inclusive system like PGS may generate a lot of red tape and paperwork.

In this context, blockchain, a

new technology, emerges with the potential to solve some of those problems. Blockchain was created based on the operation of bitcoin cryptocurrency. In that case, transactions would no longer be checked in a central institution, like a bank, but rather distributed to all users. It works as a ledger and everyone has a copy of it.

Adopting rules agreed by everybody and using encryption techniques, different users add information in blocks that connect to one another. Blockchain provides enhanced security to the process, as data entered into the chain becomes immutable.

The information can be accessed for verification, which provides transparency, traceability and greater confidence.

Security, transparency, traceability and confidence are key for certifications.

Can that new technology help consumers get closer to the entire chain and help smallholders get closer to certifications? What are the limitations and the challenges to implement it?

The com.fiar team, from the Integrated Education for Sustainability class, at FGVces, was challenged to investigate possible uses of blockchain for social and environmental certifications that will facilitate access of small businesses to the market. Stay tuned to the results in this P22_ON edition.

Enjoy!

WHAT DOES BLOCKCHAIN HAVE TO DO WITH THE FOOD ON YOUR TABLE?



Have you ever thought of how the food you consume reaches your table? Although they do not have the acknowledgment they deserve, smallholders play one of the most relevant roles: they feed the country. According to the Ministry of Social Development (MDS), family farming accounted for 70% of the food that reached the population tables in 2017. In addition to supplying the domestic market, controlling inflation of food consumed by Brazilians, and employing a significant percentage of labor in the field, smallholders fight hunger and ensure our food security.

In spite of that great relevance, smallholders find obstacles to perform their tasks. Besides facing social problems, they are highly neglected by public and private spheres and, therefore, have difficulty to enter the market, both for the lack of incentives and financial resources, and for bureaucratic issues.

Often, the only way those producers can make their products available to end consumers is through **middlemen**, whose price policies depreciate producers' labor and remuneration, at the same time increasing prices of final products. That dynamic reinforces unfair relationships between the field and the city, prevents producer's development, and hinders, from the consumers' perspective, access to products at a fair price, taking into consideration all production costs. Therefore, products laying on the shelves of large supermarkets are often associated with poor labor conditions and do not reflect fair remuneration to producers.

At the same time, there is a growing demand in Brazil and in the world for healthier products – both for consumers and

producers – that respect labor conditions and the environment. This represents a great market opportunity for those producers, and adds value to production. The path to access those markets, however, relies on getting social and environmental labels, such as the **organic certification**. This opportunity is filled with difficulties, as we will see in this article and throughout this edition of P22_ON magazine. One way to overcome obstacles is to adopt new certification formats and adhere to technologies such as **blockchain**, even though it does not address all the complexity contained in the universe of family farming. But, before that, let's understand how we got here.

GREEN REVOLUTION AND ITS IMPACTS

With the **Green Revolution**, the production mode in the fields has radically changed. Most producers have adopted massive machinery and broad use of **agrochemicals** and fertilizers, aiming at increasing productivity in their properties. Thus, cultivation practices using agrochemicals have become conventional and predominant in the field.

Smallholders had to adapt to that new production model, since use of agrochemicals and fertilizers is understood by financial institutions as security for harvest. According to those institutions, agrochemicals ensure production and, consequently, producers' remuneration, which will guarantee payback of the financing. Therefore, if producers desire to access credit lines and financing, not rarely they must declare they adopt those practices in their property, even though it is not true.

However, that new agricultural

model resulted in a number of impacts on the environment and human health. According to Dossiê Abrasco, published in 2015 by Abrasco (Brazilian Association of Collective Health), Fiocruz, among other research institutions, intensive and indiscriminate use of agrochemicals led to contamination of soil, water, and even breast milk (*please visit goo.gl/numwRA*)

The association of agrochemicals with neurological diseases and hormone disorders, combined to alarming data such as the fact that Brazil is the largest world consumer of agrochemicals and that the country uses agrochemicals that have been banned in other countries, like the ones in the European Union, makes a growing percentage of the population question that production model.

One of the effects of that questioning is an increase in the demand for products that, even though inserted in that production model, have less associated environmental and social impact. In this context, **social and environmental certifications** seek to respond to the wish of this part of the population by creating systems that will guarantee responsible practices from the environmental and social perspectives.

In parallel, on the demand side, the search for healthy food, i.e.: agrochemical-free, coming from more sustainable production systems such as organic production methods, is a trend that has been reinforced and consolidated worldwide (*learn more in the article entitled **Demand***).

Although still lagging behind, the Brazilian market follows that trend. In 2016, there was a 20% increase in the domestic



market for organic products, and the estimated revenue was BRL 3 million. According to the Conselho Nacional da Produção Orgânica e Sustentável (Brazilian Council of Organic and Sustainable Production), the percentage was even higher than in previous years (*please see more in the article entitled [Supply I](#)*).

At first, for consumers, certifications seem to be a good way to ensure products they buy have been through production processes that had reduced environmental impact, complied with the legislation and are, to a certain extent, sustainable. Considering that differentiator, certified products have higher added value, and certification becomes key to accessing demanding markets, such as the European Community.

Also, public policies start acknowledging the relevance of certified products. For organic food, for instance, specific credit lines were created and it gained important space in public procurement: currently, the lunch offered at public schools must consist of certified organic food.

In spite of addressing issues of environmentally and socially responsible production, certifications are not so inclusive with smallholders. In order to access the benefits of the certified product market, producers must face a number of bureaucratic procedures, in addition to afford the high costs associated with the auditing process (*please see more in the article entitled [Certification](#)*).

For organic products, for instance, in addition to the costs

involved, the certification is obtained through surveillance visits and audits conducted by certifying bodies accredited at the Ministry of Agriculture, Cattle Breeding and Food Supply (Mapa) and the Brazilian National Institute of Metrology, Quality and Technology (Inmetro).

According to a study conducted in 2018 by Sebrae (Brazilian Service to Support Micro and Small Businesses), there are only 16,000 organic farmers registered at Mapa, out of which 6,257 are certified, 5,084 are registered through the [Participatory Guarantee System](#) (PGS), and 4,692 participate through direct sales with social control. The figures are modest if compared to the 90,000 properties using organic techniques, according to the 2006 Agricultural Census.

The figures indicate the certification process is still not very inclusive. Among the reasons to explain that, is the fact that limitations in the structure of small properties are not taken into consideration. Often the requirements are unattainable for family farmers, ignoring the context and the reality of specific production systems like the ones used by traditional populations. Even though complying with the standards required by the label, they get stuck in bureaucratic issues.

POSSIBLE ALTERNATIVES

The most common certification method is auditing, which is when an expert institution attests, through (usually annual) visits, that the organization operates in a responsible manner, not damaging the



environment and the society. However, this is a costly service.

But, in order to overcome the obstacles of a traditional certification audit, an alternative found by smallholders is the PGS, a mechanism involving solidarity forms of social control that does not rely on the participation of an external institution. It started in Brazil as a result of social pressures and was acknowledged by the Law of Organic Products.

The system works based on a network of producers, aiming at overseeing whether the practices adopted by other members of the group comply with organic production regulation. Regularly, they visit one another's properties and check whether they are compliant. The label they get is collective, meaning if one producer does not comply with the norm, they will all lose their certification.

PGS was successful in overcoming the obstacle posed by high costs of the certification audit system. However, the bureaucracy required is still significant. In addition to that, the Brazilian system, despite allowing for the use of the organic product label, is not acknowledged in other countries.

Another alternative, as surprising as it may be, is blockchain. Recently created, that technology,

which is behind cryptocurrency, is increasingly used in different applications in a number of industries. The main characteristic of the emerging technology is to allow traceability, through a decentralized system, of all transactions made throughout the production process (*please read more about blockchain in the article entitled [Technology](#)*).

The new tool may eventually be an alternative to enable the certification process for smallholders, since their foundation resemble the rationale behind the Participatory Guarantee System. Just like PGS, blockchain is a networked system that fosters transparency and security, and shares information through active participation of system members.

Blockchain can be understood as a new technology involving connection and reliability.

Connection: *With the goal of enabling transactions between people, here is how it works:*

A transaction is made and stored in a block.

- 1. Of one the participants, randomly chosen, is selected to validate the block.*
- 2. After validation, information from the new block is disseminated in the network.*

- 3. If most members agree (51%), the block is inserted into the network.*

Reliability: *Blockchain involves a decentralized database, with no intermediaries, immutable, resistant and public. Therefore, blockchain is based on the reliability of the system as a whole, not of the emitter.*

In summary, blockchain technology is a system based on users' collaboration, characterized by a collective experience, since it is embedded in a distributed environment on the Internet. Thus, it can be understood as a way to automate PGS process, since both have common principles and bases.

Also, blockchain can be a more assertive way than conventional certifications. Certification audit checks what has been done and, by analogy, it 'takes a snapshot of the current moment'. Whereas blockchain can be compared to a movie, since it records the entire process throughout time.

However, it is worth questioning: considering smallholders find it difficult to get financing and structure, can blockchain actually solve that problem? Or will the technological challenge be one additional barrier for producers? (*Learn more in the article entitled [Supply II](#)*)

VIDEOS:



Video on family farming, certification and trust in relationships:

youtu.be/tUNW_BYE_-A



Video on the operation of blockchain technology:

youtu.be/_QV3tewlQNA



Video on social and environmental certifications:

youtu.be/TIE3ON4lpNc

END CONSUMERS AND BUSINESSES INCREASE DEMAND FOR CERTIFIED PRODUCTS

'The transparency society is a society of mistrust (Misstrauen) and suspicion (Verdacht), based on control due to the end of trust. The strong and intense demand for transparency points exactly to the fact that society moral foundation became fragile, and moral values such as sincerity or honesty are increasingly losing their original meaning.' Excerpt from the book *Society of Transparency*, by Byung-Hul Han

Regarding relationships of **conscious consumption**, there is a growing uneasiness associated with the path products take to end consumers, the inputs used, forms of labor adopted, among other concerns. Consumers have been playing a new role of questioning and investigating producers and businesses. Producers, on their turn, seek new ways to build trust with those who buy from them. But how can they do it? **Certification** and traceability are some of the responses.

Among the new conscious

consumption habits, we can highlight **organic products**, which already account for BRL 3 billion per year, and show growth rates of 20% to 30% per year, according to Organis (Brazilian Council of Organic and Sustainable Production). Greeneries, vegetables, fruit and cereals are the most representative products in the sector, still according to Organis.

Thanks to the influence of organized groups in civil society and producers, the consumption of organic products was incorporated into the government agenda.

In the municipality of Sao Paulo, for instance, law # 16,140/2015 establishes it is mandatory to serve organic food in the lunch offered at public schools.

