

Using Blockchain to Secure Honduran Land Titles

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Abstract

Evidence has consistently shown that the delimitation and protection of property rights, properly recognized by the legal system, constitutes an essential element in relation to the availability of capital and credit and, as a result, in economic growth and better standards of living. According to the Global Competitiveness Report (WEF), Honduras ranks 63rd in the world for protection of property rights and 88th for ease of registering a property according to the World Bank. Recent research both by the Honduran government and civil society groups backed by Transparency International have consistently revealed widespread corruption within the Property Institute's land registry; evidencing how politicians have been using land titles to buy votes from impoverished citizens, for legalizing squats, and installing an institutionalized bribe culture.

Fundación Eléutera has been working on the implementation of the Zonas de Empleo y Desarrollo Económico (ZEDE, Zone for Employment and Economic Development), part of which includes creating an internal land registry. The organization began looking for a low cost, secure, trust creating technology for land registries, and began to look into the Blockchain space to try to find solutions that could help solve the property problem. This is how Factom and Epigraph came into the picture.

The Factom technology and Epigraph Operations Framework lowers implementation and operational costs while providing the highest level of data integrity and transparency, all of which goes directly to work on solving the land registry problem in Honduras. A reliable, secure asset base would increase lender confidence, lowering the cost of borrowing, and opening economic growth opportunities for Hondurans. An immutable register would lower the number of property disputes moving forward, providing respite to a region's

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judicial system to work through the backlog of disputes. A pilot project to test the technology with Factom/Epigraph is being attempted in the second semester of 2016.

In the long term, a robust land and property rights system backed with the proper blockchain technology will allow communities to flourish socially and economically—which can later serve as a foundation for building voting systems, shared property transactions, co-housing initiatives, peer to peer dispute resolution, and much more.

1. Context of Property Rights and Public Registries in Honduras.

In 2004 the Honduran Government led a World Bank supported Land Registry Reform which introduced the digitalization of titles under a new unified system of registries (SURE system). The reform slashed the time to register property from 18 months to 15 days (at least theoretically), transferring the responsibility for the property registry from the judiciary, to the executive. The law created a decentralized government agency, the Property Institute (IP), which now manages a computerized system of property data, accessible to the public through its website. The IP is also responsible for the general operations of registries of immovable property.

Before the reform, registration was done by hand in books; recording the name of the owner and a brief description of the property, but it did not link the owner to the location. This system led to an unreliable real estate market. The system was plagued by distrust, and registration took between one to two years to complete. By 2002 only 37% of properties in the capital city of Tegucigalpa, were registered².

The intention of the 2004 reform was to create the institutional and legal framework for an efficient system of property rights that would reduce transaction costs and activate capital markets. Though the new SURE system cut the time and cost to register a property dramatically and made titles available in digital form. However, property rights protections did not improve significantly due to unexpected challenges in the new system which undermined the reformers' intentions.

As the responsibility to register property was transferred from the judiciary to the executive, the Property Institute became vulnerable to political interests – its authorities and staff could be hired according to party affiliations and electoral needs, rather than their technical/professional skills or the financial health of the Institute itself. Within a few years, and a change in government, widespread corruption and impunity returned, the Property

² Coma-Cunill, R., & Delion, M. (2008). Slashing the time to register property from 18 months to 15 days. Doing Business.

Institute once again became an unstable and unreliable source for protection of property rights.

By 2013 there were 299 lawsuits against the Property Institute due to illegal actions by IP personnel; these cases represented over \$58 million US dollars in lawsuits for the IP³, counting only those cases that had a declared amount. Distrust in public institutions, legal barriers, and difficult access to judicial courts for the users of the system, may have protected the IP from further legal actions by victims of its corrupt practices.

In 2014, a study led by civil society groups in an alliance with Transparency International brought forward evidence of the depth of corruption in the Property Institute. It revealed how politicians granted land titles to buy votes from impoverished citizens and how bureaucrats handed out desirable government land in exchange for personal favors and bribes. Along with nepotistic appointments and extended periods of paid leave, the Property Institute had fallen far short of the capabilities required to fulfill its legal tasks⁴.

