

HARA

BLOCKCHAIN FOR BETTER DECISIONS

A global & transparent
blockchain-based
data exchange



Executive Summary

Today society produces a huge amount of data each and everyday. In 2016, we generated 16.1 zettabytes of data and that number is expected to grow ten-fold by 2025. Data is now a vital element of all aspects of our daily lives. The growth of real-time data is enabling better data driven decisions in many socially impactful sectors such as: health, education, public transportation, technology, and urban planning. Data is addressing a range of societal issues and creating a more prosperous, safer, and healthier future for the next generations.

However, only a small fraction of data is analyzed. Many organizations have collected vast amounts of data just to let it sit dormant in silos. Furthermore, users who have access to the internet are losing the value of their own data to few centralized platforms. Those who are digitally excluded, while also generating data everyday, are always at a loss since very little of their data is captured with the intention of benefitting their lives. The year is 2018, and yet, everyday we lose so much valuable data that could improve productivity and benefit to many.

The arrival of artificial intelligence (AI) and blockchain technology is improving data accessibility by removing endless layers of friction. The Dattabot team as a leading big data company in Indonesia has been successful in providing access to data and bringing valuable insights across industries. Now, a combination of AI and blockchain is unleashing the next phase of our mission: to democratize data for the world's most socially impactful sectors. Starting with the food sector, Dattabot, as the parent company, is developing HARA into a decentralized data exchange. This ecosystem brings data symmetry to all players and incentivizes participants to continuously partake in a virtuous cycle. All proceeds raised from the Initial Token Sale (ITS) is used by HARA to continue building the platform, expand its ecosystem, and fund its incentive mechanisms. HARA aims to help people, especially those who are at the bottom of the wealth pyramid, to make better decisions and improve their livelihood.

The value of data comes from its accuracy. The moment new data enters the system, data qualifiers are incentivized to validate the data which acts as a crowd-sourced indicator of its quality. Overtime, this will help improve the overall robustness of the data and help generate healthy, ongoing demand. Furthermore, data also becomes more valuable when it is processed, so HARA also provides an 'enriched data' category that allows data buyers to resubmit data that has been analyzed and rendered useful – all the while sharing proceeds with the original data provider(s). The platform will be automated by the smart contracts on HARA's blockchain and different methods of data submissions, including: the HARA suite of mobile apps, Internet of Things (IoT) devices, satellites data, imagery and more. Since Dattabot has been in the media and big data business for years, it already has relationships with businesses in all sectors, financial institutions, scientists, governments, NGOs, and educators who are ready, willing, and able to afford access to this rare and crucial data. HARA data exchange already has critical use cases that are needed to be solved today.



Executive Summary

Before the democratization of data, different silos of data sets were not linked together and were controlled by separate central institutions. Therefore, these use cases below will be difficult to realize without HARA's decentralized data exchange. Some of the immediate benefits that players will see:

- Financial institutions can now access new segments to provide low-cost banking services
- Insurance companies can now provide products that leverage better climate forecasts and soil information
- Green energy companies can use enriched data to further innovate in renewable local energy production
- Data companies can build sophisticated credit scoring models for untapped segments
- FMCG companies or retailers can provide customers with traceability information
- Certification agencies can receive information to certify and monitor real-time certification requirements
- Marketplaces can now be more efficient and competitive by providing price transparency to all players
- Biotech firms can accelerate the evolution in microbiology supporting effective substitutes for chemical and otherwise toxic farm inputs
- Smallholders and family farmers now have agronomical data, online-advice and market information, such prices and off take-volumes of products and farm inputs on a micro-market level in a timely fashion

Data empowers billions and levels the playing field for everyone. With a traceable and transparent data exchange, we do not have to lose any more valuable data and players of all sizes will have access to the data we generate collectively every day. Beginning with the food sector, HARA will touch up to 1 billion people in the planet and work its way up to the value chains of health, education, mobility, and recreation sectors.

Starting with one byte at a time.



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Company Background



Established in 2003 as Mediatrix, Dattabot's origins were "big data" and content acquisition from online and offline sources. Our company amassed an immense volume of data in its linguistic database and through AI applications, enabled computers to understand, digitize and curate Indonesian-language content from all media sources. From this platform, we aided business customers with data-driven consulting services, geo-demographic data, and media monitoring services.

In 2016, the company rebranded itself as Dattabot. Still a leader in big data analytics, we have extended our services portfolio to include systems integration, industrial internet, and our Big Data Dojo. Our technology platform now encompasses leading edge proprietary AI software applications, IoT integrations and further advancements in big data to deliver groundbreaking solutions for big problems.

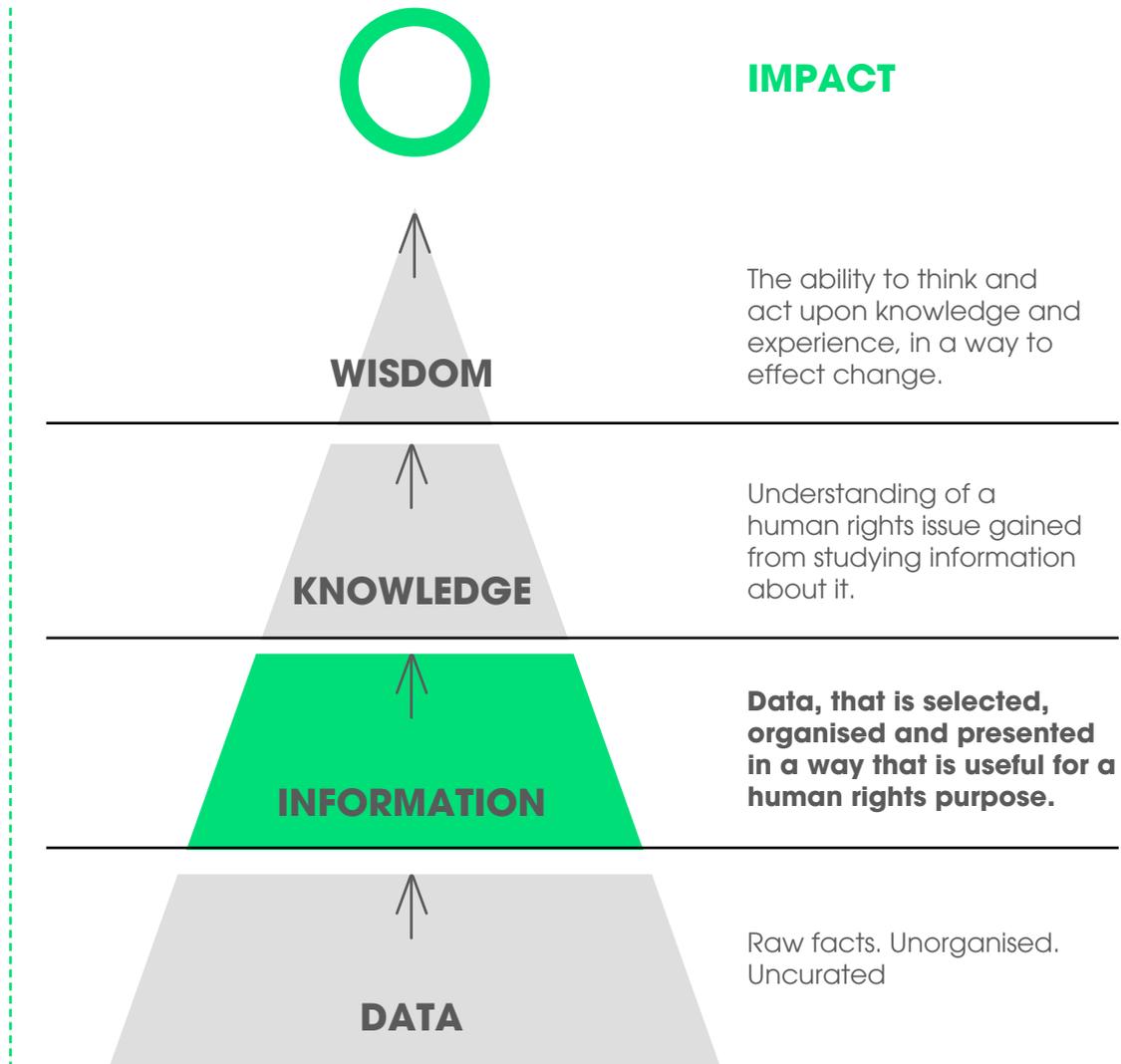
Below is a glimpse of accomplishments that characterize our journey:

- Dattabot is the leading company in big data analytics, territory management, supply-chain optimization, document digitalization, text analytics, consumer profiling and marketing analytics
- Created the first Indonesia's contextual legal taxonomy
- First start-up company in the world to establish a partnership with GE Digital to serve industrial internet market on a big data industry
- The only start-up to be invited and speak at an internal World Bank Group retreat in Kuala Lumpur, Malaysia in March 2018 with a focus on technology disruption in social impact sectors

We realize that data equals power, but we are not the only one to realize it. More and more private firms now focus their attention on data mining. They collect, analyze, and sell personal data to corporations, marketers, governments and even political parties. This data gives them an informational advantage that not only provides limitless strategies to beat their competitors but also leads to the misuse and abuse of data. While these private firms are generating massive profits, their users, do not receive any benefits from it and in many cases do not even have access to their own data. At Dattabot, we believe in data democratization. Not only should all users have access to the data, but they should also be rewarded for the data they provide.