According to Heloisa Bio Ribeiro, from AAO (Associação de Agricultura Orgânica, Organic Farming Association), the law is the result of a mobilization of the civil society with the Legislative branch. As she explains, the goal is to have 100% meals with organic products by 2026, which will account for 2.5 million meals per day, generating a great positive impact on the health

of children and on the market. 'It is a law that is not associated specifically with a certain mayor, but is rather the result of a historical construction. However, the current administration virtually halted the implementation of the law', she declares.

Consumers visiting the organic product street market in Ibirapuera, Sao Paulo, highlight health and environment as the main drivers for their choices. Lívia Menezes, for instance, points out the growing dissemination of information showing the harm caused by



agrochemicals. 'It is amazing to see many substances forbidden in other countries are still allowed here', she says. In addition to health issues, Mariana Cury, who has been going to the street market for five years, mentions as a reason for her choice the way the land is handled, care with the ground, and respect for nature in the production of organic food, but she believes very few people are aware of all that (*learn more about what consumers think about labels, below*).

The demand for more sustainable products goes beyond organic products, reaching other sectors and affecting the way companies deal with responsibility concerning the origin of the products and the conditions under which they are produced. Businesses that manufacture cosmetics, food products and even clothes are interested in getting certification and traceability in their produc-

tion chains, seeking for greater control and mitigation of risks.

Natura, for instance, which produces and trades cosmetics and personal care products with Brazilian inputs, has its own certification to assure the quality of its final products and proper conditions for producers. 'We aim at the stability of our supply chain in order to manage risks. With clarity and transparency in our chain, we can verify where the risks of supply and even labor conditions are', says João Teixeira, Sustainability Senior Coordinator at Natura.

According to him, the company supports smallholders, not only to certify the inputs needed for production, but also to play a role in training, instruction and support to local development projects and infrastructure. Selected producers in the Brazilian Amazon region have been tracked since 2000, with the launch of Natura Ekos

line, which uses inputs from sociobiodiversity in the region. According to data published in Natura's 2017 annual report, 5,296 families have been benefited, and the plan is to reach 10,000 families by 2020.

'In the beginning, it felt like a kind of 'toll', one additional task so they [producers] could meet the company's requirements. But, as time went by, we were able to show them that caring for the land is important to enable sustainable trade', tells the Supply Coordinator, André Santos de Freitas, who works in the Relationship and Sociobiodiversity Supply Management department, at Natura, Belem (State of Para) and conducts **audits** in the region. For him, in addition to certification being beneficial to consumers, it strengthens the relationship with producers and encourages them to search for higher levels of quality. 'Currently, producers acknowledge

they are capable of transacting with other businesses.'

Another example is Nespresso, who is part of Nestlé Group portfolio and trades espresso coffee machines and capsules. The brand decided to create its own verification process, after having determined there was no system that met the company's quality requirements. According to Guilherme Amado, current Green Coffee Project Manager at Nespresso, the priority is to combine coffee quality assurance with encouraging of best social and environmental practices.

That is why, according to him, the AAA Sustainable Quality Program (**Triple A**) was created, including audits and technical visits to verify coffee production. They assess environmental aspects (such as the water used), social and labor, economic and operational aspects (such as produc-

tivity), among others. 'Traceability tells the story about the life of a product', he says.

In 2016, 2,563 farms were assessed by the program, according to Nestlé Report in the Society. The manager also points out that, using traceability, it is possible to see the entire chain and offer guarantees to consumers, who are increasingly more demanding. The producers' certification process started in 2009 as a demand from consumers.

In addition to that, Amado sees the certification as a tool to improve management, as it promotes a closer relationship with producers, and increases productivity and quality.

New consumer demands can also be noticed in the fashion industry. 'The connection between individual choices and the collective impact they cause, whether social or environmental impacts, is increasingly visible', says Dariele Santos, founder of Alinha Institute. Mrs. Santos had the chance to get to know the reality and poor labor conditions in Sao Paulo and felt the need to change that situation. For that purpose, she created the institute, in order to improve labor conditions and the life of seamsters and seamstresses in small textile factories.

Alinha Institute is a social business that operates in the city of Sao Paulo, offering free consultancy services to factories so they can deploy fair labor conditions. In addition to that, she acts as a link between the factories and the brands interested in paying fair prices and setting feasible deadlines. Brands, on their turn, fund the Institute when they purchase

plans to have access to the Institute factories database and the Alinha label to affix to their products, as a way to assure provenance to end consumers.

HOW TO FIGHT DISTRUST

Behind the search for labels, there is a deeper issue: fight distrust. People need guarantees to believe what is offered. According to the Irish philosopher Onora O'Neill, author of TED Talk *What we don't understand about trust*, 'in the Western culture, and particularly since communication revolution, we have lots of examples of behaviors that were not trustworthy, and hence more regulation, more accountability and more complexity were introduced'.

A survey conducted in 2014 by the World Values Survey shows Brazilians are one of the most distrustful people in the world, ranking in position 55 among 60 countries surveyed. When asked about the options to either trust most people or to be very careful about them, only 7.1% of Brazilians chose the first option.

A poll conducted by Latino-barómetro in 2017 corroborates that information, showing that, out of all Latin American countries, Brazil has the lowest trusting rate, with 7% of Brazilians trusting most people. The ranking contrasts with the fact that, according to the World Values Survey, 93.2% of Brazilians see themselves as generally trustworthy.

The question is: how much guarantee is enough to build consumers' trust? In interviews conducted by our team with people who either consume or not organic food or other products with social and environ-

mental labels, we could notice there are different levels of trust. As O'Neill points out, 'in real life, we place trust in a differentiated way'. There are people who simply trust what others say, and there are people who will not even trust regulations and accountability records.

In the first group, we can find Mariana Cury, the consumer visiting the organic street market in Ibirapuera, mentioned in the beginning of this article. She knows every stand and just about all products offered, and the presence of a label does not make any difference in her purchase decisions. She believes merchants are telling the truth.

Another group of consumers is formed by those who seek the label as a guarantee. Maria Eduarda Loureiro is one of those people. She says she only consumes organic products in the supermarket, and her choice is guided by whether there is a 'Produto Organico Brasil' (Brazil Organic Product) label.

According to a research conducted by Organix in 2017, in nine Brazilian capitals, only 8% of consumers find out the product is organic because of the label, whereas 37% read the information contained on the package, and 27% at the point-of-sale. For 86% of the respondents, the 'Produto Organico Brasil' label is more trustworthy than any other source of information about organic products.

Producers also find the presence of the certificate important to build trust. The President of Rural Farmers Association in Campo Limpo (Aprocamp), Valdir Ataíde Mateus, tells that losing the label for organic production in the outskirts of Para State, due to a

change in the way the audit was conducted, was a great discontentment to all associates. 'We are still growing organic products, but how can we prove our jambu herb is organic if we do not have a label? It is like being a driver and not having the driver's license!' Thus, by losing the label, the trust relationship with consumers was affected.

And the remaining group consists of those who do not trust even the labels. Márcio Hamashira, who has been attending organic products street markets for three years, is one of them. 'I particularly do not believe it is organic', he says. According to him, that distrust is explained by 'the Brazilian people, who usually wants to take advantage of others'. He suspects businesses use agrochemicals but advertise their products as organic. According to Livia Menezes, distrust about everything is a problem in Brazil today. 'We do not trust anything anymore, we do not trust institutions, we do not trust politicians, we do not trust people.'

Consumer Sérgio Pileggi has another point of view. In his opinion, the fact there are many social and environmental certification labels confuses consumers, so they do not know in which label they should trust. But he agrees there is a general distrust in people and processes. According to him, scandals such as the one known as 'Weak Flesh' meat fraud contribute to that distrust, because they reinforce the idea that processes in Brazil are subject to fraud. Hamashira agrees and points out: 'We are not free of a 'Weak Organic' fraud. I do not believe human beings who are issuing the certification', he declares.

In order to minimize distrust,



NETO GARCIA

blockchain can be a solution. Through this technology, consumers can track the entire production chain. André Salem, a blockchain expert, refers to Walmart as an example. In partnership with IBM, Walmart is applying a QR Code to its products. This allows consumers to scan the bar code using their smartphones and view the entire production chain of the product.

The software company Provenance is also promoting a similar initiative. Consumers go to the company website, enter an identification number found on the product and can access a history that Provenance offers in partnership with producers who adopted blockchain. Among the information consumers can access, are the

production date and location, as well as the amount produced.

Innovation provided by blockchain has great potential to be seen as beneficial. The research conducted by the World Values Survey shows that 70.9% of Brazilians think the technological development would generally bring benefits to their routines. That number is higher than countries like the United States (48.9%), Argentina (47.1%), Chile (50%), South Africa (46.9%) and Sweden (46.3%).

However, the application of blockchain divides the consumers' opinions. Consumer Lívia Menezes, for instance, says she would be very interested in knowing the origin of the products she buys through a QR Code or website. 'When we have an application

[that traces back the origin of the products], it offers more security, definitely', she says.

Maria Eduarda points out that having access to the origin of the products would be very welcome, but questions whether consumers would be really interested in that type of technology. She suggests information provided to consumers should not be in a written document format, but rather a video or image, which usually builds more trust. Menezes says that 'if it is something practical, people would appreciate it'. As for Hamashira, he disagrees with both of them. He questions if the price of certified products, such as organic food, which is high, wouldn't get even higher, and if it wouldn't encourage corruption.



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OBSTACLES SMALLHOLDERS FIND TO ADHERE TO CERTIFIED PRODUCTION

Organic production, an important response to meet the growing demand for sustainable products, represents a market opportunity for smallholders and family farmers. But the transition from the **conventional** to the **organic** model is no easy task. In addition to challenges inherent to **family production**, farmers still face obstacles to obtain **social and environmental certifications** that would be like a passport to reach new consumers.

The valuation of organic products and the possibility to participate in street markets and initiatives like the National School Nutrition Program (Pnae) and the Food Acquisition Program (PAA) are very attractive to family farmers. However, the transition to more sustainable forms of production and consumption requires changing economic,

social and cultural standards established by traditional production models, and also requires attention to aspects that go from financing to technical support to enable production.

In the Northeastern and Northern regions, the context is even more alarming: 72% of farmers do not have enough profit to take the family labor to a level above the poverty line, according to a Census conducted by IBGE in 2010, whereas 25% of the rural population lives in poverty, with income lower than BRL 70 per month per capita. In the Northeastern region, 65.5% of the families working in the farms receive Bolsa Família (Family Grant), according to data in the Cadastro Único (Unique Record).

Besides those difficulties, the transition process from the conventional production to the

organic production is slow and costly. It may take up to three years to complete, and often farmers need to have access to credit. According to Roseilda Lima Duarte (Rose), a family farmer who grows organic products in Parelheiros (SP), the challenges persist for those who have already made the transition: because they do not use **agrochemicals**, those types of facilities are more subject to losses, estimated in 30% of the production. In addition to that, it is difficult to access organic inputs, such as manure to fertilize the ground, and there are logistic barriers to sell the food produced.