A 2015 audit performed by the Honduran government found over 712 irregularities in property registries. Of which 466 were related to criminal acts of corruption. The IP system was publicly criticized by Ebal Díaz, Chairman of the Board for the IP itself, for lack of coordination among employees, ease of registry and land title tampering, and cooperation between the staff and organized crime for money laundering activities⁵. The findings were remitted to the Fiscal General (Attorney General), and a few months later, 17 employees of the IP were criminally charged for abuse of authority, embezzlement of public funds, fraud, tampering of evidence and interfering with ongoing investigations⁶.

These deficiencies within the Honduran State's property protection system have resulted in a system where land holdings are challenged by ownership ambiguity, unregistered land and a permanent threat of squatters on private and public property. Approximately 80% of the privately held land in the country is untitled or improperly titled. Only 14% of Hondurans legally occupy properties and, of the properties that are legally held, only 30% are registered. Squat movements on private and ejidal (communal) land have become a common way for the landless to access land. As a result, land rights on private and ejidal

³ Revistazo. (12 de diciembre de 2013). Se Necesita una Depuración y Reforma Profunda al Instituto de la Propiedad (IP). Revistazo.

⁴ Transparency International. (21 de agosto de 2014). Honduras: beating corruption in land registration. Obtenido de Transparency International: http://www.transparency.org/news/feature/honduras_beating_corruption_in_land_registration

⁵ Crimen organizado opera en IP de La Ceiba. (26 de febrero de 2015). La Tribuna.

⁶ Ministerio Público acusa a 17 personas por corrupción en el IP. (10 de junio de 2015). *Diario El Heraldo*.

land are not completely safe, legally nor physically. The uncertainty of structural land tenure in Honduras renders mortgage and other forms of credit difficult to obtain or accessed at double digit interest rates. The informal land market is strong in both rural and urban areas, as lack of clear land title makes formal land transactions risky and expensive⁷.

It is clear that the Property Institute has not fulfilled its role of securing the Honduran people's property rights. Despite undergoing a deep reform, which was implemented and then amended and reorganized 10 years later, it is still subject to title tampering and manipulation.

Property Rights in Honduras as perceived by international indexes.

As the national property registry has failed to meet basic security and transparency standards for the protection of property rights, it would fall upon the judiciary to make sure property rights and contracts are being effectively protected. However, Honduras also lacks an independent and impartial judiciary. With high levels of corruption, manipulation from external forces (both political and private), and inefficient operations, the Judicial Branch has been found incapable of adequately ensuring the defense of property rights and the legal execution of contracts.

The World Bank's Doing Business Index ranks Honduras at the 88th place worldwide for Registering a Property. According to the Index, it takes 6 procedures, 22 days and a cost of 5.7% of a property's value in order to get it registered. On the category of Enforcing Contracts, which measures the time and cost for resolving a commercial dispute through a local first instance court, Honduras is ranked as the 150th place worldwide. It takes an average of 920 days to resolve a commercial dispute from the moment the lawsuit is filed in court until effective payment is made; the cost in court fees and attorney fees, represents around 35.2% of the total claim; and the quality of the judicial process gets 7.5 points out of 18, where 8.4 is the average for Latin America & the Caribbean and 11.0 the average for OECD countries.⁸

In the Heritage Foundation and Wall Street Journal's 2016 Index of Economic Freedom Honduras places 113th in the world, and classified as "mostly unfree". With one of the lowest scores for the property rights subcategory, the Index concludes private property is weakly protected, the court system is highly inefficient, corruption extensive, and the judiciary strongly influenced by other branches of government. The resolution of disputed

⁷ United States Agency for International Development (USAID). (2011). Property Rights and Resource Governance: Honduras. Washington D.C.: USAID.

⁸ World Bank. (2016). *Doing Business 2016*.

cases can take years, laws and practices regarding real estate differ substantially from those in more developed countries, and fraudulent deeds and titles are common. As such, the “Rule of Law” category gets the lowest score in the freedom Index.