Company Background



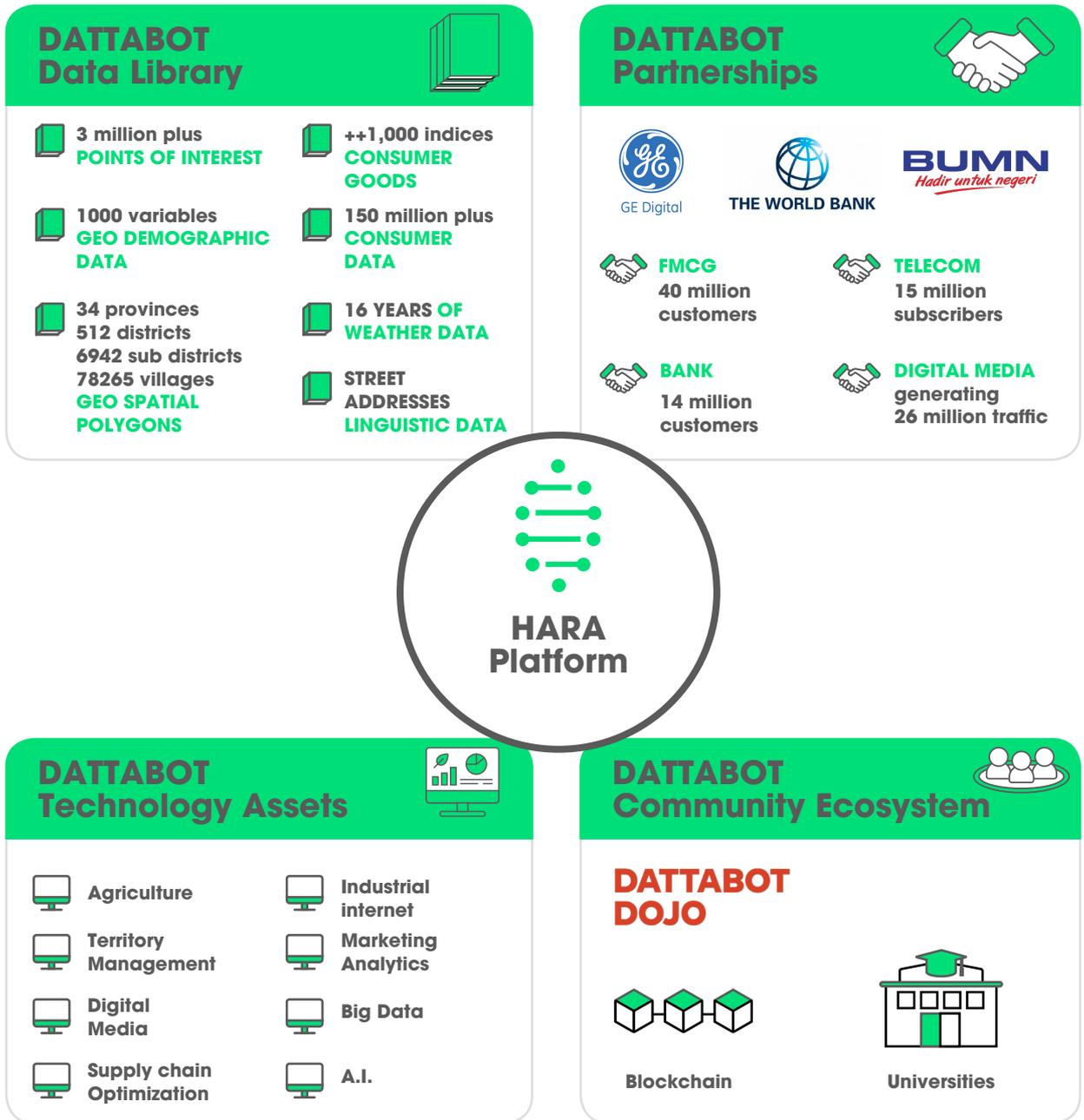
The more data we have, the more problems we solve. If we could increase access to data, we could develop innovative solutions to innumerable problems and to identify limitless opportunities. With data democratization in mind, we believe we owe our data to society and to the individuals who continuously contribute, byte by byte. Building a technology platform that could ensure economic and informational equality to all users in the data ecosystem is our way to give back to society, particularly those who are at the bottom of the wealth pyramid: the largest yet the poorest and the most digitally excluded socio-economic group.

Coming from Indonesia, we understand the economic and informational inequalities suffered by those living in the digitally excluded world. Dattabot is focused on solving large societal problems. We want to accomplish this mission by developing HARA's decentralized data exchange and ecosystem which will support better data-driven decisions for data buyers and incentivize data providers to share their data. It is our dream to create a virtuous cycle that could help all users to fully embrace the opportunities in this new era of data age.



Company Background

Through our experience in the big data industry, HARA is well positioned as we already have a wide and diverse network of data providers, data buyers, and value-added services. Our technological assets, custom-built solutions, network of clients and partners, community relationships and proactive engagement with NGOs/government bodies makes HARA a perfect complementary initiative for Dattabot. Below are the channels through which Dattabot will support the growth of HARA:



Company Background

- Our **data library** contributes its rich datasets to HARA. It supports HARA data exchange platform as a data provider, below are what we currently have:
 - 3,000,000 ++ Point-of-Interest data covering traditional markets, hyper and mini markets, education institutions, and business institutions.
 - 150,000,000 ++ Consumer data and 1000 variables of consumer goods
 - Geo-demographic data consist of socioeconomic information and geo-spatial data with detailed polygons for Indonesian region covering 34 provinces (512 districts, 6,942 subdistricts, and 78,265 villages).
 - 16 years of weather data
 - Linguistic data including 35 million formal media articles, 98,000,000 ++ social media conversations and 4,500 ++ e-books.
 - Street addresses
- Our existing **partnerships** with a diverse network of clients and partners across business sectors connect HARA with potential data buyers, such as:
 - The only authorized channel partner of GE Digital in Indonesia
 - FMCGs with 40 million customers
 - Banks with 14 million registered customers
 - Telecommunication companies with 15 million subscribers
 - Media partnerships that generate 26 million traffic
 - The World Bank
 - Local government bodies
 - NGOs
- With our on-board **technology assets**, we perform the function as value-added service provider that maximizes data potentials in the HARA platform. Our assets include:
 - Big data solution for 360-degree customer profiling
 - Deploying Industrial Internet-of-things (IoT) solutions on GE Predix platform
 - Territory management for effective routing of sales and distribution
 - Supply-chain optimization
 - Marketing analytics solution catering to digital marketing strategy and implementation for FMCGs
 - Search and recommendation engine for digital media platforms
 - Artificial intelligence, text analytics and precision agriculture capabilities
- Our close relationships with the relevant **communities** also support HARA in empowering the ecosystem by expanding access to value-added services. Our past activities include:
 - Partnering with universities and other institutions such as World Bank's Pulse Lab in research and development activities.
 - Founding member of big data associations and IoT forums in Indonesia.
 - Conducting regular knowledge-sharing and meet-up sessions for blockchain enthusiasts



2 Problems



Huge amount of data is underutilized



Data is owned by separate institutions or silos



Concerns on data quality



High cost of data acquisition



Limited data availability in certain areas or sectors



Lack of benefits for data providers

The advancement of technology also advances our ability to collect, manage, process, and deliver data. According to the International Data Corporation (IDC), the world will produce and replicate approximately 163ZB of data by 2025, or a tenfold increase from the amount of data created in 2016¹. Data driven decision-making is crucial to gaining a competitive advantage. It is not only vital for business operations but also for consumers, governments, and society at large. It offers limitless possibility to address a range of societal issues across many sectors, from food, health, education, transportation, technology to economic sectors.