In order to be sold, organic products need a label as a guarantee. There are certifying bodies that conduct **audits** to attest if the production in a facility complies with international criteria for organic farm-

ing – the work of those bodies is specially critical for farmers interested in exporting food. The supervision of the audit process by accreditation bodies ensures the reliability of the labels in this certification modality.

On the other hand, the cost can be a barrier for smallholders, as explained by Vilson Câmara, an organic farmer in Rede Povos da Mata, Ilheus (State of Bahia): 'We, smallholders, could not afford it, because, at the time, in 2004, a visit would cost BRL 8,000.' The costs of transportation and hospitality incurred by the auditor are paid by farmers, and the investment can be even higher if the process requires more visits.

For the producers in the Rural Farmers Association in Campo Limpo (Aprocamp), in Santo Antonio do Taua (State of Para), the cost of certification made them

lose the label. The audit, which used to be charged per association, started to be charged per farmer, which made the process unfeasible to many associates.

Another point of attention is the proximity with facilities that use conventional farming. The use of agrochemicals in the neighboring areas requires organic farmers to take some actions to avoid contaminating their lands. Contamination can occur through the ground, water and air, when packages are improperly discarded of, when herbicides and insecticides are misused, or when there is aerial dispersion in adjacent properties.

In addition to that, the infrastructure for family farming is often poor. One of the barriers is communication, since there is lack of Internet access and telephony. Production transpor-

tation is often hindered due to poor road conditions. 'One and a half year from now, we will only be able to drive on our road using a tractor. For about three years there have been potholes all over; it takes us one hour and 20 minutes to go downtown. For freight that would normally cost BRL 60.00, we have to pay BRL 150.00, BRL 180.00, due to poor conditions on the road', tells Vilson Câmara about the difficulty for access.

Production planning also requires care from organic farmers. Without using chemical products to ensure productivity, the calculation to estimate production becomes complex and makes planning harder. In addition to that, the management plan of an organic property is very detailed and requires time and dedication from farmers to keep compliance.

POSSIBLE PATHS FOR THE LABEL

To facilitate access of smallholders to the organic market, one of the alternatives that can be explored are the **Participatory Guarantee Systems (PGSs)**. In that certification modality, farmers form groups to mutually support one another in the certification process and in adjusting properties to the organic production, through a joint effort.

According to Câmara, in PGS, 'one farmer oversees the other, they are the ones who certify farmers. As they are present here in their daily routine, they know what the others are doing.' In addition to facilitating access to the guarantee label, that model also offers a beneficial community engagement for producers.



Seu Vilson, from Rede Povos da Mata, in Ilheus (State of Bahia)

DID YOU KNOW?

Data and interesting facts about farming and labels

- The Brazilian agribusiness ranks number 5 worldwide, with great contribution to family farming. Most facilities belong to family groups (84.4%), which accounts for about 4 million units. They account for 35% of the GDP, and employ 74% of the labor in the field, according to the 2006 Agricultural Census.
- Family farming is the major responsible for over half of the production of varieties

such as manioc (87%), beans (70%), milk (60%), and swine (59%), also according to the 2006 Agricultural Census.

- According to the U.N. report on the implementation of SDGs in Brazil, 'fostering family farming contributes to decrease poverty and inequality in the rural area, promote greater diversification and, potentially, enhanced resilience in food production, strengthened food supply and local sustainable development'.
- Social and environmental certifications relate to the topics of two of the Sustainable Develop-

ment Goals (SDGs) established by the U.N., goal # 2, Zero Hunger and Sustainable Farming, and goal # 12, Responsible Consumption and Production.

- Between 2013 and 2016, organic production more than doubled in the country – a growth attributed to an increase in the participation of family farmers in that market, according to data from the Sociedade Nacional de Agricultura (National Agriculture Society).
- Organic products must have guarantee labels to be sold, and those labels are issued by

different bodies, such as Organizações de Controle Social (OCS, Social Control Organizations), Organismo Participativo de Avaliação de Conformidade (Opac, Participatory Body to Check Compliance) and certifying bodies, which are supervised by accreditation entities. There are over 4,000 OCS and over 5,000 Opac operating in the country, according to the Ministry of Agriculture, Cattle Breeding and Food Supply (Mapa), and to the Cadastro Nacional de Produtores Orgânicos (National Record of Organic Farmers).

Another way to support organic family farming is through technical training and access to financing. In that case, there is room for the State and the third sector, with initiatives that contribute to local development. One example of how the Third Sector operates is Taboa Institute, who works with communities in Serra Grande, in Ilheus (State of Bahia). The work of the institute aims at reinforcing sustainable initiatives by granting credit, providing incubation, and strengthening businesses.

The State also offers initiatives, such as the National Policy on Agroecology and Organic Production (Pnapo), whose goal is to mobilize states and municipalities to encourage, strengthen and expand organic production systems. Moreover, the National

Program to Strengthen Family Farming (Pronaf) supports smallholders through different financing modalities, with specific lines to support agroecology and implement technology to make production more sustainable.

However, there are bureaucratic barriers to purchase the Pronaf Declaration of Fitness (DAP), which hinders access to credit. Investments in the sector have also been reduced: the amount of contracts and the volume of credit accessed have also dropped, from 1,988,525 contracts and BRL 19 billion in credit in 2013 to 1,019,716 contracts and BRL 18 billion.

The annual budget of the federal government for 2019, as established by the Annual Budget Law, anticipates a decrease

in investments when it comes to strengthening and boosting family farming (-25.4%) and sustainable farming (-11%).

But, in addition to the importance of public policies in supporting family farmers, businesses play a role in accessing smallholders in the market. The work Natura does with communities that live on agriculture and resource extraction in the Northern regions of the country is an example of that form of sustainable relationship. By incorporating native species into the production of cosmetics, the company provides the communities with training and infrastructure to support the strengthening of those communities in a sustainable operation.

Technology can also be a tool

for farmers to access social and environmental certifications. Currently, applications of the blockchain system have been assessed in different sectors, with potential to simplify the certification processes that, in their different modalities, demand many steps and management of a variety of documents (*learn more in the article entitled **Technology***).

In any case, extending the responsible production – beyond the infrastructure, financing and technical support needs – requires a change in the mindset about the forms of consuming and producing. The transition to that more sustainable model is also a cultural transformation (*learn more in the article entitled **Supply II***).

HOW TO TAKE INTO ACCOUNT CULTURAL ASPECTS OF ORGANIC FARMERS

The transition to more sustainable production forms, particularly in the case of **organic family farming**, depends upon public policies, infrastructure, technical support and financing. The spaces for this type of production have been built to respond to the growing concern with new forms of producing and consuming, as shown in those articles: **Supply I** and **Demand**. In this sense, the transition also requires a cultural change and adaptation to new paradigms.

Use of technology and tools can facilitate access of smallholders to **social and environmental certifications**. However, it is necessary to consider cultural aspects involved in the relationship of farmers with technologies – or any tools available to optimize organic production – and the farmers' peculiar way of getting hold of the tools.

Typically, new technologies seek understanding of time and space, speeding processes and simplifying communication and interaction between people who are physically distant from one another. Technologies such as email brought benefits to the communication between people, when compared to a more obsolete tool, like letters. That transition does not

represent only the adoption of a more efficient support, but also the rearrangement of possibilities individuals have to interact in time and space.

But, what about when you expect to use a technology to optimize a space that has its own time? What about when the relationship of the people with that space go beyond what is produced, and involves deeper aspects, such as purpose and faith, traditions and beliefs?

To turn Brazilian smallholders into active agents in the complex production and consumption chain of organic products and facilitate their access to social and environmental certifications through new technologies, such as **blockchain**, introduces the matter of how to relate with meanings farming and organic production have to farmers. And it also raises a question about how their traditional knowledge is leveraged and boosted by technologies, without being replaced with a vision that is only focused on production.

A MATTER OF DIALOGUE

When we speak about organic smallholders in Brazil, it is worth pointing out the differences between that type

of actor and large farmers who produce using the conventional rationale of **agribusiness**, with many resources and sophisticated technologies.

For smallholders, the contact with the land and the production is something closer, more manual. In addition to that, the role played by farming is key to those families, it is an integral part of their members and their lives as a whole.

To speak about the application of blockchain in the organic production chain in Brazil is to inevitably address its applicability to a way of life and existence, not just work. It is the starting point to discuss issues including access, appropriation and use of technology, farmers' acceptance, and possibilities to adjust the use of technology to their lifestyle and world vision.

A MATTER OF TIME

The speed technology can convey to the most varied processes and the dynamic of conventional production, which needs to be fast to support an intensive consumption standard, does not match the organic production time, which is nature's time.

'We've been working with this

[sustainability] since 2000, because it is about the importance of balancing the ecosystem. If there are rats in the field, snakes eat them. When ants start flying, birds eat them. So, you must work on fauna and flora at the same time. That is what makes the environment sustainable. It is to live well in a good environment, to live well with nature', says Vilson Câmara, an organic family farmer of Rede Povos da Mata, in Ilheus, State of Bahia.

Organic family farming sees the land as a living organism that must be respected. It is not the peaks of demand that command production pace, but rather the possibilities of cultivation offered by each season throughout the year. Whereas the agribusiness rationale follows a market calendar – a year divided into 365 days and a population that demands all kinds of food throughout the year –, organic farmers are driven by the seasons of the year.

Whereas conventional farming needs agrochemical and artificial production systems to adjust nature's time to the demand's time, organic farmers must know rain and dry seasons and know what is possible to produce in each period. It is necessary to prepare the composting, fertilize the



Organic farmer in Manaus

land, plant. And, according to farmer José Rodrigues Pinto, a member of the Associação dos Produtores Orgânicos do Amazonas (Apoam, Association of Organic Farmers in the Amazon), it is necessary to really believe each seed will become a plant that can be served as food to the family, or a source of revenue, traded in organic street markets in the city.

Also, another example of that connection with nature, in areas of family farming visited by the group in Belem, such as the group of women Rede de Economia Solidária e Feminista (Resf, Solidarity Economy and Feminist Network), the harvest of many plants – which are directly sold to Natura – has a greater meaning. It is a ritual, which first requires a ceremony of thanks called Priprioca. That dynamic with time positions nature not as a resource

to be explored, but rather as a critical agent that enables life and should be, above all, watched over and valued.

A MATTER OF PURPOSE

Purpose is another important concept to understand organic and responsible production. 'Producing organic food is not like wearing a T-shirt. If you change teams, you change your T-shirt. Here we do things with our hearts', says Câmara.

Often, the motivation to start producing organic food is to have the work more valued, because organic products offer an average potential gain around 30% higher for farmers. But finding out the importance of that type of production for the environment and for the health of population is what keeps families of farmers producing organic food.