In Fraser Institute’s 2015 Economic Freedom of the World Report, Honduras earns its lowest score in the Legal System and Property Rights area; with low subcategory scores in Judicial Independence, Impartial Courts, Protection of Property Rights, Integrity of the Legal System, Legal Enforcement of Contracts, Reliability of Police, and Business Cost of Crime. Finally, in the 2015 International Property Rights Index Honduras earned a Global Rank of 89th out of 129 countries. Again, Honduras earns its lowest scores in the Legal and Political Environment category (3.2/10); while the Physical Property Rights category gets a 5.6/10; and the Intellectual Property Rights category gets a 4.3/10 score.

The main obstacles for property rights protections in Honduras are found within the legal system itself, both in its legislation and in its institutions, such as the judiciary. Without a properly working legal system, property rights will continue to suffer and so will the vast majority of Hondurans living below the poverty line. Creating a steady, unchanging, reliable registry for land titles and other registries, would ease one of the key burdens on the troubled legal system.

2. Zones for Employment and Economic Development.

In 2013, the Honduran Congress amended the constitution in order to create the Zones for Employment and Economic Development (ZEDEs), highly flexible special economic zones designed as a means to promote economic growth and employment by offering the possibility of an open and dynamic local administration and to create strong rule of law institutions. They are modeled as a mixture of the green field city movement, best practices from free special economic zones, and special purpose/improvement district.

The ZEDEs consist of a decentralized system of government, very much similar in its powers and attributes to a State within the American Union, as they are still bound by the Honduran Constitution and International Treaties ratified by Congress. As long as it does not come in contradiction with the Constitution and International Law, the ZEDEs may enact their own norms, have their own Public Administration, Judiciary, Public Attorney’s Office, its own security forces, its own monetary policy and jail system; as well as its own system of law and jurisprudence. In this sense, the ZEDEs represent a mild return to a sort of constitutional federalism; as was the case with most Honduran Constitutions prior to military rule in the 1960s and 70s, when regulatory, economic and political power was heavily centralized within the Capital City of Tegucigalpa.

As the ZEDEs may have their own Public Administration, Fundación Eléutera thought of the necessity of establishing a more secure and transparent Property Registry system, which would be most apt at protecting property rights within the ZEDE. As the popularity of Bitcoin grew, so did the idea of using its underlying technology, known as the blockchain, as a secure foundation for applications in finance and law.

Coming in contact with U.S. based technology companies who were developing blockchain-based applications, we started pitching the Honduran ZEDEs as an ideal place to effectively start using such technologies to enhance government performance. In 2015, Guillermo Peña participated as a speaker at the Texas Bitcoin Conference and spoke about the possibility of using a blockchain technology based property registry as a means to strengthen the rule of law and the protection of property rights in Honduras.

Since the ZEDEs are in the process of being newly created, we thought the ideas and applications developed in the blockchain space could be more easily implemented in the “greenfield” offered by the ZEDEs, without having to change existing national processes and manage historical data points. The blockchain based registries, presented a low cost, modern and safe solution to provide protection and security for several kinds of contracts, titles, land deeds and other relevant documents, without the risk of them being manipulated by public officials or third parties during and after registration.

As we continue to work towards the launch of the first ZEDE, we still believe it represents one of the best opportunities to implement and execute new blockchain technologies. The legal regime within a ZEDE will allow it to become a very competitive area for businesses and we envision it as a regional center for the creation and registration of corporate structures which can then operate (or establish subsidiaries who do) in the rest of Honduras or in other countries, in a manner similar to the States of Delaware and Nevada in the United States, Panamá in Latin America or Isle of Man in the Great Britain.

3. Cooperation between the Honduran Government & Factom.

In January 2015, Peter Kirby and Matt Regan from Factom/Epigraph visited Honduras and met with government officials at the Presidential Palace and the Property Institute and discussed the Honduran Land Administration Program, known by its Spanish acronym (PATH). The visit allowed those that could develop the technology to get a first hand at the current system, its strengths and weakness, and how to begin conceptualizing how blockchain could help. The most urgent weakness that was detected was that there were no backups for the physical land title records of the Property Institute. Land registry books

dated into the 1880's, making all of the land wealth stored in those books vulnerable to arson, theft, or misuse.