According to McKinsey only 1% of data is collected and analyzed². Considering the considerable investment for data collection, management and analytics, data acquisition can be too costly for many organizations. On the other hand, there are some organizations that own vast amounts of data but failed to realize the potential of sharing the data and extracting insights that were previously unimaginable. Furthermore, data quality has always been a concern. Since organizations are the only ones responsible for data management and analytics, they must allocate considerable resources and time to maintain data integrity, accountability, and security. Ensuring the precision of data, consistency, trustworthiness, avoiding bias, and anticipating security threats are crucial in producing good quality data. Data should also be traceable back to its original source while being made transparent and reliable. Poor quality data from unreliable sources is the biggest risk in data-driven decision-making and can lead to formulation of damaging strategies.

¹ David Reinsel, John Gantz, John Rydning. April 2017, IDC White Paper. *Data Age 2025: The Evolution of Data to Life-Critical*. <https://www.seagate.com/www-content/our-story/trends/files/Seagate-WP-DataAge2025-March-2017.pdf>

² <http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world>



2 Problems

As the use of connected devices is rapidly becoming more widespread, the average person's level of interaction with data also dramatically increases. Currently, only a few centralized institutions are capturing and formulating data into insights, leaving the original data provider at a loss. IDC estimates that an average connected person anywhere in the world will interact with devices nearly 4,800 times per day — basically one interaction every 18 seconds by 2025³. This contributes to the huge amount of data being generated and drives the importance of personal data. However, these people do not have access to their own data nor are they gaining any benefits from it. Across the world, vulnerable communities and the digitally excluded lose when the few powerful centralized platforms decide what to do and what not to do with their data.

While these issues occur in all sectors, we would like to focus our attention on the agriculture and food sector due to its role in expanding economic opportunities at multiple levels of society. Food is the most fundamental need and billions of people depend on cultivating, processing, and selling food, particularly in developing countries where agriculture plays a vital role in economic development. The lack of near-time valuable data creates many hidden problems to all stakeholders across the agriculture and food value chain, for example:

- Farmers, particularly in developing countries, have little to no access to agricultural data and market information that could reduce productivity loss and increase profits.
- High percentage of food is wasted through inefficiencies in the food supply chain due to lack of location-specific and market data.
- Agriculture insurance companies are unable to predict weather and climate risks as well as production value due to lack of cultivation and ecological data.
- A customer today would want to know where a juice comes from, how it was produced, or if it was exposed to harmful materials since being produced. This information does not exist.
- Our transportation system is unable to satisfy public food demand or needs with public policies that are developed with minimal real-time data.

These problems occur due to several reasons. First, only few centralized institutions collect, store, and analyze specific agricultural and food-related sector data. It limits data accessibility to stakeholders in this sector, particularly smallholder players and individual users. Second, some data is simply not available. Individuals, groups, and regions may be at a disadvantage due to lack of access to technological infrastructure, related skills and tools to produce and utilize data in ways that benefit their lives and communities.

³ David Reinsel, John Gantz, John Rydning. April 2017, IDC White Paper. *Data Age 2025: The Evolution of Data to Life-Critical*. <https://www.seagate.com/www-content/our-story/trends/files/Seagate-WP-DataAge2025-March-2017.pdf>



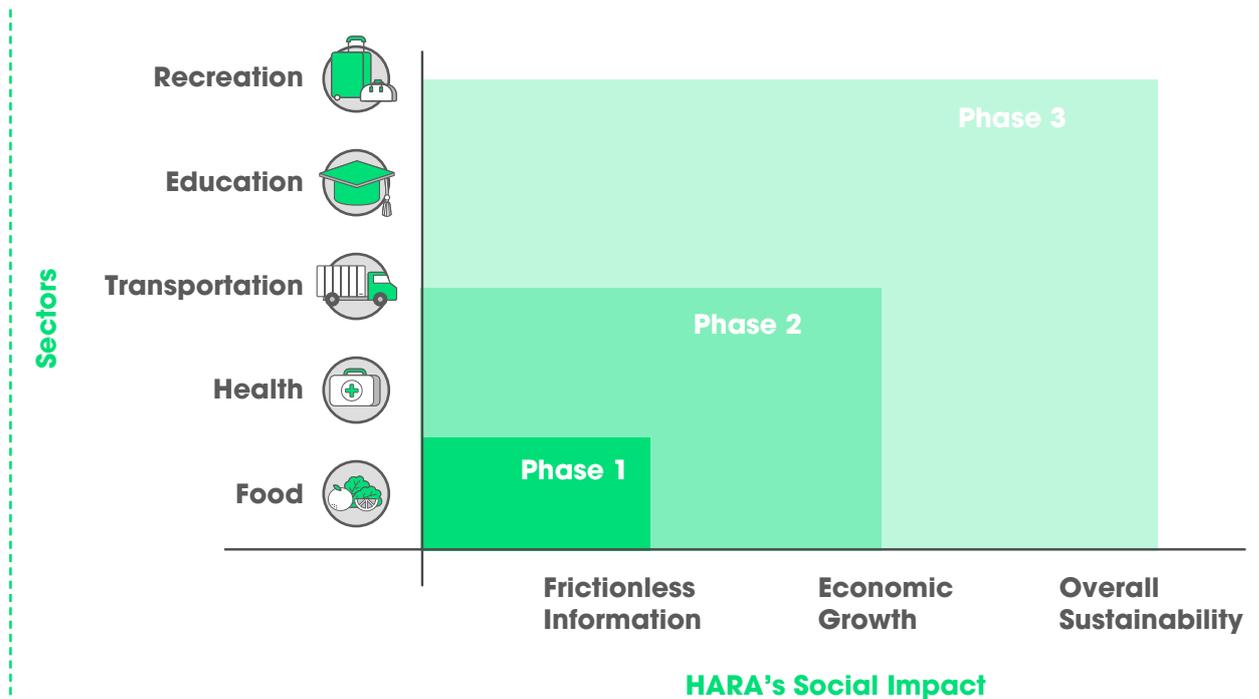
3 HARA - The Equality Solution

In the Indonesian language, the word "hara" means soil nutrients. HARA Ecosystem supplies life-sustaining nutrients in the form of transformational knowledge that enables our partners to grow and flourish so that they may collectively nourish the world.

Mission

“ Empowering billions by utilizing a global and transparent data exchange. ”

Our mission began within the agriculture and food sector and continues toward overall sustainability for the world's most socially impactful sectors. The potential impacts of a global and transparent data access on agriculture and food sector are increase in productivity, supply-chain and market efficiencies. The growth in this sector directly influences the health sector, for instance, improvement in household ability to purchase and consume cheaper and better food. Access to location specific data also enables well-targeted infrastructure development that will impact the transportation sector. Overall, a global and transparent data exchange platform will improve the welfare of agriculture workers and provide a trigger for remarkable economic growth and expansion to other sectors, particularly in developing countries where agriculture plays a pivotal role to the country's economic development.



Our Products

- **A Decentralized Data Exchange** – HARA Ecosystem provides decentralized data exchange for data providers to provide their data and data buyers to access the data. Powered by blockchain technology, this exchange is traceable, transparent, and secured. Vast amounts of data, ranging from farmers identification data, cultivation data, location specific data, ecological data, and market information and transaction data, are collected via a variety of sources including IoT and satellite as well as from third-parties such as farmers, governments, scientists, academia, farm-input manufactures and other entities. These data originators are enabled to upload datasets to the data exchange and sell their data to other third-party data buyers via the decentralized token-based data exchange.



3 HARA - The Equality Solution

- **Suite of Data Acquisition Applications** – Mobile app and web portal enable data providers to easily supply data. The app and web portal are gamified and data providers who supply and verify data are rewarded with loyalty points. These points may be redeemed for various products and services, such as phone credits, discounts on agriculture supplies, and education supplies. This mechanism encourages data providers to continuously supply data to HARA Data Exchange Platform.

HARA Ecosystem is a decentralized, secured and transparent platform that is built on top of an Ethereum-enabled blockchain with smart contracts. The main benefits of this platform are:



Facilitates integration of numerous data sets



Offers more affordable data management system



Provides traceable and transparent data that can be continuously verified



Simplifies data connectivity to all stakeholders



Ensures that data ownership belongs to data providers



Incentivizes data providers through tokens

Revenue Model

HARA Ecosystem retains a modest portion of each dataset transaction, with the remainder to be earned by data providers and data qualifiers (if applicable). Data providers include crop and livestock farmers, data companies, NGOs, as well as other agriculture data collection technology purveyors (satellite and IoT data providers).