The feeling of having a purpose, which is so valuable for farmers, becomes part of a cosmopolitan, i.e.; a world vision and a way to conceive reality. Cosmopolitan refers to a set of values, beliefs, conceptions and, especially, feelings that emerge regarding the way beings see the world before their existence.

Câmara, who lost his property certification label for a while, decided to continue producing organic products. 'Let's do the right thing. (...) Let's work with clean farming, selling health to our customers. And, actually, eating healthy, because we only eat what comes from the property, so we know it is clean food, and we will live better', he declares.

Acknowledging the importance of the work they do and sharing that pride with family members is a critical factor for organic farmers – particu-

larly for young people, who see organic production as a possibility to value the work and to have better life conditions.

Therefore, it is not enough to provide the necessary infrastructure (such as Internet access, mobiles and computers), offer training, and apply blockchain hoping to solve the organic chain in Brazil. It is necessary to understand that projects like that will greatly affect the way smallholders live and, thus, keeping that in mind, one must first understand their reality and respect it. As well as blockchain operates according to the so-called **consensus rules**, some assumptions must also be made when applied to organic production: full respect to the beliefs, values, traditions and lifestyles of farmers.

Learn more watching the videos in **Drops**.

LABELS GAIN MOMENTUM IN THE PRODUCTION CHAIN

Located behind a white gate, on a narrow dirt road that crosses BR462, you can find the farm that belongs to Arinaldo Ribeiro de Oliveira, commonly known as Seu Arinaldo. The property is located in an area known as 'Cerrado mineiro', a region that is popular as one of the largest coffee producers in Brazil and spans a total of 210,000 hectares of production area. The farmer, who was born in the municipality of Patrocínio, Minas Gerais State, lives on his small 15-hectare farm, out of which 11 hectares are exclusively dedicated to coffee plantation. For over 40 years he's been supporting his family with the money he earns selling his production, and one of his major customers is Nespresso, from Nestlé Group.

Seu Arinaldo's farm has not been certified yet, but, to be able to produce coffee for Nespresso, it had to start complying with the 'AAA Sustainable Quality Program' – widely known as **Triple A**, a number of basic production criteria required by Nespresso that attest

the property's environmental and social sustainability. Currently, he has been doing all he can to adapt his farm and qualify it to obtain Rainforest Alliance certification label, a type of international **social and environmental certification** whose goal is to ensure diversity, product quality and sustainable livelihood in the property. But why is obtaining the cert

The social and environmental certification is an instrument created to test and assure best practices in the facilities. The demand for that type of instrument came directly from consumers, in search for the assurance that, when buying a certain product, they would not be indirectly encouraging environmental or social damages. In other words, consumers wanted to be assured that they would not be polluting rivers and land when buying a cleaning product from an industry that does not properly discard sewage, for instance, or that, by replacing their clothes, they would not be buying clothes from a factory that uses child

labor or slave-like conditions. That type of concern led to the creation of certification labels.

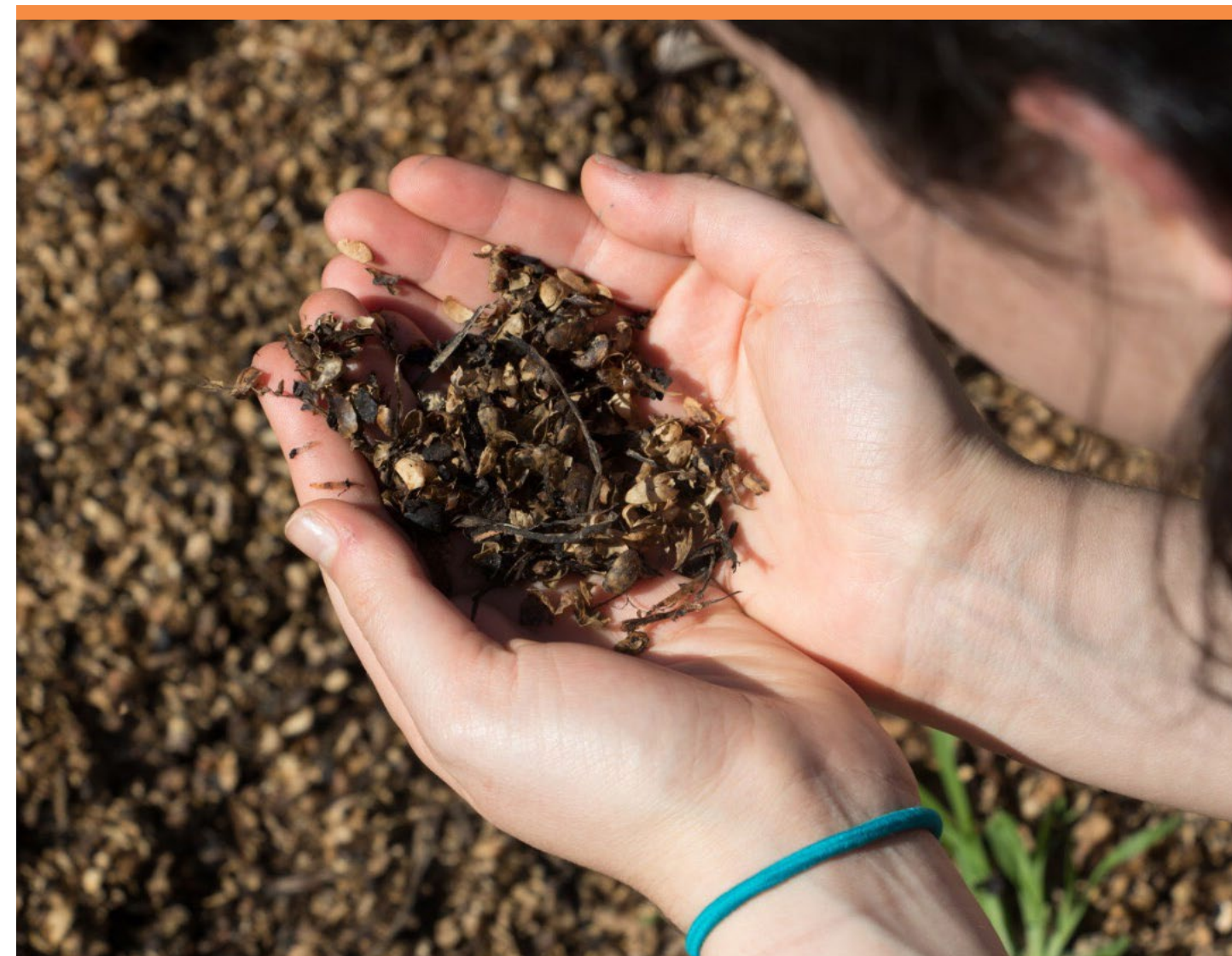
Large businesses like Nespresso and Natura, committed to keeping their values and concerned with being part of a production chain involving suppliers with dubious practices, decided to adopt more stringent criteria to select their suppliers, elaborating their own production standards (as is the case of Triple A at Nespresso), or only buying products from facilities that have social and environmental certifications. Thus, even though Seu Arinaldo can provide coffee to Nespresso, getting the Rainforest certification label would open up more doors to the farmer, ensuring international recognition of the quality of his product and, mainly, the social and environmental sustainability of this property.

For coffee production chain, the most popular certifications in Brazil are UTZ and Rainforest Alliance, according to Guilherme Amado, Green Coffee Project Manager at Ne-

spresso Brazil. Those labels first appeared in the country in 2002, a time when the farms started to adjust to different demands that emerged from consumers, and have been increasingly requested (*please read more in the article entitled **Demand**, and access the video on certification in **Drops***).

To control and maintain certifications, properties must go through audit processes. According to Amado, there are two types of audits: individual audits, conducted on a single property, and the ones conducted in a group, involving many properties.

Individual audits are conducted twice a year: an internal audit, conducted by an agronomist from a cooperative or exporter (trader) of a specific product; and an external audit, conducted by the Instituto de Manejo e Certificação Florestal e Agrícola (Imaflora, Forestry and Agricultural Management and Certification Institute), a representative of Rainforest Alliance and of the major cer-



tification labels in Brazil. Both processes aim at checking whether a specific farm still meets the criteria established by the label it is certified with.

As for collective audits, although the process is similar in some aspects, the difference is that the process is conducted with a sample, and there is co-responsibility between members that belong to that group: one or more farms that form the group are randomly selected for the on-site audit. In case of any non-compliance in any member farm, all the others will be accountable, too. But there are also benefits, such as reduction in the price of audit, and a collaborative knowledge created by the group.

To conduct audits, properties must properly follow the processes of traceability which, by definition, is to keep records of a process, whether it is physical or financial. However, regardless of the type of traceability we are talking about, it is necessary to take notes of all the processes and circumstances of production.

On Seu Arinaldo's farm, for instance, there is a certain amount of coffee fields. Before harvest, it is necessary to write down all that occurs in each field, from levels of soil moisture to the presence of crop protection. As soon as the product gets prepared for drying, it is controlled once again, now with measurements of

weight and size. Traceability of the chain of custody continues throughout the process, tracking all steps and changes that might eventually occur with that product. All the information is written down, compiled and shared with the auditor annually, enabling him or her to assess the performance of their 130-lb (60 kg) coffee bags.

One of the great issues is exactly that the **traceability** process is performed manually, becoming a time-consuming stage, with low level of efficiency. César Júnior, an employee at Stockler, a coffee exporter and trader, says the process could be much easier, if integrated into an application, and maybe this is the major bottleneck of

certified production processes.

A great challenge is to obtain the certification for smallholders, such as Seu Arinaldo, even though it is a group audit. As the criteria are stringent, it is very costly to maintain the standards required and, at the same time, afford the value charged for the certification audit. Given that scenario, farmers have been seeking new ways to obtain the recognition of origin for their products.

Production of agroecologic and organic goods has many requirements, assessing a number of items, from the products used on the soil, such as natural fertilizers and crop protection, to a sustainable relationship not only with the environment, but above



all with society. The need to assure the products comply with the standards required boosts the creation of different forms of certification of those processes.

For farmers, certification is seen as a way to add value to products, making them more attractive in the market and enabling increased profitability in sales. With the labels, products gain higher reliability on the shelves, allowing for enhanced sales.

'If we had the certification, we would be able to sell our products in Manaus and increase production, bringing more people to work with us', points out Maria de Jesus Pascoal, an organic farmer in Manaus.

Maria de Jesus is an organic farmer who does not have a certificate for her products yet. According to her, the certification process is hard, since there are many requirements with which smallholders should comply. According to Law 10,831, as of 2003, popularly known as 'Organic Product Law', for a product to be sold as organic it must have a certificate granted by a legally recognized institution.

However, in case of direct trade

between family farmers and consumers, certification may be optional. For this to be feasible, it is necessary for farmers to be 'inserted into proper processes of organization and social control, previously filed with a supervisory body', as established by Item I in Article III.