In March 2015, the Committee for the Adoption of Best Practices (CAMP), which is in charge of supervising and approving the ZEDE norms, met for the first time on the island of Roatán, Honduras. The Honduran President and his Chief of Staff were present at the meeting. We were invited to present a ZEDE development project to CAMP, and so we extended the invitation to Factom to join us as part of our committee.

At the meeting, we introduced Factom and their technology to several high ranking officers within the current Honduran government, and presented them with a solution to prevent the type of corruption cases that had just recently been discovered to be taking place within the Property Registry.

4. Media Reaction of the Honduran blockchain based land title registry initiative.

Soon negotiations to implement a blockchain land registry pilot program began, and the news reached several media outlets. By May 2015 Reuters reported that Honduras had agreed to use Factom's blockchain technology to strengthen its Property Registry system and illustrated the difficult economic conditions and widespread corruption the nation is facing. The Honduran Project was mentioned alongside blockchain ventures made into the burgeoning fin-tech space by UBS, Barclays, ING, Goldman Sachs and BNY Mellon.

The 2015 cover for The Economist Magazine's October-November issue read "The Great Trust Machine: How the technology behind bitcoin could change the world" included two articles discussing the Honduras – Factom partnership for a new blockchain based property registry as a means to combat mismanaged and corrupt land registries. It discussed how the "blockchain" cryptographic technology has applications well beyond cash and currency, as it offers a way for people who do not know or trust each other to create a record of who owns what and earn the assent of everyone concerned. In short, the Economist proclaimed, "It is a way of making and preserving truths,".

The Honduras – Factom partnership was covered by NASDAQ, Forbes Magazine, The Guardian, Wired Magazine, Finance Magnates and the Central American business magazine Estrategia y Negocios. All of whom presented the blockchain alternative as an innovative means to use new technology to fight legal uncertainty and weak protection of property rights in Honduras.

Rarely has Honduras received so much positive coverage from international media, as most of it has usually been about political instability, corruption, poverty, drug trafficking and

violence. Of course, we showed all this coverage to our partners within the Honduran government as proof of the worldwide acceptance of using blockchain applications to strengthen property rights. So far, we are continuing the conversations to carry on with the process of implementing the first pilot program, either on the national property registry system or within a newly created ZEDE.

5. Operating System: Blockchain-based Land Title Registry.

The Factom/Epigraph designed Operating System offers a registry characterized by its immutability and auditability. Placing the registered documents (land titles or deeds) beyond the reach of actors involved in operating, governing and manipulating a property registry. A system that embraces and achieves these critical success factors can disrupt property rights registration, and thereby change the lives of property owners and the economies in which they live and work.

Traditional software implementations are backed by a purely centralized data storage, which makes it vulnerable to manipulation by those who control the system or by someone who attacks it. Our platform, however, records its data using Factom: an open source decentralized ledger which is secured by the Bitcoin Blockchain. The Factom protocol removes the need for blind trust by providing a precise, verifiable, and immutable audit trail, which then serves as a reliable source of truth for all future transactions. If the system were to be implemented, the immutable audit trail would boost the capabilities of the Honduran government and civil society groups to fight corruption and prosecute agents who would manipulate the property rights registries.

Factom: A Blockchain Backbone

Factom is an irreversible publishing engine—write once, never erase. Applications can use Factom to secure data by publishing encrypted data or a cryptographically unique fingerprint of the data to Factom’s immutable, distributed ledger. Land and Property administration involves a wide array of documents and supporting data. By securing this data in the blockchain, Factom ensures that it will be preserved and will not be changed once recorded, establishing “Proof of Existence”. Further, and just as critical to the overall trustworthiness of the registry, publishing cryptographic hashes during each step of an instrument’s recording process provides an irrefutable “Proof of Process”, protecting that what is submitted for recordation is what is actually recorded.

Administering and securing land and property rights represents the most valuable “Proof of Existence” use case globally. Land and property administration systems built on Factom’s blockchain backbone to create immutable operational and financial processes can secure

trillions of dollars in assets; resulting in a large social, economic and political impact globally.