4 Total Addressable Market (TAM)

“ HARA is a marriage between digitalizing the bottom of the pyramid and creating visibility across the agriculture industry. ”

HARA aims to target three growing industries, which are: agriculture and food sector, data commercial market, and digital advertising. Data collected in the HARA data exchange platform will be of great benefit in improving productivity and efficiencies as well as facilitating market expansion and fair playing field in these industries.

Agriculture and Food Sector

HARA starts with the agriculture and food sector in order to address one of the world's most fundamental problems: food security. According to Department of Economics and Social Affairs of the UN, the current world population of 7.6 billion is expected to reach 8.6 billion in 2030, 9.6 billion in 2050 and 11.2 billion in 2100. The majority of growth will occur in Asia and Sub-Saharan Africa⁴. Consequently, the global agriculture and food sector is changing rapidly because of the intensive increase of global food demand. The Food and Agriculture Organization (FAO) estimates that food production will need to increase by 100% globally to ensure food security in 2050⁵ and to meet 70% increase in caloric demand. There is a clear need for improvement in the sector's technological, infrastructural, and institutional basis to ensure its sustainable development.

One of the biggest challenges in ensuring food security is to make the agriculture and food system to be more effective, inclusive, and resilient. The global agriculture and food sector is worth US\$ 5 trillion and represents 10% of consumer spending and 40% of the employment⁶. The Food and Agriculture Organization of the United Nations estimates the combined global gross production of cereal, crops, and livestock to be nearly \$4 trillion. Moreover, global food exports grew by approximately 45% between 2006 and 2016. However, according to the FAO, approximately 30% of global food production or 1.3 billion tons of food is either lost or wasted⁷. It is estimated that global food waste and loss cost \$940 billion a year⁸. In developing countries, 32% of total loss occurs during production and handling⁹, mainly caused by managerial and technical limitations during storage, transportation, processing, packaging and marketing of the food production.

To solve these problems, the agriculture and food sector needs to embrace the potentials of digital innovations that could increase productivity, supply-chain and market efficiencies. As the sector involves a wide range of stakeholders, from input suppliers, logistics, traders, financial services to data companies, access to near-time valuable data is extremely crucial to link information from diverse points across the value chain. It will increase the capacity to absorb foreign and domestic knowledge and better respond to the dynamics of the supply-chain and the market.

⁴ United Nations, Department of Economic and Social Affairs, *World Population Projected to Reach 9.8 Billion in 2050, and 11.2 Billion in 2100, June 21, 2017*, <https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html>

⁵ Food and Agriculture Organization of the United Nations, *The State of Food Security and Nutrition in the World 2017*, <http://www.fao.org/state-of-food-security-nutrition>

⁶ Goedde, L, Horii, M. and Sanghvi, S., 2015. *Pursuing the global opportunity in food and agribusiness*. <https://www.mckinsey.com/industries/chemicals/our-insights/pursuing-the-global-opportunity-in-food-and-agribusiness>

⁷ Food and Agriculture Organization, United Nations, *New online platform fosters efforts to curb food losses through information sharing*, 2014, <http://www.fao.org/news/story/en/item/262504/icode/>

⁸ Magnin, C. 2016. *How big data will revolutionize the global food chain*. <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-big-data-will-revolutionize-the-global-food-chain>

⁹ The FAO of the United Nations, 2011. *Food Balance Data*. www.fao.org/faostat/



4 Total Addressable Market (TAM)

Innovations such as precision agriculture enable the collection of valuable data that will provide all stakeholders with new opportunities. Precision agriculture is a modern farming management tactic that utilizes IoT, big data, and satellite imagery to maximize resources and improve productivity. Combining different data sources is particularly important because agriculture is very location-specific. Water, land, weather, and climate characteristics are largely varied from one area to another, the proximity of a given farming operation to the marketplace and the logistic also differs greatly from location to location. In addition, farming methods and practices are influenced by local values and cultural roots, which result in distinctive behavior and decisions made on the farm. Precision agriculture is one of the vital components in the smart agriculture market. The smart agriculture market alone is projected to grow from \$5.18 billion in 2016 to \$11.23 billion by 2022, at a compound annual growth rate of 13.27% between 2017 and 2022.

Initial Target Countries

Aligned with Dattabot's mission to ensure economic and informational equality for all, HARA focuses on the agriculture and food sector in developing countries. Increased agricultural productivity plays a vital role in alleviating poverty in these areas. Various studies have found that there are "significant relationships between productivity growth and poverty and nutrition, and the agriculture had a greater impact on poverty than the other sectors"¹⁰. Attempts to quantify the impact of poverty abatement through increased of agriculture productivity estimates that one percent (1%) increase in productivity reduces the percentage of people living on less than a dollar per day by between 0.6% and 1.2%.¹¹

Furthermore, in developing countries where critical agricultural data is more difficult to find, having a decentralized data exchange platform will solve the painful problems of data asymmetry. Access to the market and agricultural data remains key challenge for farmers in these countries and will push the adoption of HARA platform. Starting from the needs of financial inclusions enabled by the financial institutions, to food traceability, precision agriculture, logistics, supply chain and general market place.

Our pilot project shows that the impact is big. This impact has not gone unnoticed and is reflected by the supports HARA receives from: International NGOs; multinational and national banks; insurance companies; support from local governments and communities; and also national and international media.

The markets that HARA will focus on are developing countries located near the equator, characterized by long growing periods (many are year-round), and where access to mobile phone service is available. Dattabot has identified eight (8) countries that possess these attributes, where collectively, these countries represent nearly one third of all smallholder farmers in the world, which are:



¹⁰ Australian Government, Australian Centre for International Agricultural Research, *The Contribution of Agricultural Growth to Poverty Reduction*, ACAIR Impact Assessment Series, 2012, 29, http://aciarr.gov.au/les/node/14358/ias76_the_contribution_of_agricultural_growth_to_p_27524.pdf

¹¹ International Finance Corporation, World Bank Group, *Poverty Literature Review Summary: Agriculture and Poverty Reduction*, June 29, 2012, 2, International Finance Corporation, World Bank Group, *Poverty Literature Review Summary: Agriculture and Poverty Reduction*, 2012, <https://www.ifc.org>



4 Total Addressable Market (TAM)

Below is the analysis of the size of agriculture and food sector, as well as internet and mobile penetration to ensure that HARA platform will be easily adopted in these countries. We also considered financial services penetration, as it can be used to measure growth potentials in the agriculture and food sector. In addition, financial services can also utilize HARA platform to expand their business opportunities by touching previously untapped segments, such as smallholder farmers, due to lack of valuable data.

Agriculture and Food Sector: Brief Overview

The agriculture and food sector is crucial in these countries. Agriculture employed almost 200 million people, or equal to 23% of total population. Furthermore, with Peru as an exception, more than 30% of land area is used for agricultural purposes (areas that are characterized as arable, under permanent crops, and under permanent pastures)¹². In Bangladesh and Uganda, agricultural land constitutes more than 70% of total land area thus highlights how important agricultural sector in these countries. In size wise, Mexico has the largest agricultural land with more than 1 million square kilometer. In total, agricultural production value in these eight countries is worth US\$ 499 billion, of which food production (e.g. cereals, food crops, and dairy products) contributes to almost 90% of total production.

Target Market	Total Population	Production Value (Current US\$) Total	Total Workers in Agriculture	Total Land Area (Sq.km)	Agricultural Land (% of Land Area) 2015
Bangladesh	162,951,560	\$ 62,644,488,070	40,445,519	130,170	70.6%
Indonesia	261,115,460	\$ 153,225,975,712	46,178,507	1,811,570	31.5%
Kenya	48,461,570	\$ 15,365,895,535	27,333,732	569,140	48.5%
Mexico	127,540,420	\$ 85,286,916,154	6,767,994	1,943,950	54.9%
Peru	31,773,840	\$ 20,849,232,121	4,291,679	1,280,000	19.0%
Thailand	68,863,510	\$ 75,068,128,347	16,310,773	510,890	43.3%
Uganda	41,487,960	\$ 10,700,763,022	12,164,802	200,520	71.9%
Vietnam	92,701,100	\$ 75,887,835,992	41,204,574	310,070	37.8%
	834,895,420	\$ 499,029,234,952	194,697,580		

Internet and Mobile Penetration

Internet and mobile penetration are the most important factors to ensure the penetration of HARA platform. Our target countries are among the most populous countries in the world and all have relatively high internet penetration rate¹³. Kenya and Thailand have highest penetration with up to 85% of the population already connected to the internet. In terms of size, Indonesia has the largest internet-connected population with approximately 140 million users. Mobile penetration rate is also very high. Seven out of 8 countries have more than 80% penetration rate. With the requisite mobile connectivity in place, the HARA Ecosystem solution is ready for deployment in these countries.

