
[Blockchain and Smart Contracts: Capital's Latest Attempts to Seize Life on Earth](#)

The control of genetic resources (non-human living organisms that humans can make use of) through property rights has caused a massive theft of forest peoples' knowledge. Today, a fully-fledged project called the Earth Bank of Codes aims for a global seizure of life for capital accumulation.

The two meanings of “biopiracy”

The “fair and equitable sharing of Benefits from the use of genetic resources” (1) is, besides preservation and sustainable use of biodiversity, one of the main goals of the Convention on Biological Diversity (CBD). The Convention, created at the Earth Summit in Rio de Janeiro in 1992, was celebrated as a victory by southern megadiverse countries for being the first international treaty that recognized the sovereign right of these nations to exploit those resources. Foreign parties, interested in accessing genetic resources would have to get permission from the respective state governments. The benefits from commercial use were to be shared with both the state and the local communities and indigenous peoples that hold traditional knowledge about these resources.

By that time, **the monopolization of genetic resources through intellectual property (called patents) – mainly by pharmaceutical companies – was increasingly perceived as a threat by Amazonian forest communities.** Maybe the most emblematic case in this context was that of US patent number 5.751P, that granted a US citizen in 1986 exclusive rights over the plant *Banisteriopsis caapi* – an Amazonian endemic plant, known as Ayahuasca, sacred to many of indigenous peoples in the region.

To expose this kind of **theft of traditional knowledge from forest peoples** through patents and, above all, the conversion of collectively used biological resources and collective knowledge associated with such resources into private property, the NGO Rafi (today ETC Group) coined in the mid-1990s the term “**biopiracy**”. (2) Initially the use of the term was avoided inside the CBD debates, being considered the expression of an “extreme view”.

In the following years however, the term became increasingly integrated in those debates, although its meaning changed fundamentally: Biopiracy was now understood as obtaining Indigenous Peoples rights over genetic resources and traditional knowledge without permission or benefit sharing. The underlying idea of “legal appropriation” stands of course in stark contrast to the original intent of critical groups like ETC. Indian activist Vandana Shiva brought this contradiction to the attention by stating that the problem of biopiracy is a result of the western Intellectual Property Rights systems, not the absence of such systems in the global South. (3)

In 2010, the Nagoya Protocol, a legally binding agreement about Access and Benefit Sharing of genetic resources, was adopted by the CBD with the declared intention to “prevent biopiracy”. As a matter of fact though, there are countless obstacles to the implementation of the Protocol. Disclosure of origin of genetic resources and identification of the original holders of traditional knowledge, who

would be entitled to benefit sharing, seem to be impossible tasks. Besides, **pharmaceutical companies, like Bayer or Novartis, can gain access to these resources in indirect ways by operating in the grey zone of academic collaboration.** They are also increasingly able to produce synthetic substances in the laboratory, in theory without ever physically accessing the genetic resource in the country of origin. They can then claim in their patent applications that the synthetic copies are their “inventions”. (4) “Successful” benefit sharing contracts continue largely to be wishful thinking. Negotiations generally fail due to cultural differences, different value systems, communication problems and lack of trust between the parties.

The Amazon Bank of Codes

In January 2018, the World Economic Forum (WEF) launched at its 48th annual meeting in Davos, the Amazon Bank of Codes Initiative. It is supposed to be **the first phase of a larger program, which consists on the partnership of the Earth BioGenome Project and the Earth Bank of Codes.** (5) The Earth BioGenome Project intends to sequence and catalogue all plants, animals, fungi and a large portion of all single-celled organisms on earth by developing and implementing air-, land- and ocean-faring drones and new cheap sequencing technologies (see note 1) within the next ten years. The Earth Bank of Codes is planned as an online system that will use a technology called blockchain, which would facilitate to register global biological and biomimetic (copied from nature) intellectual property assets, as well as the origin, rights and obligations associated with them.

Why blockchain? This technology allows property values like money (6) to be transferred “peer to peer” – directly from one party to another without a third party, like a bank or trustee. How does this work? Transaction data are stored in blocks that are timestamped and tied to one another in forms of codes and cipher systems, forming a chain. Copies of this chain are stored across many devices and updated with each new transaction, which makes it virtually impossible to alter transactions retroactively. Blockchain systems frequently make use of so-called “smart contracts” in order to facilitate negotiations of contracts as well as the fully automated commercialization of the assets through a web portal.

Many people believe that these new technologies will restructure the global economic system in the next decades. The combination of blockchain and self-executing smart contracts carries the potential to make in the future not only banks (including central banks) obsolete, but also notary offices, land registry offices, lawyers, security companies or any other mediator or trusted third party.