This enabled another form of certification, the **Participatory Guarantee System (PGS)**. That system is formed by Organizações de Controle Social (OCS, Social Control Organizations), and each one of them has their own base groups. The base groups, on their turn, are formed by small groups of family farmers who will jointly monitor the production processes. Each group is assigned a collective responsibility, and all members are responsible for ensuring the production stages are performed according to the norms established by law. That system consists of granting a collective certificate to the group members. More than that, it is an empowering system for smallholders.

In this certification system, there is a mechanism of peer visits, in which the members themselves, followed by two or more technical people, pay

annual visits to the properties of group members. Those visits work as a verification of the properties. In addition to that, all farmers must present an Organic Management Plan, specifying the productive areas, the crops grown, among other specificities.

The Ministry of Agriculture, Cattle Breeding and Food Supply (Mapa) conducts an audit sampling on the Participatory Guarantee System, to check whether the system complies with the legislation. PGS follows the same rationale of collective audits; if one of the OCS members does not comply with the standards, the whole group will lose the certificate. As mentioned, not only environmental aspects and use of agrochemicals are assessed, but also social aspects during production processes.

José Rodrigues Pinto, a smallholder who is a member of the OCS Associação dos Produtores Orgânicos do Amazonas (Apoam, Association of Organic Farmers in the Amazon) and a member of the PGS Associação Participativa (Maniva Association of Participatory Certification), lists the items observed during peer

visits. He highlights some of them: if there is waste spread throughout the property posing any risk to contaminate the produce; if there are dogs, specially in the areas greenery is planted; if the produce is sanitized before going for sale; if labor is outsourced or done by family members; and if there are children helping their parents while they should be at school.

That alternative certification system reinforces trust between OCS members. Since it is a co-responsibility system, PGS fosters a rationale that is actually reverse to certifying bodies. There is no hierarchy; instead, there is cooperation between members.

According to Mariana Gama Semeghini, from Rede Maniva, the greatest strengths of PGS are participation and the process of training, integration and empowerment of all members (farmers, technicians, students, managers, consumers), specially farmers. In addition to that, she points out international recognition as one of the major challenges of the system, because the PGS, created in Brazil, is not recognized in other countries.

WHAT IS BLOCKCHAIN AND HOW IT IS APPLIED TO CERTIFICATION

Ten years ago, an unpretentiously rationale capable of revolutionizing business and somehow transforming human interactions emerged: **blockchain**. Having as its foundations the democratic access to information and each individual as an integral part of the process, one can say that concept brings in itself a disruptive potential and can be applied in different ways.

Blockchain is similar to other two types of technology that are present in our daily lives: electric power and the Internet. Two economists – Boyan Jovanovic and Peter Rousseau – used the term 'general purpose technology (GPT)' to compare electric power to the Internet, two technologies that changed human relationships, the way of thinking, and power relationships. In this sense, some critical blockchain characteristics, such as control decentralization and distribution of infor-

mation, give more autonomy and power to users involved.

Blockchain is a rationale used for organization, validation of information and transactions concerning currency, processes or documents. It is a distributed form, in which people in the network can directly transact with one another, peer to peer. There are not third-parties or intermediaries in that type of transaction.

The rationale acts as a public 'record', a permanent virtual space where all information between the group of people that form that 'place' is stored. 'People share information that is contained in the same **ledger**, where the accounting transactions are made', says André Salem, blockchain expert (*please see the video with the interview in Drops*). In other words, all participants in the network, such as producers of goods and services, consumers and certi-

fying bodies, have the right to access the same information.

Each group within the blockchain previously establishes how to validate the information inserted in the network, and this will be equally applied to everybody – therefore, a rule of consensus is created. Once they decide to participate in a certain network, they agree with the operation rules. In addition to that, another blockchain characteristic is the security in information chaining.

As explained in the video, the consensus between them, which is automatic, given by an algorithm, validates the transaction and generates a block. 'This block is my transaction with yours, plus everybody else's validation. The next transaction to occur in that network, not necessarily mine and yours, will generate a following block. And that block brings information from the old block'. It is, there-

fore, a mechanism to add trust to an 'insecure environment'.

Blockchain allows for not only transparency in the processes themselves, but also in the information present there, preventing modification or fraud. Another element to offer security is the fact that blockchain is based on encryption (an internal language of codes), in such a way that all information that enters the network is translated by the internal language and cannot be read by 'nonmembers'.

For a technology to be considered general purpose, three conditions are required, and blockchain also seems to fit in that aspect. First and foremost, the technology should be able to be improved, i.e.; to be enhanced as time goes by. Another condition is that it should be able to invent and produce new products, processes or even new technologies. Lastly, it should spread to different sectors of the economy.

IN PRACTICE

In addition to applications in the agricultural sector, blockchain is being used worldwide in many other fields: transportation, banking, elections, power distribution, and even music. And also in Brazil. One example is the company [Caipira Express](#). That e-commerce of handmade food in Araxá (State of Minas

Gerais) uses blockchain to certify and validate the provenance of cheese, tracing back the entire production and distribution chain. Thus, consumers can visit the company's website, enter the identification of the cheese they purchased, and have access to information, such as details about the input, manufacturing place, and people responsible for their production and resale.

Another organization that uses blockchain to ensure the product quality by tracing back the entire production chain is Walmart, jointly with IBM. André Salem gives as an example the consumption of spinach, and explains the process: spinach reaches the supermarket aisle with a QR Code and, when consumers want information about the entire input production chain, all they need to do is turn on their mobile's camera and point it to the code assigned to the product.

Blockchain could be applied both to a [Participatory Guarantee System \(PGS\)](#) and to certification audit. The differences would be only the consensus rules; a certification [audit](#) would be more centralized in its validation form, if compared to a PGS ([read more about the topic in the article entitled Certification](#)).

In a model of certification audit – either individual or collective – an external agent is responsible

for certifying certain characteristics of one or more products, or even batches of a given product. The auditor may work for profit or non-for profit, but what matters is that he or she represents the consensus rule. There is also a modality in which a group of farmers is responsible for self-certification through a control system in which they pay for the costs themselves.

In a PGS system, neighboring farmers are divided into groups and make technical visits to the properties of system members in order to 'certify' their agricultural practices. Thus, that type of model is naturally more distributed in its consensus rule and it is easier and more feasible to use blockchain.

Questioned about the difficulties in the certification process in a PGS, Roseilda Lima Duarte (Rose), a family farmer and a member of Cooperapas Agricultura Orgânica, located in Parelheiros, in the South Zone of São Paulo, says: 'Just like many farmers, it's hard for me to use the computer. There are many reports to fill out. Besides, my Internet connection here is not good.'

'In fact, communication is still a problem. If you walk by a house in the rural area and happen to see a person on the roof, don't you think he or she is fixing the roof, no, that person is looking



for signal to try to communicate', says Vilson Câmara, an organic farmer in Ilheus (State of Bahia).

But let's imagine smallholders use blockchain. They could have an application on their mobile with a template for a certification report, on which they would write down what has or has not been done, in addition to making specific remarks, and they could save the file on their own device. That process would not need to be completely online; whenever a farmer got to a hotel in a place with Internet connection, he or she could download the file from the blockchain network.

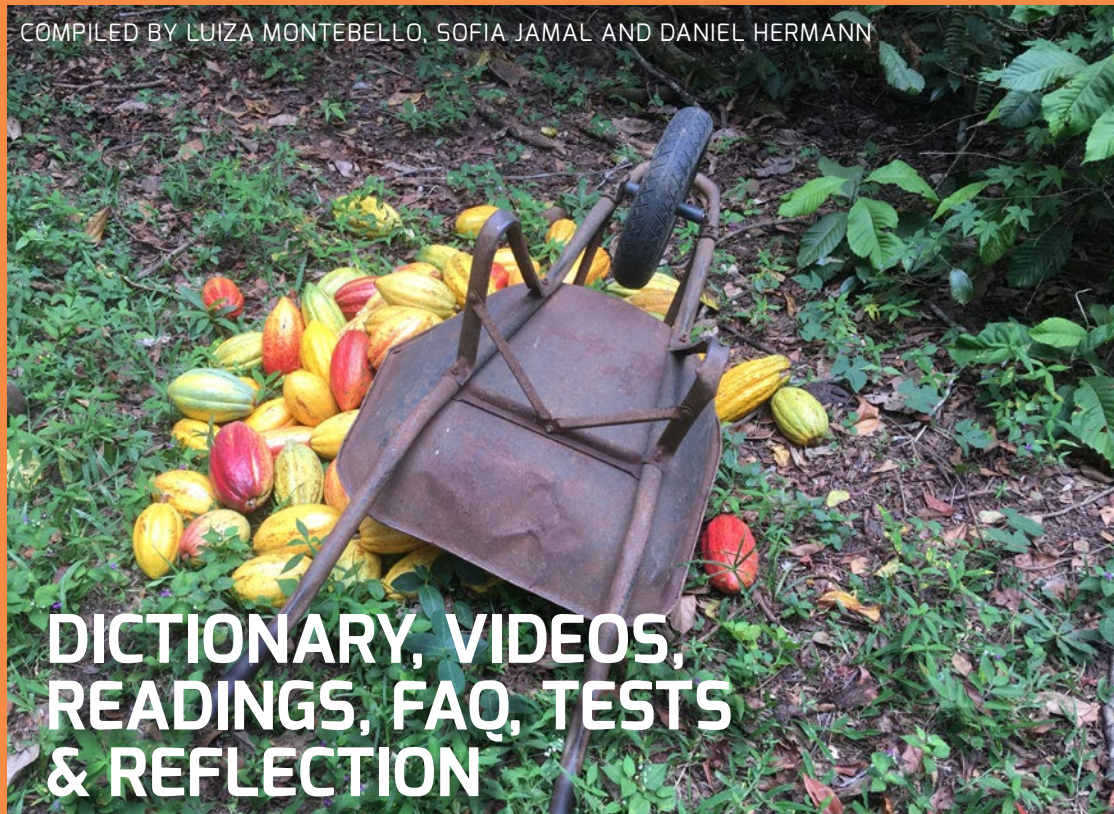
All members of Cooperapas, for instance, who issue an organic certification using the PGS model, could benefit from using blockchain. With the development of an application and us-

ing the network, it would not be necessary anymore to store all your documents and reports at home or in some physical location as it is currently done. Another farmer from another Cooperapas group could have instant access to a certification issued recently by Rose's group. Looking at it from a different perspective, consumers who are part of the network would be able to identify the origin of a product more easily; or, else, the route of the products could be allocated in a more efficient manner.

In this sense, both models can be beneficial in different ways. In addition to providing enhanced transparency to all members in the network, both allow to reduce operational costs, gain more reliability with other agents and include smaller players, such as smallholders.

Blockchain, which emerges as a globally revolutionary technology, also affects the local level, being able to provide a number of benefits to different sectors in the society. But, beyond technical aspects, introduction of blockchain into the scenario of small production can bring other consequences that should not be neglected.