Target Market	Total Population	Internet Penetration	Mobile Penetration Rate
Bangladesh	162,951,560	45%	83.4%
Indonesia	261,115,460	54%	99.7%
Kenya	48,461,570	85%	80.4%
Mexico	127,540,420	64%	87.6%
Peru	31,773,840	68%	109.8%
Thailand	68,863,510	84%	105.0%
Uganda	41,487,960	46%	55.0%
Vietnam	92,701,100	67%	79.0%
	834,895,420		

¹² <https://data.worldbank.org/indicator/AG.LND.AGRI.ZS>

¹³ Combined data from www.internetstats.com and www.statista.com

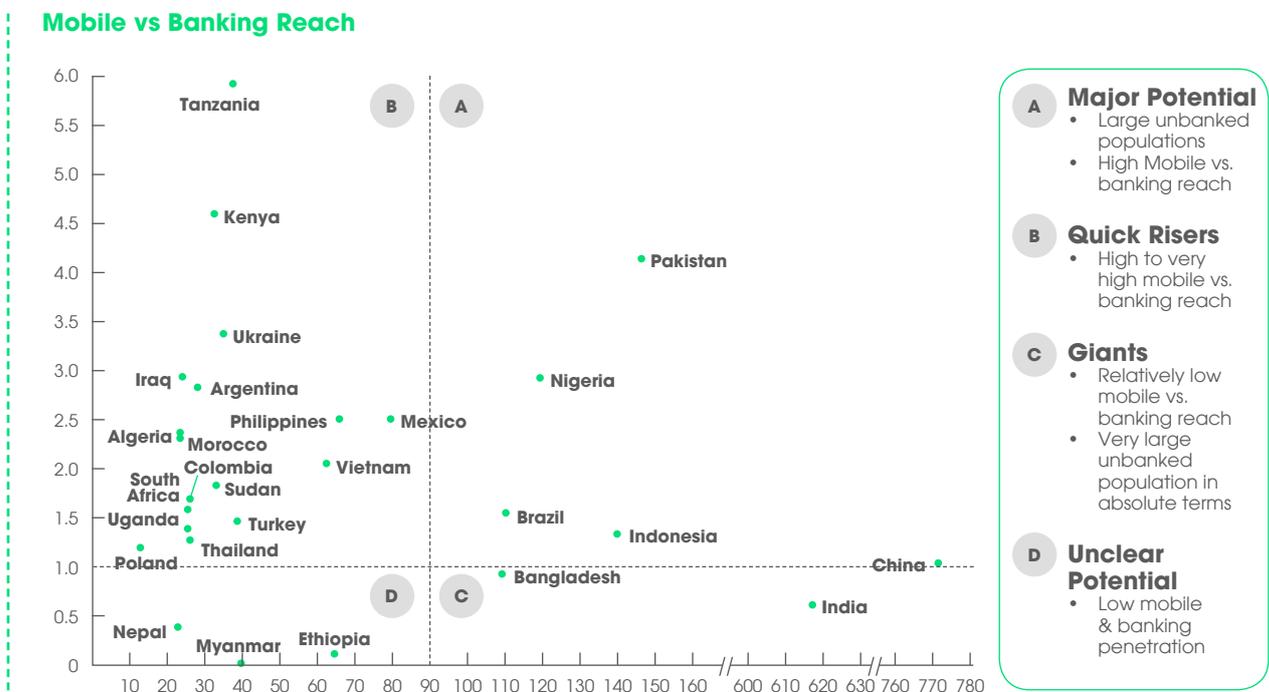


4 Total Addressable Market (TAM)

Financial services

The development of agriculture and food sector requires financial services to support bigger investment of agriculture-related infrastructure and other production-related resources. Thus, it is important to have an overview of financial service industries and its potentials in the target countries.

All target countries have high potentials in mobile and banking/microfinance institutions reach. According to the International Finance Corporation (IFC)¹⁴, Indonesia, for example, is categorized as a major potential country as it has large unbanked population and high mobile penetration. Other target countries, which are: Kenya, Mexico, Uganda, Vietnam, and Thailand, are categorized as quick risers. This category has high mobile penetration and high adoption rate in mobile money or digital wallet. Mobile money or digital wallet can improve efficiencies across the food value chain and open the opportunities to utilize mobile-based technology to advance agricultural operations. For example, in Kenya, MFarm developed an app providing up-to-date market prices for agricultural products. This app also links farmers with buyers with a group-selling service that facilitates smallholder farmers to market their products to large buyers¹⁵.



¹⁴ The International Finance Corporation of the World Bank Group, April 2013. *IFC Mobile Money Scoping*. www.ifc.org

¹⁵ Magnin, C. 2016. *How big data will revolutionize the global food chain*. <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-big-data-will-revolutionize-the-global-food-chain>



4 Total Addressable Market (TAM)

Despite the potentials of banking reach, microfinance institutions are still the key to improve financial access to agriculture workers in developing countries, given its advantage in proximity to the customers and its frequent association with more cooperative financing approaches. Some of the target countries, which are: Vietnam, Bangladesh, Peru, and Mexico, are among the top 10 countries for micro-loan portfolio outreach as shown in the table below:

Top 10 countries by borrowers and loan portfolio outreach

Rank	Country	Borrower FY 2016 & borrower growth since 2015 (%)	GLP(USD) & GLP growth since 2015 (%)
1	India	47.0m (+18.4%)	14.7bn (+24.4%)
2	Vietnam	7.6m (0.0%)	7.4bn (+0.2%)
3	Bangladesh	25.2m (+5.1%)	6.9bn (+19.7%)
4	Peru	4.6m (+12.4%)	10.8bn (+16.3%)
5	Mexico	7.0m (+3.2%)	4.4bn (-6.4%)
6	Cambodia	2.3m (-0.1%)	6.4bn (+20.7%)
7	Colombia	2.8m (+0.4%)	6.0bn (+12.5%)
8	Bolivia	1.3m (+2.4%)	7.4bn (+13.1%)
9	Brazil	3.2m (0.0%)	1.9bn (+11.8)
10	Ecuador	1.3m (-10.0%)	5.1bn (-7.2%)

The top 10 countries listed are defined based on the loan portfolio and borrowers registered in each country during 2016

To conclude, our initial target is developing countries where agriculture has been vital to the country's economic development. Agricultural land occupies large percentage of total land area and has been one of the main sources of employment. These countries also have high internet and mobile penetration rate, which are the requisite for the adoption of HARA platform. In addition, combination of high mobile and banking/microfinance institutions reach increases the potentials for HARA and its incentive system to be accepted by farmers as data providers. Despite limited data available to illustrate the food value chain in these countries, our local knowledge assures us that these countries are promising markets that are suitable to be the focus of our data collection.

Data Commercial Market

As previously stated, vast amounts of data is underutilized. Many organizations are still reluctant to invest in data management due to its high cost of data acquisition as well as limited strategic and human resources to convert cost of data management into assets. It creates big opportunities for players in the data commercial market. It is estimated that big data and analytics sales will reach US\$187 billion by 2019, an increase of over 50% to 2015 levels. Furthermore, PWC estimated that revenue from commercializing financial data could be worth US\$300 billion annually by 2018 with 10.38% compound annual growth. A Capgemini survey supports the PWC finding, in which 61% respondents state that big data is now a driver of revenues in its own right.



4 Total Addressable Market (TAM)

Digital Advertising and Adoption

HARA focuses on the bottom of the pyramid data. This group previously received little attention resulting in limited data availability. HARA offers limitless potentials of data commercialization, particularly in the digital advertising to reach this particular market. The digital advertising industry is projected to continue to experience remarkable growth through 2021 to reach almost USD 100 billion in annual revenue, with mobile and social advertising becoming the top destinations, which the latter expected to double in size to USD 30.8 billion by 2021. Furthermore, in the Global Advertising Forecast report published in December 2016, Magna estimated revenues from digital advertising for 2016 to be over \$178 billion (36% of the total global spend of \$493 billion). Approximately 54% of this was shared between Google and Facebook. Magna expects this 36% figure to rise to 50% of the total by 2021 (i.e., \$300 billions of an estimated \$600 billion). Digital advertising revenues are thus considerable, averaging about \$89 per internet user, and \$287 per US Internet user, and they are projected to grow at 11% annually.