So how is the Amazon Bank of Codes expected to put these technologies into practice?

Through the web portal, a buyer (for instance a pharmaceutical company) would be able to obtain Intellectual Property rights over a biological resource (for instance an Amazonian medicinal plant) quickly and with almost zero transaction cost. All rights and obligations would already have been coded into a smart contract and the sellers (for instance the government of Brazil or a group of indigenous people that hold traditional knowledge about the plant) would automatically receive their respective share, as soon as the buyer gets revenues from his Intellectual Property asset. (7)

The World Economic Forum propagates that its project, counting with a budget of US\$ 4,7 billion will in the next decade enable **a multi-trillion dollar “inclusive global Bio-Economy”**, and – enforcing the Nagoya Protocol – ensure the fair and equitable sharing of the benefits arising from “bio-inspired innovations”.

Why blockchain and smart contracts are not solutions but part of the problem

In a recent article, Larry Lohman, researcher from The Cornerhouse, analyses the emergence of blockchain and smart contracts as one more chapter in a long-standing historical process of mechanization promoted by capital. (8) For Karl Marx, all artefacts, including means of production like machines, are crystalized human labour. In the capitalist industrial mode of production, machines are part of capital and inversely instrumentalize the human workers. “The instrument of labour confronts the labourer, during the labour-process, in the shape of capital, of dead labour, that dominates, and pumps dry, living labour-power.” (9) In this sense, a mechanical loom or an assembly line, as parodied by Charlie Chaplin in his movie *Modern Times*, is dead machine labour that dominates and exploits living human labour.

Basically, the same thing is happening with blockchain and smart contracts. However, they supplant different kinds of labour. “What the smart contract strives to mechanize is something more encompassing and complex: trust, rights, identity, recognition, respect and – in an even more thoroughgoing sense than any factory machine or personal computer – interpretation.” (8) **In the capitalist context, these machine algorithms (computed programming codes), that we like to regard as our “tools”, actually dominate and exploit us.** We still think that we are “using” the internet, when we apply likes or dislikes in Facebook, write a WhatsApp message with autocomplete, identify objects on CAPTCHA-images or adapt text in Google Translate. In fact, we are not only feeding big data, but also grooming the algorithms that learn from us. **We still think we are “consuming” online services, while in fact we are providing unwaged living labour for the dead labour of capital.** In contrast to traditional human labour, like assembly line work, this new labour takes place unrecognized and hence reinforces the capitalist myth of a fully automated labour-free world.

Proceeding from Marx, Lohman concludes that “machines can’t serve capital without constant, cheap infusions of the ‘blood’ and ‘vitality’ of free-range human and nonhuman activity.” The “nonhuman activity” refers to the living labour provided by nature throughout millions of years, like the conversion of solar energy into coal, oil and gas (through plant metabolism and earth's pressure on buried organic material), or the provision of minerals and metals. In the case of blockchain, the amount of nonhuman activity is enormous. **The amount of energy consumed to run the computers, storing data devices and related technology is massive. Thus, the carbon emissions of blockchain as a whole are already today in the range of those of a medium-sized country in the global North.** (10)

The second law of thermodynamics says that the total entropy of a system will increase over time. What does this mean? Systems like living organisms or machines will always have an output of usable energy that is lesser than the input. **To keep them alive or running, new constant input of usable energy is necessary. This is why a perpetual motion machine cannot exist.** The idea of a fully mechanized world relies precisely on the myth of the perpetual motion machine and accordingly can be refuted on the basis of the second law of thermodynamics: mechanization – the transformation of living labour in dead labour – will always cause the consumption of more living labour from humans and nature.

Moreover, human sign-interpretation – what smart contracts ultimately strive to mechanize – cannot be reduced to computer codes. This is due to a fundamental paradox that results, to put it simply, from the fact that each rule that is supposed to govern the correct interpretation of a sign has itself to be interpreted in order to be applied correctly. So, the rule always requires another rule, leading to an infinite regress. (11) This means that **the attempt to mechanize interpretation not only must fail, but lead to ever more interpretation work.**

A wave of neo-colonial grabbing in the tropical forests

What took place a few decades ago in the form of occasional transgressions by mainly pharmaceutical companies and was exposed as biopiracy by activists and grassroots NGOs, has developed into **a fully-fledged project of global seizure of life by capital (pushed mainly by pharmaceutical companies, conservationist NGOs, mainstream scientists, Northern governments, etc.)**

The Earth Bank of Codes is however highly myth based and, what the World Economic Forum describes euphemistically as “interesting challenges” to be overcome by the project, are in fact **fundamental and insurmountable contradictions**.