As stated by the sociologist in his book entitled *Post-Urban Landscapes*, 'the introduction of a new medium in a culture changes the 'sensorial balance' and, consequently, the forms and practices of interactions'. It is a reference to Marshall McLuhan's idea that 'the medium is the message'. And it is a warning to point out the introduction of new technologies should also be thought of in terms of culture ([please read more about the topic in the article entitled Supply II](#)).



DICTIONARY, VIDEOS, READINGS, FAQ, TESTS & REFLECTION

> Dictionary: Find out the meaning of expressions and acronyms used in this edition

AAO – Associação de Agricultura Orgânica (Organic Farming Association), founded by the Agricultura Alternativa (Alternative Agriculture) group in 1989. It was the first Brazilian NGO to establish organic production norms focused on the local reality of smallholders.

Agribusiness – Commercial and industrial relationship that permeates agricultural production chains. The expression is often used to refer to significant players who use conventional techniques, machines and inputs, such as agrochemicals and chemical fertilizers in production.

Agrochemicals – Products and agents present in physical, chemical or biological processes used in production, storage and processing of agricultural products, pastureland, pro-

tection of forests, both native and planted, and other ecosystems and urban, water and industrial environments. Their purpose is to change the composition of flora and fauna, to avoid the damaging action of living beings considered harmful. Substances and products used as defoliants, desiccants, stimulators and growth inhibitors are also considered agrochemicals (Source: Mapa).

Agroecology – A set of practices that incorporate social, political, environmental, cultural, ethical and energy issues into sustainable farming. It aims to resume the production method adopted before the Green Revolution.

Agroforestry System (AFS) – A production mode that adopts old forms of cultivation, combining multiple tree species with the cultivation of food and cattle breeding.

Audit – The act of examining and proving the activities conducted by an organization. For

product sourcing, it aims to find out whether the entire production chain followed the standard predefined by the industry. For organic products, it validates no agrochemicals were used, for example. In the fashion industry, it checks whether labor conditions are proper and do not use slave labor.

Biodynamic Farming – A farming production model conceived by Rudolf Steiner, founder of Anthroposophy, in 1924. It is different from organic farming because, besides not using agrochemicals, GMOs or hormones during production, it also takes into consideration the integration and harmony of all agricultural activities conducted in the same property.

Blockchain – A decentralized system of networked users where there is no middleman to conduct and validate a transaction. Everybody is allowed access to current information, with no right to change it, but able to trace it back to

its origin, which conveys confidence to the data entered.

Complexity – A field that studies how a certain system interacts in the world. Those systems are seen as complex, because they consist of different organisms that do not follow a pattern within the environment. However, they are also somewhat interdependent, since there is no clear boundary determining where one starts and the other ends.

Conscious Consumption – A form of consumption that seeks to maximize positive effects in social relationships, in nature and with yourself, and minimize adverse impacts (Source: Ministry of the Environment).

Consensus Rule – Rules agreed among the participants of a given system that determine whether the transaction is valid.

Conventional Farming – A farming production method that uses chemical products and agrochemicals.

Family Farming – A farming production method in which the management of the property is shared by the family, and agricultural activities are the main source of revenue (Source: Mapa).

Floresta em Pé (Standing Forest) Project – An initiative that encourages sustainable production and extraction in riparian communities, aligning environmental conservation with economic development in those areas.

Geographic Indication – The place that is well known for the production of a certain good or product. The Industrial Property Law # 9,729 says geographic indication is the 'indication of provenance and denomination of origin, and it assigns Inpi (National Industrial Property Institute)

with the competence to establish the conditions for recording geographic indications in Brazil'. (Source: Ministry of Industry, Foreign Trade and Services)

Green Revolution – A set of practices and technologies that changed agriculture, increasing production of food worldwide. It started in the 1950s, in Mexico, where the first agrochemicals were developed to fight a pest that was adversely affecting corn production. In spite of the initial benefits of the Green Revolution, there was a lot of damage associated with the exponential increase of agrochemical use in agriculture, such as: high level of environmental degradation, increase in use of water in plantations, and reduction of genetic diversity.

IBD – The Instituto Biodinâmico (Biodynamic Institute) is the major certifying body conducting audits throughout Latin America. It is a Brazilian company that provides inspection and certification services to the following segments: resource extraction, agriculture and livestock, organic and biodynamic products.

Inmetro – The Brazilian National Institute of Metrology, Quality and Technology is an autonomous federal agency responsible for checking compliance with technical and legal norms, when it comes to measurement units, measurement methods, materialized measures, measurement instruments, and pre-measured products, among other tasks.

ISA – The Instituto Socioambiental (Social and Environmental Institute) is an NGO established in 1994 with the goal of proposing solutions to social and environmental issues in an integrated manner.

Ledger – Records of all trans-

actions made in a certain system or organization. For blockchain, the ledger is shared among all participants. There is no such a thing as a central institution, and everyone can access the same information.

Mapa – Ministry of Agriculture, Cattle Breeding and Food Supply.

MDS – The Ministry of Social Development has a social protection program to fight extreme poverty.

Middleman – "Free" traders who pass the goods forward. They take goods from producers to consumers.

Mining – Concerning blockchain, it is a process to check transactions according to the consensus rules within the bitcoin system. Users make their computational power available for that task, and are rewarded within the network for having done so.

OCS – Organização de Controle Social (Social Control Organization). Aims at assuring quality of organic food from family farmers in direct sales.

Opac – The Organismo Participativo de Avaliação de Conformidade (Participatory Body to Check Compliance) is considered the entity who is formally responsible for the activities conducted within a **PGS**, and is also in charge of overseeing the system.

Organic Farming – Please refer to **Organic Products**.

Organic Products – Products obtained in an organic system of agricultural production or from a sustainable extraction process that does not harm the local ecosystem (Source: Mapa). They can only be sold as organic products if they are certified, except for farmers

who trade directly with consumers, which does not eliminate the need for registration as part of social control organizations along with Mapa.

Organis – The Brazilian Council of Organic and Sustainable Production that aims at developing the organic products sector (organis.org.br).

PGS – The Participatory Guarantee System is a system through which organic smallholders mutually supervise one another, assuring food is produced according to Mapa rules.

Pnae – Programa Nacional de Alimentação Escolar (National School Nutrition Program). A federal government project to offer food in public schools and take action to foster students' nutrition education.

Pronaf – Programa Nacional de Fortalecimento da Agricultura Familiar (National Program to Strengthen Family Farming). It offers funding for deploying, expanding or modernizing production, specifically targeted at family farmers.

QR Code – A quick response code that can be 'read' by most smartphones. Once decoded, this code can redirect users to texts or external links, allowing them to have additional information about a certain product, news feature, among others.

Rainforest Alliance Certified Seal – An international certification that can be applied to any agricultural product in tropical countries, assuring a sustainable production management. It is a Rainforest Alliance seal, but it can also be issued by other auditors, as long as they comply with the standards.

Resource Extraction – Activity

of extracting natural resources from planet Earth. It can be manually performed, or machines can be used. (Bioextraction: sustainable extraction of natural resources. Neoextraction: aggressive extraction of natural resources.)

Responsible Consumption and Production – Theme of the 12th U.N. Sustainable Development Goal (Ensure sustainable consumption and production patterns). The target is to reduce by half the waste of food per capita worldwide and achieve environmentally sound management of chemicals and all waste (Source: U.N. Brazil).

Sebrae – The Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (Brazilian Service to Support Micro and Small Businesses) is a privately-owned organization that aims to bring long-term competitiveness and development to those organizations. (goo.gl/7tdJyp)

Smallholder – A person who lives in the rural area and has the possession of a piece of land no larger than 50 hectares, and explores it with his or her own labor and family members' labor. Potential help from other people is considered, as well as collective land possessions, as long as the individual fraction does not exceed 50 hectares. At least 80% of their gross revenue must come from agriculture, cattle breeding, forestry or rural resource extraction activities or use' (Source: Law # 11,428, Chapter I, Article 3, Item I).

Social and Environmental Certification – An economic instrument to differentiate products that comply with norms and criteria agreed to both in Brazil and abroad. It was created aiming at encouraging changes in production modes,

associating superior quality to sustainable products (Source: AGEITEC - Embrapa Technological Information Agency).

Subsistence – A set of resources critical to the life of any human being. In subsistence farming, farmers produce all they need to survive.

Sustainable Development – Development capable of meeting the needs of the current generation, without compromising the ability of future generations to meet their own needs (Source: Brundtland Commission Report).

Sustainable Development Goals (SDGs) – Act as guides to create national policies and international cooperation. The idea is that they will guide the national and international relationships until 2030, replacing and updating the Millennium Development Goals (MDGs). There are 17 SDGs in total, among them: eradication of poverty, fight against climate change, and responsible consumption and production. (Source: Itamaraty)

Sustainable Forest Management – Forest management aiming at economic, social and environmental benefits, respecting the mechanisms that support the corresponding ecosystem. It consists of using multiple timber species, multiple non-timber products and sub-products, as well as other forest goods and services, cumulatively or alternatively. (Source: Ministry of the Environment)

Traceability – An expression that indicates the ability to detect an object. For blockchain, it allows for tracking the whole production chain of the good, from the origin of its inputs to sale to end consumers. You can even find out how many units were produced.

Triple A – AAA Sustainable Quality Program. It attests the product complies with Nespresso's basic requirements, not only the environmental ones, but also social and quality requirements.

> 29 RESOURCES YOU MUST READ OR WATCH TO LEARN MORE ABOUT BLOCKCHAIN, CERTIFICATIONS, SMALLHOLDERS AND FOOD

Hint: to have some of the contents translated into your preferred language, use the Google Translator tool (how to enable the tool: goo.gl/ZWtYtc). For YouTube videos, you can generate automatic subtitles in your preferred language (please see how to do it: goo.gl/KShHq5).

1. Blockchain: Revolução tecnológica à vista no setor de serviços (Blockchain: A Technological Revolution is Coming in the Service Sector)

With its launching expected for January 2019, the book written by FGV EAESP professors Eduardo H. Diniz and Adrian K. Cernev will show step by step how blockchain was created, through bitcoin, explain how the technology works and why there is so much fuzz about it.

2. "Bitcoin: A peer-to-peer electronic cash system"

Published in 2008, this was the first article to mention the use of bitcoin as a virtual currency, and it also coined the term blockchain. The author is Satoshi Nakamoto, the creator of both technologies, and it focuses on cryptocurrency applications from a decentralized market.

3. Banking on Bitcoin

The documentary (goo.gl/MfncrN) explores the early stages of blockchain and its relationship with cryptocurrencies. It shows how transactions are made through that new technology how were the speculations in the cryptocurrency market. The independent production is available on YouTube and Netflix.