In addition, HARA platform facilitates data democratization that incentivizes owner of the data or data providers. It prevents unethical/unfair data commercialization practice that only benefits few centralized platforms that has been collecting and managing data. The market is huge, for instance, in 2015, the data broker market alone amassed USD 156 billion from selling data that does not belong to them.



5 Demand For Data



HARA offers near-time valuable data that is crucial to increasing productivity and reducing losses and market inefficiencies in the agriculture and food sector.



All stakeholders across the value chain will get access to actionable data-driven insights that will help them embrace market opportunities and improve their economic decisions.



HARA is a solution to connect farms, markets, consumers, and other stakeholders that will support the efforts to ensure food security and secure solid economic growth for all.

Having visibility and understanding of accurate data is vital to identify problems and opportunities across the food value chain. HARA facilitates implementation of precision agriculture using a suite of applications that combines data from IoT and satellite as well as from third parties such as farmers, input suppliers, logistics, traders, retailers, governments, and other entities. Data collected will provide actionable data-driven insights to support results in improved productivity and efficiency in the agriculture and food sector. HARA is a solution to connect farms, markets, consumers, and other stakeholders that supports the efforts to ensure food security and secure solid economic growth for all.



5 Demand For Data

Type of Data

Farmer related data

FARMER DATA

Farmer's ID
Farmer's Profile
Profile Photo
Selfie with ID
Birth Date
Address

COMMODITY DATA

Name

FIELD OWNERSHIP DATA

Farmer
Field
Ownership Status
Validity Status

FIELD DATA

Name
Polygon
Farmer's ID
Farmer's Profile
Profile Photo
Selfie with ID
Birth Date
Address

Location specific data

Cultivation data

FARM INPUT DATA

Farmer
Field
Commodity
Brand
Amount
Cost of Farm Input
Date

HARVEST DATA

Farmer
Field
Commodity
Selling Price per KG
Cost for a Season
Date

PLANTING DATA

Farmer
Field
Commodity
Cost of Seed
Date

DISEASE DATA

Farmer
Field
Commodity
Disease Info
Cost of Medicine
Date

PEST DATA

Farmer
Field
Commodity
Pest Info
Cost of Chemical
Date

SOIL DATA

Soil Detail
Date

WEATHER DATA

Weather
Temperature
Date

Ecological data

Market information & transactional data

MARKET DATA

Traditional Market
Commodity
Price
Date

YIELD TRANSACTION DATA

Farmer
Business Entity
Commodity
Price per KG
Total Price
Date

FARM INPUT TRANSACTION DATA

Farmer
Business Entity
Brand
Type
Amount (Dose)
Price
Date

TRADITIONAL MARKET DATA

Name
Commodity
Country
Province
Area

BUSINESS ENTITY DATA

Name
Commodity
Country
Province
Area
Type



5 Demand For Data

Potential Data Usage

Agriculture Input Suppliers

Agriculture input suppliers are retailers who provide farmers with products needed for agricultural production, such as animal feeds, vaccines, seeds, fertilizers, and pesticides.

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

- Improving inventory management, product-flow scheduling, and ability to predict future shortages, bottlenecks, and excess stock.
- Identifying market opportunities and meeting specific demands of the farmers based on type of farms, regions, climate and weather conditions

Crop and Livestock Farmers

Farmers in developing countries are mainly smallholders or farm households that own/cultivate a plot of land of less than 2 hectares. The vast majority of smallholder farms are located in rural areas, especially on the continents of Asia and Africa. As a group, they earn at or below the poverty levels in their home countries, typically earning less than \$2.00 per day. These farmers generally have minimal access to modern farming techniques, agricultural data, and access to market information.

Relevant Type of Data:

-  Ecological data
-  Location specific data
-  Market information & transactional data

Data Potentials:

- Reducing weather and climate risks
- Improving farming management through access to ecological and location specific data
- Improving operational efficiencies through access to supply-chain data
- Increasing profit by improving access to current market information

Agricultural Logistics and Transport

Logistics in the agriculture and food sector are responsible for the physical flow of agricultural products from production to consumption.

Relevant Type of Data:

-  Farmer related data
-  Ecological data
-  Location specific data

Data Potentials:

- Improving delivery reliability through location specific data that offers the status, performance, and potential roadblocks in real time
- Reducing loss from product spoilage
- Improve operational efficiencies (e.g. cutting transport times by choosing better routes)
- Combining transport-management systems with agricultural sensors can generate average savings of 10 to 20% in operational costs*.

* Magnin, C. 2016. *How big data will revolutionize the global food chain*. <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/how-big-data-will-revolutionize-the-global-food-chain>



5 Demand For Data

Off-takers and Traders

Off-takers and traders are those who purchase agricultural products directly from the farmers. Off-takers invest on the farmers and agree to purchase farmers' future production. One of the biggest risks for off-takers is failing to recover cost of their investment because farmers sell some or most of their increased productivity to other buyers, or also known as side selling.

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

- **Formulating better harvest prediction**
- **Improving quality of output and product traceability**
- **Enabling better stocking management system at the warehouses**
- **Increasing profit by improving access to current market information**
- **Reducing the risks of side selling**

FMCG and Retailers

FMCG and retailers supply agricultural and food products to the consumers, both households and business consumers (e.g. hotels and restaurants).

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

- **Improving product quality, safety and traceability**
- **Meeting the rising demand of healthier food products**
- **Having deeper understanding on market situation (e.g. demand potential, gaining insights for R&D)**
- **Performing targeted marketing activities**

Banking, Insurance Companies, and Other Financial Institutions

Agricultural financial services include banks, insurance companies, and other microfinance institutions that support farmers to expand their operations through investment on agriculture-related infrastructure and other production-related resources.

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

- **Formulating credit scoring or risk profiling**
- **Getting access to untapped segments**
- **Calculating insurance premiums with better risks prediction**
- **Facilitating the implementation of mobile banking to provide low-cost banking services**



5 Demand For Data

Data Companies

Data companies offer access of agricultural-related data to manufacturers, institutions, and other stakeholders across the food value chain. They can utilize HARA platform to gain access to both raw and structured data. In addition, data companies can also provide simple static data about the population that would be valuable for banks and insurance companies amongst other stakeholders, such as names, date of birth, addresses, marital status, and land ownership/size.

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

- **Gaining access to valuable data sets in both raw and structured formats**
- **Offering possibilities for data companies to enrich their own data sets**
- **Offering opportunities to monetize their data by submitting it to HARA platform or by processing the raw data and submitting the more valuable structured data back into the platform**

Government

The roles of government are crucial in agricultural development, such as, formation and execution of policies, provision of physical infrastructure, and ensuring financial inclusion for farmers.

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

- **Embracing potentials of data-driven policy making that could benefit all stakeholders in the agriculture and food sector**
- **Improving ability to anticipate and tackle agricultural-related problems**
- **Facilitating more efficient government**
- **Boosting economy in a sustainable manner**

NGOs

NGOs have played an important role in the agricultural development. They serve as public actors who link farmers to government, international and local funding institutions, and development agencies. They formulate agricultural programs that could create sustainable agricultural development for local farming communities.

Relevant Type of Data:

-  Farmer related data
-  Cultivation data
-  Location specific data
-  Ecological data
-  Market information & transactional data

Data Potentials:

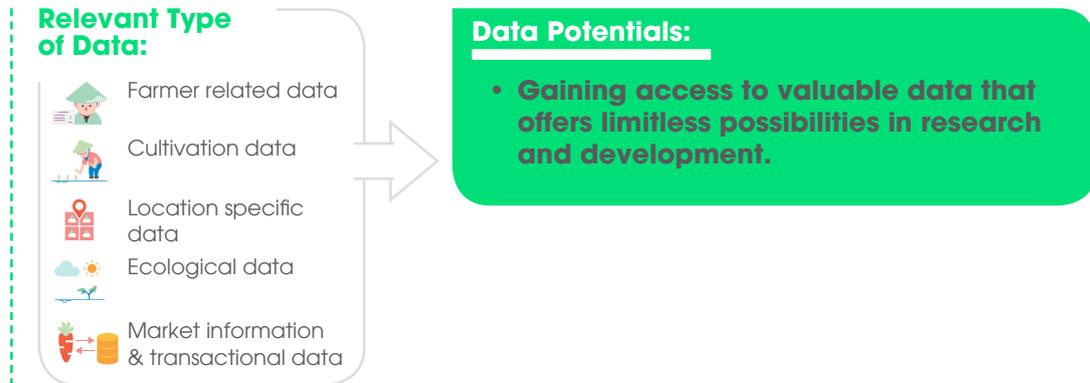
- **Gaining better knowledge of local people's circumstances and their needs**
- **Formulating effective agricultural programs that could benefit local communities**