Software as a Service (SaaS):

In order to adapt to challenges in Honduras, such as power outages, security problems and high costs of electricity, the application was designed for SaaS, cutting down development, deployment and implementation costs drastically. As the number of customers served increases, the more the software can improve. A SaaS model presents an opportunity to standardize best practices across different customer bases. Both customers and service provider will be able to learn from the ecosystem. Features developed for one service region can be shared with other regions. Shared software features lower the cost of deployment for every customer group. Upfront hardware costs with respect to system servers and service delivery infrastructure is greatly reduced in using a SaaS delivery model. Both the service provider and customers “rent” infrastructure on a consumption basis, covering costs transactionally as resources are used. Dramatically different from the traditional model pursued by the PATH program with roughly a \$100 million in sunk costs for servers, data centers, software license fees, and software consultants throughout the duration of the project. These “Sunk costs” no longer need to be at the magnitude of projects in the past. Almost 90% of the typical sunk costs are either eradicated or converted to variable costs over a long time horizon. A SaaS model ultimately makes the latest technologies more accessible than ever.

Mobile Access

Our solution has to be pragmatic about the nature of infrastructure and resources available in developing countries, in this case Honduras, and is thus mobile focused. Designing native support for mobile devices allows us to serve regions that might not have access to typical data infrastructure. Most of our solution is accessible over mobile networks and smart devices. Data can be captured at the point of entry. Information can be made available to the end user easily with mobile enabled services.

Data Management and Access

We recognize the value of reliable, consistent and trustworthy data stored in a property rights registry. Leveraging our solution as a data store that can provide long-term value for the communities it serves is a core vision that will not only help cover the operational costs of the registry, but also help transform the economies of these communities. Property secured lending that frees capital for investment will become an attainable reality. Land values can appreciate because the land’s ownership is finally understood and trusted.

The four pillars of this technology and Operations Framework lower implementation and operational costs while providing the highest level of data integrity and transparency. Each one of our building blocks in the framework has been tried and tested independently to deliver value.

We combine them to serve the ultimate need of limiting interference, corruption, mismanagement and human error in Land Administration.

A trustworthy land and property registry has a direct impact on the Doing Business Index, Economic Freedom indexes and the Property Rights Index, which in turn affects a geographic region's ability to attract Foreign Direct Investment. A reliable, secure asset base increases lender confidence and lowers cost of borrowing. An immutable register would lower the number of property disputes moving forward, while providing respite to a region's judicial system to work through the backlog of disputes.

In the long term, a robust land and property rights system will allow communities to flourish socially and economically—serving as a foundation for building voting systems, shared property transactions, cohousing initiatives, peer to peer dispute resolution, and much more.

The confluence of digital, mobile and blockchain technologies provides the greatest opportunity yet for developing nations to fix their property rights registries. This technology and the Operations Framework provide a unique opportunity for developing nations to leapfrog into an era of transparent civic applications starting with a property rights registry.

6. What would the impact in Honduras be?

Securing justice and protection of property rights.

The property rights protection system in Honduras has failed. The state Property Institute and judicial system has been unable to provide a secure and transparent property registry, to investigate and properly prosecute crimes involving property, provide an efficient, impartial and independent court process, and to protect illegal and arbitrary invasions or property theft.

Placing a blockchain backbone to the service Honduran public institutions provide, will help strengthen each one of the three weaknesses mentioned above. First, it will provide an immutable and secure software for the registration of land titles and other deeds; second, the “Proof of Existence” and “Proof of Process” features of Factom’s decentralized

blockchain based system will provide a precise, verifiable, and immutable audit trail, which can be used to boost the government's capabilities to investigate criminal invasions against property, collect judicially admissible evidence of the crimes and ultimately prosecute those responsible.

Third, the rulings of the judiciary will become more reliable. Under the Honduran legal system, all public documents (those emitted by public institutions), enjoy a "presumption of good faith"; that is, they must be recognized as truthful by the judiciary, unless one of the parties can effectively demonstrate they are not. The problem is that, as we detailed earlier, a lot of the corruption regarding property registries actually comes from within the offices of the Property Institute. The same happens with Notary documents which have been one of the main instruments used to alter the divisionary lines of private lands, and which are then illegally registered in the Property Institute.

Due to the high reliability of the "blockchain backbone", the "Proof of Existence" and "Proof of Process" features will constitute scientific evidence which can debunk and legally trump any false or manipulated land titles in court.