4. Explained Series – Cryptocurrency Episode

In 14 minutes, the Netflix episode Explained covers the context in which the cryptocurrencies emerged and their role in the creation of a decentralized value exchange operation structure. It also reveals how blockchain works, the technology behind the cryptocurrencies that has potential for applications that go way beyond digital currencies.

5. Deep web

The documentary (goo.gl/GM-bJFz) tells the history of rise and fall of one of the major networks that traded illicit products (particularly drugs) called Silk Road, from the deep web (non-visible part of the Internet), in a decentralized manner. Among the topics covered, there is the formation of a 'hacker ethics' and the ideology behind selling and buying those products, linked to a system paradigm shift. In addition to that, the documentary shows how the CIA and the FBI chased the person 'responsible' for the network, and discusses privacy as established by the Fifth Amendment of the U.S. Constitution. The documentary is available on Netflix and also on YouTube.

6. Blockchain: the solution for transparency in product supply chains

This article (goo.gl/KUkhSe)

describes the blockchain prototype used by British startup Provenance, who seeks to reinvent supply chains in the economy through technology. There is a case study (goo.gl/v9oEXu) about Soil Association Certification, who uses blockchain to certify the food production chain.

7. McKinsey Articles

The article entitled 'Blockchain explained: What it is and isn't, and why it matters', published by the American consulting firm, features a podcast with future projections about the use of blockchain in a number of economic sectors. The interview is dynamic and uses interactive images (goo.gl/EtJdV1).

The second article, 'Blockchain beyond the hype: What is the strategic business value?', also available on the consulting firm website (goo.gl/Km-npEj), helps business understand better the opportunities to create value associated with blockchain implementation and whether it is worth it to invest in the technology.

8. Medium: 'Why Blockchain is Hard'

Differently from most articles that discuss the positive changes blockchain can cause, this article (goo.gl/ZKuYGY), written by programmer Jimmy Song, shows a debate about the obstacles to implement that technology and if, in fact, it represents a disruptive change.

9. Blockchain, que revolução é essa? (Blockchain, what kind of revolution is it?)

Changing the format a little bit, this video (goo.gl/XAGnSB) on YouTube channel, You Report, features an interview with Carl Amorim, an executive at Block-

chain Research Institute Brazil and coeditor of the book *Blockchain Revolution*. In the interview, Amorim tries to answer what that technology is and what is new in it for different social and economic segments.

For those willing to delve deeper into the subject, the channel has four other interviews available about the topic.

10. TED: How the blockchain is changing money and business

In this TED Talk (goo.gl/hjwJ2B), researcher Don Tapscott helps debunk the myth of blockchain and understand it. According to him, it represents the second Internet generation and has the power to change the way society relates with money, government and business.

11. YouTube Channel: IBM Blockchain

IBM is an example of a business that develops blockchain solutions, reported through presentations and case description on a YouTube channel. It is worth exploring the channel in order to understand how blockchain is capable of making the supply and food chains more reliable.

We highlight two videos:

IBM and Maersk demo: Cross-border supply chain solution on Blockchain – example of blockchain solution adopted by container shipping company Maersk (please visit goo.gl/nfRtsV).

IBM Food Trust – Explores possibilities to use blockchain associated with the food chain (please visit goo.gl/RHmKRi).

12. CB Insights: 'Major Links In The Global Trade Supply Chain That Blockchain Could Transform'

For those who were interested in the video about the case that applied blockchain at Maersk, the text published by CB Insights consulting firm explains in further details the changes technology will cause in marine supply chain. Please visit goo.gl/vtTTYW.

13. The Economist: 'Could blockchain save the Amazon rainforest?'

The video published by the British magazine The Economist brings blockchain close to the Brazilian scenario, showing how the technology would contribute to conserve the Amazon Forest. One of the effects would be to raise consumers' awareness about the origin of their products, even reducing cases of biopiracy. Please visit goo.gl/Kjdmnp.

14. Produtos Orgânicos – Sistemas Participativos de Garantia (Organic Products – Participatory Guarantee Systems). Ministry of Agriculture, Cattle Breeding and Food Supply.

The guide published by the Brazilian federal government seeks to inform organic farmers about the operation and importance of Participatory Guarantee Systems (PGS). Please visit the publication: goo.gl/EF4kQ.

15. IBGE – Censo Agro 2017 (Brazilian Institute of Geography and Statistics – 2017 Agro Census)

Although the results of the most recent census are not totally available on the Internet, some pieces of very useful information have already been uploaded on the platform and are sorted into four different groups: farming, cattle breeding, farmers and facilities. You

can explore maps and graphs here: goo.gl/X1b1ja.

For more information about agriculture in Brazil, please access IBGE maps: goo.gl/5eM359.

16. Put It on the Table Project

A FGVces initiative sponsored by Citibank Foundation, the Put It on the Table Project has the purpose of including smallholders in the production chain. Thus, it encourages greater transparency in consumption relationships, so family farmers are present in that new and fair production chain: goo.gl/abH2HR.



17. A Guide of Organic Street Markets

The website mapped organic street markets nationwide. By using an interactive map, users can find information about the operation of each one of them. The guide also provides healthy recipes and broad literature on organic products. Please visit feirasorganicas.org.br.

18. Article: 'Agricultura familiar, desafios e oportunidades rumo à inovação' (Family Farming, Challenges and Opportunities Towards Innovation)

The publication describes the reality of family farmers, changing inaccurate ideas society has about the job. Also, it shows data on food production per smallholder in Brazil, among others. The author is Daniela Bittencourt,

coordinator of Embrapa's Family Farming Program. Please visit goo.gl/2w4F4P.

19. Roda de Carimbó (Carimbó Dance Circle) (Aprocamp)

The 'Pataqueira Song' is the music Aprocamp farmers sing to plants, like a ritual, in Santo Antonio do Taua (Para State, Brazil). The singer is Dona Maria da Graça, a member of the association and of the Rede de Economia Solidária e Feminista (Solidarity Economy and Feminist Network): check it out on youtu.be/tw6W3vrU7jE.

20. O Globo newspaper: 'Orgânico por um bom motivo' (Organic for a Good Reason)

The article describes the fast growth in the consumption of organic products worldwide, and more slowly in Brazil. It shows how an increase in consumption pushes product prices down, making them more affordable. Please read on goo.gl/tb342G.

21. Página22 magazine: 'segurança alimentar e saúde' (Food Security and Health)

In an interview to *Page 22* magazine, Sebastião Wilson Tivelli, a researcher of the Agência Paulista de Tecnologia dos Agronegócios (Apta - Sao Paulo Agency of Agribusiness Technology), from the Secretary of Agriculture and Food Supply in the State of Sao Paulo, answers about the importance of origin-based labels in food and also about food security in Brazil. Please read on: goo.gl/9z165P.

22. Okja

The film, which shows the friendship between a girl and her super pig, reflects on greenwashing and how animals are

treated in the meat industry. To learn more about the film, *Page 22* magazine published a review addressing issues related to the meat industry and environmental balance. Please check it out on goo.gl/H6QMgY. The film is available in Netflix library. Please watch the teaser on YouTube (goo.gl/3DRzMz).

23. Sustainable

This documentary addresses the relationship between conscious consumption and the impact non-sustainable productions – such as soybean plantations that use agrochemicals, for instance – have on the soil in the long term. The plot tells the story of a family who produces organic food in the United States. Available on Netflix platform on goo.gl/rXN7W1.

24. WWF Brazil: O que é certificação florestal? (What is Forestry Certification?)

The NGO WWF explains the importance of forestry certification, also describing how the verification is performed by the Forest Stewardship Council (FSC), the most renowned international 'green' forestry label. Please visit goo.gl/jzrHPz.

25. Ecolabel Index

The website is like a directory of certification labels. There are 463 labels in 199 countries and 25 industries contained in its database. It has lots of information about each label, such as year of origin, who manages it, updated news. On ecolabelindex.com.

26. Graphic: Increase of environmental labels worldwide

In 2011, Ecolabel Index counted 423 green labels worldwide. Currently, in 2018, there was a growth of 9.45%, to 463 labels,

in the number of labels distributed through 199 countries.



27. FGV: Estudo facilita entendimento de benefícios do blockchain no financiamento do clima (A study makes it easier to understand the benefits of blockchain in climate finance)

The report, elaborated by Konrad Adenauer Foundation, along with FGV-RJ, addresses blockchain and its practical application in another sustainability topic: climate finance. Please visit goo.gl/N1Wo4M.

28. Marshall McLuhan: 'The Medium is the Message'

In this series of interviews, the Canadian philosopher insists the medium is not merely a transmission channel, but rather one of the most significant elements of the message to be conveyed. Please watch on goo.gl/cUgNFq.

29. Massimo di Felice, 'Ecosofia põe a vida no centro do universo' (Ecosophy Puts Life in the Center of the Universe)

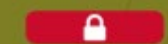
The Italian Sociologist and Professor at USP defends a study of plurality and non-centrality of human beings, which includes five lines of instruction: scientific, emotional, practical, spiritual and technological. Please read the interview in edition 97 of *Página22* magazine: goo.gl/xGtxWa.

COMO FUNCIONA?

Como exemplo, observe o caso de uma transferência de bitcoins entre duas pessoas:



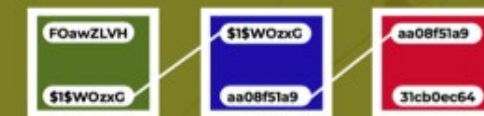
Cada transação é criptografada e enviada para validação dos usuários da rede.



No caso do bitcoin, as transações criptografadas são mineradas e validadas pelos computadores dos membros da rede.



Cada novo bloco é adicionado à corrente de blocos e recebe um código hash - uma identificação única e que não pode ser alterada. Os blocos também trazem os hashes dos blocos anteriores, garantindo a rastreabilidade das informações de toda a cadeia.



Cada conjunto de transações validado é adicionado a um bloco



Todos os usuários da rede recebem uma cópia atualizada do blockchain. Essa tecnologia funciona como um livro-razão compartilhado, onde é possível consultar todas as transações realizadas entre os membros dessa rede.

> FAQ

What is blockchain and what is its relationship with bitcoin?

Blockchain is a technology that emerged in 2008 to make bitcoin, the first cryptocurrency, work. This new model of digital currency operates with no need of intermediary institutions for monetary transaction (like banks and governments). Instead, it adopts a decentralized system of networked users, where everybody is allowed access to current information, with no right to change it, but

able to trace it back to its origin, which conveys confidence to the data entered. Users are anonymous, since there is no individual or corporate taxpayer number associated to them. However, it always records the IP of the computer used, to ensure the process is secure.

Blockchain works as follows: when a transaction is made between users in the network, it must be validated by other computers in order to be completed, processed and, thus, encrypted. All transactions made in a period of time determined by users themselves (for bit-

coin, this time is 15 seconds) are then validated, encrypted and closed in a block, a process that requires computer processing capacity. Once completed, the block record can no longer be changed, thus ensuring the reliability of the following block and of future transactions.