5 Demand For Data

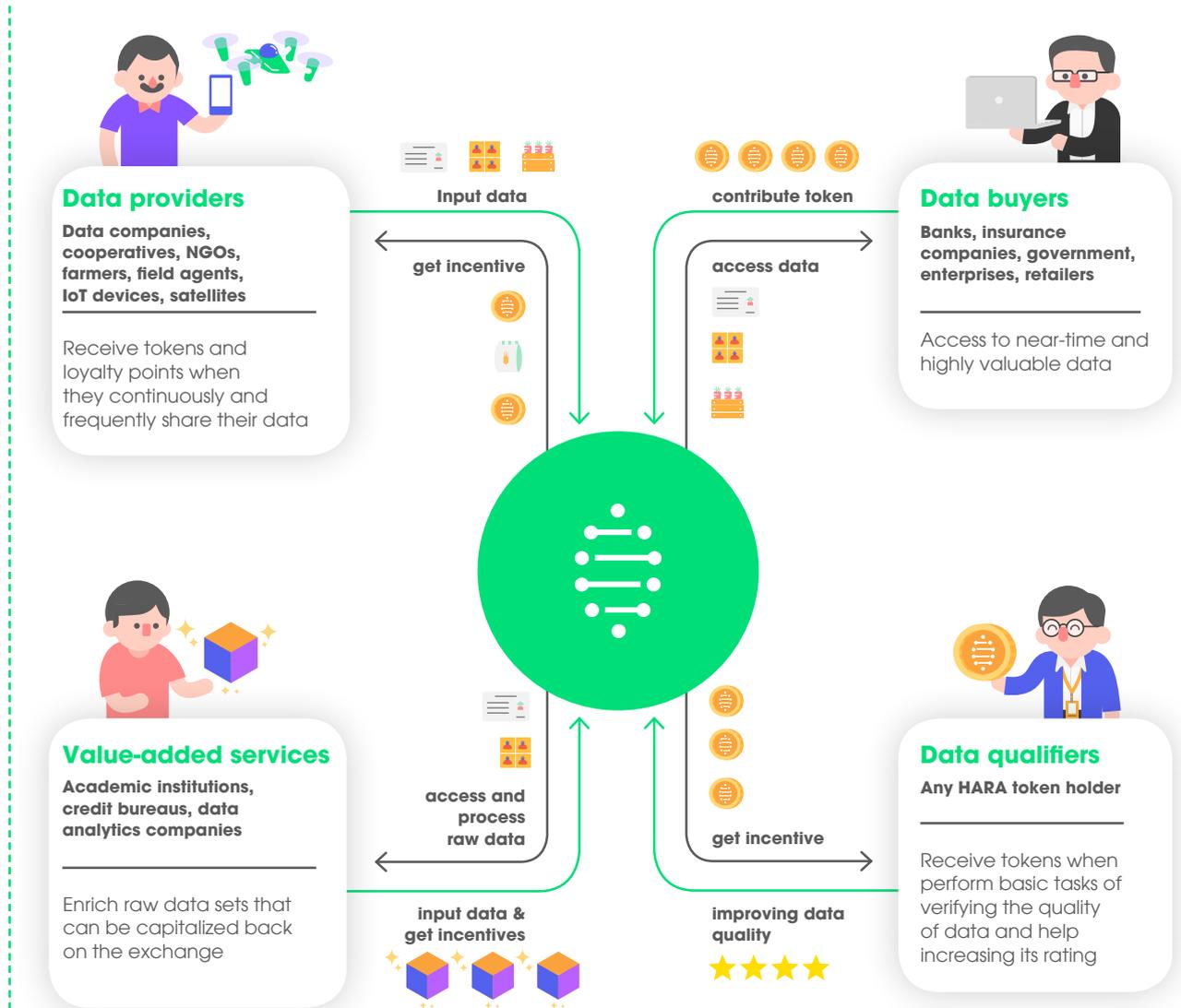
Academic and Research Institutions

The roles of academic and research institutions are crucial in providing new knowledge and skills as well as accelerating innovation and technology adoption in the agricultural sector.



6 HARA Ecosystem

The HARA Ecosystem is a decentralized, secure and transparent platform that is built on top of an Ethereum-enabled blockchain. HARA securely connects and governs data providers and buyers in its ecosystem with a market driven revenue distribution model and proprietary rating system. Data provisioning and consumption is facilitated through mobile and web-based applications. These applications enable integrated data transactions, acquisition, processing, storage and analysis.



6 HARA Ecosystem



Data Providers

Data providers include individual data contributors, data companies, cooperatives, NGOs, field agents, and governments. They can use the data exchange to assess the quality of their data and monetize it by exchanging it for tokens.



Data Qualifiers

Data qualifiers add value to the ecosystem by providing verification in the form of proof of work. They act as a crowd-sourced indicator of data quality, which overtime, will help improve the overall robustness of the data and help generate healthy, ongoing demand. Data qualifiers will receive tokens based on their efforts related to the tasks they perform-in verifying data on the exchange. Data qualifiers can be any HARA token holders.



Data Buyers

Data buyers include enterprises such as banks, insurance companies, retailers, agriculture input suppliers, NGOs, and government – all the way down to local communities or even individuals.



Value-added Services

Companies and institutions that access and process raw data from HARA Ecosystem, and resubmit it as 'enriched data'. These can be academic institutions, brands, data analytics, financial technology and agriculture technology companies. They create value-added insights from the raw data and share in the proceeds with the original data providers by submitting the cleansed, organized, and structured data back to the HARA Ecosystem.



7 Use Cases

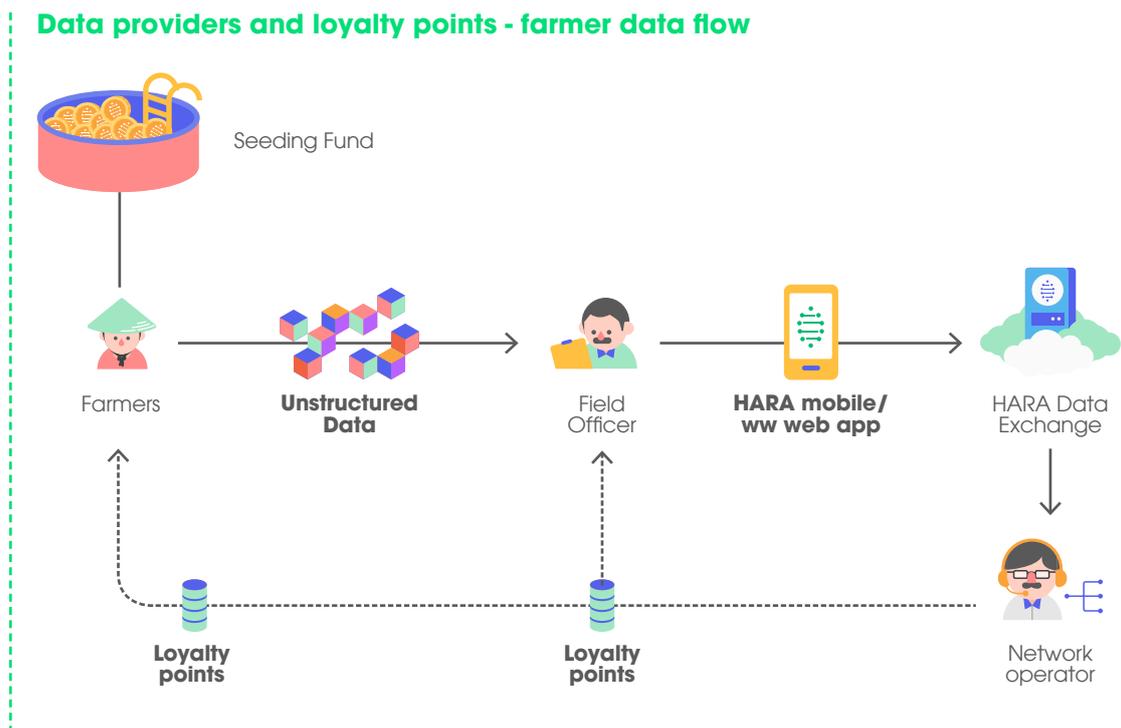
A native token in the HARA ecosystem is required in order to encompass the inner economy and protects it from those with large stakes of ETH and interests that are alien to the system. Similar to how arcades prefer to use pre-paid cards or proprietary physical tokens, without a native token, it would be difficult to manage the ecosystem at large. It is important to note that HARA token is issued as a pure utility token and does not represent any form of security under Singapore law, rules, and regulations.