Nevertheless, we have to remember that historically the waves of colonial exploitation and violence that ravaged tropical forests and its people were oftentimes prepared and accompanied by mythical constructions like the “El dorado” and the “warlike Amazons”. When those myths were shown to be false, the plunder still continued and other narratives were created for its justification.

The Amazon Bank of Codes will probably have severe impacts on forests and forest people. It is likely to exacerbate the existing impacts of the REDD-type projects (12) that are currently taking toll in tropical forests: land grabbing, rights violations, rural exodus, division of traditional communities, loss of traditional knowledge and cultural identity. (13)

It ultimately targets what economic geographer David Harvey describes as accumulation by dispossession: “taking land, say, enclosing it, and expelling a resident population to create a landless proletariat, and then releasing the land into the privatised mainstream of capital accumulation” (15) In former times, the so produced landless proletariat was exploited as cheap labour in factories. Today, however, **forest communities are often not directly expelled through conservation or carbon projects. Instead, their traditional subsistence activities are restricted or completely prohibited** in order to maximize “carbon stockage” or another “environmental service”, and hence their traditional relations with plants, animals and their living space as a whole are cut off.

It can be expected that once the Amazon Bank of Codes facilitates “successful” deals with what its promoters call “biological, biomimetic and traditional knowledge assets”, the **financial benefits will revert mainly to local oligarchies or other somehow already privileged individuals**. The majority of the impacted forest people, whether staying in the forest or moving to the impoverished outskirts, would probably be transformed into indebted users of smartphones or other online devices, or – more accurately – unpaid big data and Artificial Intelligence maintenance workers for companies like Google and Facebook.

Given the increasing pressure, with which capital promotes the financialization of nature and the disruption of human relations with it, there is an **urgent need for understanding these new technologies that are an imminent threat to remaining forest dependent communities and for supporting their resistance**.

*Michael F. Schmidlehner, michaelschmidlehner@gmail.com
Research Nucleus on Work, Territory and Politics in Amazonia
(Núcleo de Pesquisa Trabalho, Território e Política na Amazônia - TRATEPAM-IFAC)*

(1) Institutions like the UN use the term “biological resource” for any non-human living organism (animal, plant, microbe...) or part thereof that humans can make use of. “Genetic resources” are

understood as those biological resources that are of interest with regard to their genetic (hereditary) components. "Genetic information" can nowadays be extracted from these components through a technology called "sequencing" and is increasingly being patented.

(2) ETC Group. [Patents & Biopiracy](#)

(3) SHIVA, V., [Biopiracy: need to change Western IPR systems](#), in The Hindu, 28/07/1999

(4) [TWN Info Service on Biodiversity and Traditional Knowledge](#) (Nov15/01) 16 November 2015

(5) WEF - World Economic Forum: Harnessing the Fourth Industrial Revolution for Life on Land, 23 January 2018

(6) Blockchain technology has enabled the creation of decentralised "digital currencies" such as Bitcoin and Ethereum, which can be transferred un-burocratically across borders online, without banks and without governmental control.

(7) In reality, the current Brazilian law for benefit sharing disregards to a large extent the rights of indigenous people in such "negotiations". It limits benefit sharing to between 0,1 and 1 per cent of the annual net revenue obtained from the economic exploitation of the developed product. For more information about the law, see WRM. [The Brazilian Biodiversity Law: Progress or Threat?](#) Bulletin 227, December 2016

<https://www.weforum.org/reports/harnessing-the-fourth-industrial-revolution-for-life-on-land>

(8) This text section reflects some basic ideas of Larry Lohman's article: [Blockchain Machines, Earth Beings and the Labour of Trust](#), first published 21 MAY 2019.

(9) MARX, Karl. [Capital](#), Vol.1, p.286

(10) The yearly energy consumption of the blockchain-powered crypto currency Bitcoin is comparable to that of Austria, the resulting carbon emissions to those of Denmark. [For more information see here.](#)

(11) An "Infinite regress" is a sequence of reasoning that cannot come to an end. In his argumentation, Lohman (8) refers to the so-called "rule-following paradox", that was described earlier by language philosophers Ludwig Wittgenstein and Saul Kripke. For a more detailed explanation of this paradox and its implications for attempts of automated interpretation, refer to Lohman's article, pages 23-25.

(12) WRM. [Envira REDD+ project in Acre, Brazil: Gold certificate from carbon certifiers for empty promises.](#) Bulletin 237, April 2018

(13) FAUSTINO, Cristiane; FURTADO, Fabrina. [Economia verde, povos da floresta e territórios: violações de direitos no estado do Acre.](#) 2014.

(14) CIMI. [Natureza a Venda.](#) Porantim n. 368, Edição especial

(15) HARVEY, David. Accumulation by Dispossession. 2005, pp. 149, 145–6