Poverty alleviation in rural areas.

According to The World Bank data (2014), 63% of the population in Honduras is living in poverty. In rural areas, approximately six out of 10 households live in extreme poverty, or on less than US\$2.50 per day⁹. As such, those in extreme poverty and those considered in the rural poor in Honduras, are primarily subsistence farmers and agricultural workers. Low agricultural productivity and the lack of human, capital and financial assets have been consistently pointed out as the main causes for rural poverty in Honduras.

Studies on rural poverty and the land market in Honduras led by the United States government have pointed out that without secure access to land, the poor will be unable to increase productivity and earn greater incomes or reap secondary benefits of clear property rights including: a reduction in conflict, decreased land market transaction costs, increased access to credit, and increased investments in the land. Such outcomes, would bring about a more efficient allocation of land, increased productivity and a reduction in poverty¹⁰.

⁹ The World Bank. (2016). Honduras Overview. Retrieved from The World Bank: <http://www.worldbank.org/en/country/honduras/overview>

¹⁰ United States Agency for International Development (USAID). (2011). Property Rights and Resource Governance: Honduras. Washington D.C.: USAID.

As we detailed on the first section of this document, private property land tenure in Honduras is accompanied by a considerable degree of risk and insecurity. As a result, there are strong incentives against investing or granting credit to projects in rural areas; which in turn makes it harder to break the poverty cycle.

Fundación Eléutera will continue working closely with blockchain companies to implement the technology in Honduras, either on the national system or within the ZEDE regime, as it has been specifically designed as a solution for the above mentioned problems. *Only a reliable (immutable, secure and transparent), user friendly and low cost property registry system can provide the foundation for a massive titling and registration of land. Such a system will drastically reduce the ambiguity of ownership and threat of land theft through the manipulation of public documents.* We expect that a boost of confidence in the property rights protection system of rural and urban land will also bring forth a boost of much needed investment in Honduras.

Land titling and greater access to credit have been identified as key ingredients to empower people in developing nations¹¹. Peruvian economist Hernando de Soto has explained for many years, that land titling reforms significantly benefit the poor, enabling “such opportunities as access to credit, the establishment of systems of identification, the creation of systems for credit and insurance information, the provision for housing and infrastructure, the issue of shares, the mortgage of property and a host of other economic activities that drive a modern market economy.¹²” And in his 1999 work, *Development as Freedom*, Nobel laureate Amartya Sen pointed out that one of the most important aspects of development is freedom of opportunity, a vital part of which is access to capital and credit¹³.

As property rights are secured, and thus greater access to capital and credit becomes available, market conditions will allow for greater investment in capital resources, which will boost agricultural productivity and result in higher income for the people who need it most.

Greater enjoyment of Human Rights.

¹¹ Murray, I. (2015). *Real Goals to Empower the Developing World: Alternatives to the U.N.'s Agenda for Sustainable Development*. Washington D.C.: Competitive Enterprise Institute.

¹² Soto, H. D. (1989). *The Other Path: The Invisible Revolution in the Third World*. New York: Harper Collins.
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¹³ Sen, A. (1999). *Development as Freedom*. New York: Anchor Books.

Private property rights represent the greatest safeguard to individual liberty, they empower individuals in a manner that allows them to change their reality and better their quality of life through market transactions that are only possible due to private property rights. Though international Human Rights instruments may not provide protections to private property we would like them to, they are indeed recognized and, in cases of tribal and indigenous people, the State of Honduras has been condemned by the Inter-American Court of Human Rights for not fulfilling its obligation to secure those rights through proper land registration and effective protections against illegal invasions¹⁴.

Property rights are the basis of natural rights theory, which in turn is the basis for modern human rights doctrine. Private property rights are the rights of humans to use specified goods and to exchange them. By securing individuals with a personal and inviolable margin of action, they become empowered and able to push their society towards securing greater political freedom.

The establishment of a property protection system which can usher trust in the Honduran land market, will bring forth a very tangible empowerment of the people living in rural areas. Such economic empowerment, will potentiate their ability to achieve a more transparent, democratic and accountable government that will respect their civil liberties and political rights.

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Capítulo II

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