Transactions are validated by the 'consensus rule', as determined by the group, that is, the technology considers a transaction valid when the rules previously established by the group are observed. For that purpose, users connected to the network make their computer process-

ing power available, a process that is mostly known as mining. However, due to the high computational power required in the process, bitcoin issuance is expected to consume about .5% of all energy in the world by the end of the year (Source: *O Estado de S. Paulo* newspaper – goo.gl/bDQsXV)

What are the possible applications of blockchain in the real economy?

Given the reliability and traceability the technology conveys to the processes, blockchain is a way to decentralize procedures. So, it can be used to validate monetary transactions or check all the steps in a supply chain. Thus, that new technology can be used in social and environmental certifications, which aim at ensuring compliance with norms in the manufacturing process of different products (food, consumer goods) and even services.

How can the blockchain technology be useful for social and environmental certification in small businesses in the food chain?

Certification audit is a bureaucratic and costly process in Brazil. Currently, organic smallholders are migrating to participatory guarantee systems, as a way to facilitate food production and certification. However, because they require a centralized institution (for organic products, for instance, it is the government, represented by the Ministry of Agriculture, Cattle Breeding and Food Supply - Mapa), paperwork and contracts are still needed to validate the organic production process, which hinders the routine of smallholders. Thus, digital certification, through blockchain (traceable, decentralized

and reliable) technology could not only facilitate routine processes in family farming, but also include smallholders in the food chain, encouraged by the elimination of red tape in the process, easy access and language, as well as reduction in transaction costs when compared to other current certification models. Certification can still be used in different production modes, benefiting small businesses in general, such as organic farmers, seamstress-es, timber producers, etc.

What are the benefits for producers and final consumers?

Concerning food, for instance, choosing certified products values smallholders, which generates incentives in revenue and local development. Consumers, on their turn, can confirm, through blockchain using their mobile devices, whether the product they bought observes the principles of sustainable agriculture and conscious consumption. Therefore, customers will be more likely to trust environmental labels. The approach between consumers and farmers through technology will enable new forms of consumption and the relationship with food.

For conscious and sustainable consumption, the Brazilian National Health Surveillance Agency (Anvisa) recommends:

- Choose products that have their origin identified, in other words, products labeled with the farmer identification. That identification reinforces the farmers' commitment with the quality of food they produce.
- Prefer seasonal produce because it typically has less agrochemicals.

- Prefer certified food, for instance, carrying 'organic' product and/or 'Brazil Certified' labels. Certification shows the farmers' professionalism and commitment with sustainable production system protocols previously established by the State in partnership with food production chains.

- Go to retail networks that have programs to trace and control food quality.

What is family farming and what is its relationship with organic products?

The law that regulates family production (# 11,326/2006) defines rural family entrepreneurs as those who 'conduct activities in the rural area, own an area of up to four tax modules, use labor of their own family members, have a family revenue associated with their own facilities, and the family members themselves manage their facilities or projects'. (Source: Special Secretary of Agriculture and Agrarian Development, 2016). In this production mode, farmers have a peculiar relationship with the land, which is both their workplace and home. Production activities are the main source of revenue for that population.

According to the 2006 Agricultural Census, 84.4% of the agricultural environments in Brazil are dedicated to family farming. It employs roughly 40% of the active population in the country, which accounts for about 35% of the national gross domestic product.

Family farmers are the major responsible for organic production (which is not necessarily a requirement for that production mode), according to the Agroecology Coordination (Coagre)

at the Secretary of Agricultural Development and Cooperativism (SDC) from the Ministry of Agriculture, Cattle Breeding and Food Supply (Mapa).

According to Mapa, the Brazilian legislation considers as organic product, both fresh and processed, one obtained in an organic system of agricultural production or from a sustainable resource extraction process that does not damage the local ecosystem. 'In order to be traded, organic products shall be certified by bodies accredited at the Ministry of Agriculture; certification will not be required only in case of products grown by family farmers who are members of social control organizations registered in Mapa, who trade exclusively in direct sales with consumers.'

What agrochemicals are contained in your food?

According to Mapa's definition, agrochemicals are products and agents present in physical, chemical or biological processes used in production, storage and processing of agricultural products, pastureland, protection of forests, both native and planted, and other ecosystems and urban, water and industrial environments. Their purpose is to change the composition of flora and fauna, to avoid the damaging action of living beings considered harmful. Substances and products used as defoliants, desiccants, stimulators and growth inhibitors are also considered agrochemicals.

Currently, Brazil is a world leader in consumption and use of agrochemicals (please see more here: goo.gl/XM4wki). According to DW Brasil (goo.gl/oQ1xZd), there are 484 agrochemicals allowed to be used in the country, and 22 out of the

50 used most often are prohibited in European countries. Best sellers in Brazil in 2016, according to Ibama (Brazilian Environmental Institute) were:

SUBSTÂNCIA	O QUE É	VENDAS (em mil ton)
GLIFOSATO	herbicida	185,6
2,4-D	herbicida	53,4
MANCOZEBE	fungicida	33,3
⊗ ATRAZINA	herbicida	28,6
⊗ ACEFATO	inseticida e acaricida	24,8
CARBENDAZIM	fungicida	13,3
DICLORETO DE PARAQUATE	herbicida	11,6
IMIDACLOPRIDO	neonicotinoide	9,1

⊗ Substâncias proibidas na União Europeia

FONTES: IBAMA

How many ecolabels are there? How many of them are associated with food production?

According to Ecolabel Index, there are currently 463 ecolabels in 199 countries for 25 different industrial sectors. The main labels in the Brazilian market are:

- Rainforest Alliance Certified: Ensures that companies that work with agricultural products do not interfere with the biodiversity in the place of cultivation.
- IBD: Associação de Certificação Instituto Biodinâmico (Biodynamic Institute Association of Certification) is an organization that develops certification activities of organic and biodynamic products.
- Ecocert: A certification body founded in 1991, in France, that came to Brazil in 2001. The organization is currently considered a reference for organic certification worldwide.
- PGS: Participatory Guarantee System; allows smallholders to access organic certifica-

tions, because it works more like a collaborative and self-inspected community than a certifying body with formal processes.

- Certified Humane: An interna-

social and environmental certifications that facilitate access of smallholders to the market'. For more information about the formative process and the methodological propositions of the optional discipline, please visit: www.eletivafis.com.br.

The main methodology adopted by FIS is Theory U – a process that aims at helping teams learn something new through seven steps:

During the fourth stage of the process, when most of the information contained in this edition was collected, FIS 17 students had field visits to five different cities: Sao Paulo, Belem, Manaus, Ilheus (BA) and Uberlandia (MG):

Organizations and people who contributed to the learning process:



How and why was this edition of P22_ON magazine produced?

As an initiative of the Center for Sustainability Studies at FGV Eaes (FGVces), the optional discipline Integrated Education for Sustainability (FIS) selected for its 17th class the following challenge: 'Create and publish an edition of the P22_ON magazine about potential uses of blockchain for

São Paulo

- Cooperapas Agricultura Orgânica Parelheiros SP
- André Salem – Co-Founder, Blockforce
- Eduardo H. Diniz, FGV
- Alexandre Harkaly – CEO, IBD Certificações Ltda.
- Angela Bozzon – ABVTEX – Program Manager, ABVTEX
- Andrea Werneburg – Business Development Analyst, FSC.

Manaus

- REMA – Rede Maniva de Agroecologia do Amazonas
- Pagodao Community

Ilheus

- Taboa Fortalecimento Comunitário
 - Arapyau Institute
 - Rede Povos da Mata
 - CIC – Centro de Inovação do Cau (Cocoa Innovation Center)
- Uberlândia:
- Fazenda Boa Vista
 - Stockler
 - Dulcerrado

Belém

- AProcamp
- Cofruta
- Natura

Sponsors and supporters

- Itaú
- C&A Institute
- Gol
- Natura
- Konrad Adenauer Stiftung
- Nespresso

For more information about those organizations, please contact: contato.fis17@gmail.com

What is the com.fiar team, mentioned in this edition?

The *com.fiar* team is responsible for producing the content of this P22_ON magazine edition. It is formed by 17 students of the Getulio Vargas Foundation, from Business Administration, Public Administration and Economics, and three employees who work in the companies that support/sponsor FIS classes: Natura, Banco Itaú and FGVces. Learn more about the team members:

What is the origin of the name com.fiar?

Confiar – In Latin, *confidere*, com – *fidere* (believe), which derives from *fides* (faith). *Con-*

fiar (Trust) is related to believe, that is, share faith between two people or groups.

(Fiar) – To weave together, collaborate.

Com. – Refers to .com, to represent the context of the Internet and blockchain, and their role in connecting people.

> TESTS

TEST 1: Tell us what kind of food you would buy, and we will tell you what kind of consumer you are:

When buying your own food, are your choice criteria clear to you? Find out here: goo.gl/ww3HLN

TEST 2: How many planets are necessary to support your lifestyle?

Asking questions about consumption habits and behaviors, the test designed by Rede Clima e Instituição Científica e de Inovação Tecnológica (ICT) calculates your carbon footprint. It is useful to reflect on habits we should eliminate or radically change. Hint: change some of your answers to observe how a simple change could drastically reduce your carbon footprint. Please access the test on suapogadaecologica.com.br.

TEST 3: How much do you know about blockchain?

A lot has been said about blockchain, but do you master the topic? Find out here: goo.gl/GeQjNZ.

> QUESTIONS FOR REFLECTION

While preparing this edition of P22_ON magazine, *com.fiar* team gathered different topics

it would like to share with readers. They are questions related to the most varied topics covered in the magazine and their purpose is to raise doubts and pique curiosity, encouraging everybody's critical role.

• Why do organic products need labels? That is, why is it there are no labels specifically for products containing agrochemicals, sorting the different levels of chemical products used during production?

• When we go to a grocery store and see organic products sold at a high price, are they in fact expensive? Or are conventional products sold at a much lower price?

• Even though implementing blockchain technology, how can we ensure the first piece of information entered into the system is true?

• How can we trust a new technology?

• Is blockchain technology really disruptive, or is it only a new way to present the same type of information?

• At the grocery store, does the existence of social and environmental certification labels really make a difference during purchase?

• Do you know the difference between the various labels?

• Won't the low price of non-organic products be charged from consumers in the long term? In other words, when choosing non-organic products, will what we save now be charged in the next decades, to treat some form of disease caused by agrochemicals?

• What drives the purchase of organic products: is it just a fad, or a search for benefits to our health?



P22ON

If you are interested in associating your organization to high-quality content on strategic sustainability issues, support this and upcoming issues of P22_ON.

For more information, please contact amalia@pagina22.com.br.

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AGRÔNOMAS DA NESPRESSO.

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what else?