Smallholder Farmer as any Data Provider

Smallholder farmers use the HARA platform with the expectation of receiving multiple benefits from the various value-added providers in the ecosystem. By being a part of HARA, they gain access to many benefits including, but not limited to:

- Access to precision farming advice catered specifically to their farm to help them produce greater yields per hectare accompanied with instructions and guidance
- Recommendations regarding the best farm inputs – crop types, seed types, fertilizers, pest controls, irrigation and more that are specific to each farmer’s location and environment
- Access to market information specific to each farm including: local supply chain partners, post-harvest off-takers, traders, and wholesalers
- The farmer uploads certified land title document and other associated data that may be leveraged to receive loans and other financial services
- Access to other non-banking financial services such as crop/health/life insurance
- Access to market data related to supply and demand levels and local market prices for each type of crop
- Ability to earn loyalty points that can be redeemed for a variety of goods and services provided by HARA partners

The following diagram illustrates the flow a farmer will follow to add data to his account and other inputs such as GPS data, crop planting suggestions, pest data and other information associated with their farming practice.

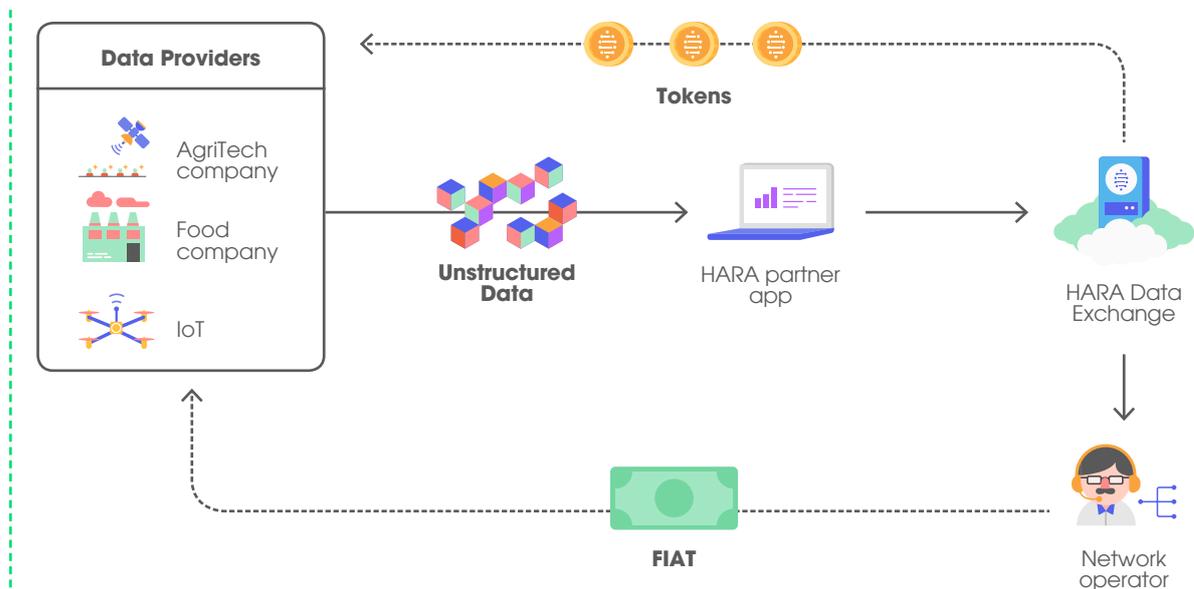


7 Use Cases

Given the inherent challenges of training farmers to submit data, HARA is employing field officers to assist farmers in registering their profiles and continuously collecting agriculture data throughout the farming cycle of cultivation, harvest and post-harvest seasons. Smart contracts award tokens to these data providers in the form of loyalty points, and the farmers can collect incentives (such as discounts on fertilizers and seeds) through local partners also in the HARA ecosystem.

AgriTech or IoT Companies as any Data Provider

Businesses operating in the realm of agriculture, food, supply-chain and technology industries are rewarded in the HARA ecosystem for sharing their data sets on the exchange. The HARA suite of applications include a variety of apps for companies to upload data onto the HARA data exchange platform. To simplify the token acquisition process, we are providing an entity called a 'Network Operator', which maintains a reserve of HARA tokens. When data is transacted, these companies will receive proceeds in the form of tokens and can choose to convert them into local currency using a network operator.



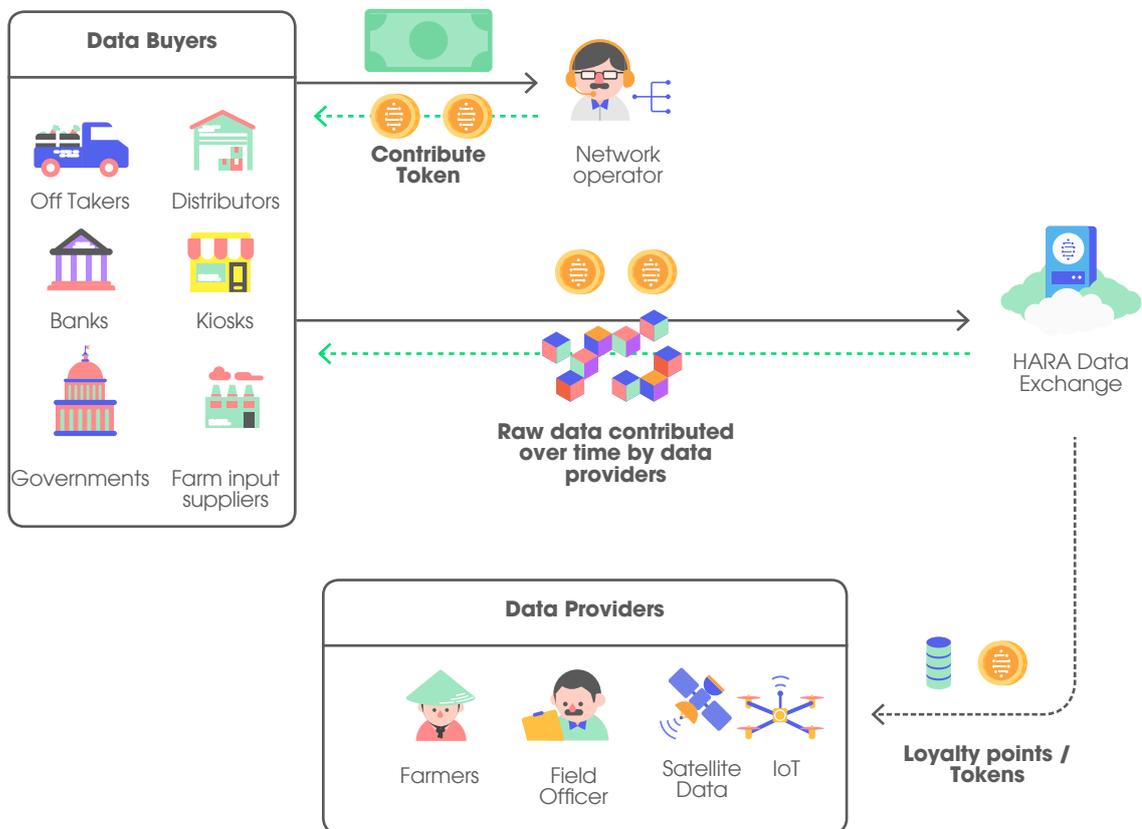
Data providers have to use HARA Token to be listed on the exchange. A portion of those tokens is allocated to receive a basic rating and compensate for the work that goes into validating their data. Data providers that get their data qualified by more qualifiers will receive higher ratings, which will increase credibility compared to other data sets listed on the HARA decentralized data exchange.



Data Buyer - Purchase Raw Data Sets

In this scenario, a company, NGO, government institution, or even an individual can contribute tokens to get access to raw data sets from HARA. These data buyers will input a search query using parameters and filters provided in the HARA ecosystem, initially concentrated around agriculture and food sector data. When buyers access data, they can do so directly with tokens or go through a network operator using local currency. The network operator will find the best exchange price and make the transaction seamless for the buyer.

Data buyer contributes token to access unstructured data from data providers - Access to raw data flow via network operator



In addition to accessing data on the platform, HARA is adding a data seeking program feature for data that is not yet available. Any data buyers can request and fund the acquisition of highly specific granular data that is not yet available in the platform in the form of a 'mini tasks'. Data providers are crowd-sourced and incentivized to provide the requested data. Through this feature, these 'mini tasks' can be pushed out to users and targetted based on GPS, demographic segmentation (e.g. age, gender, location), time, and so forth.

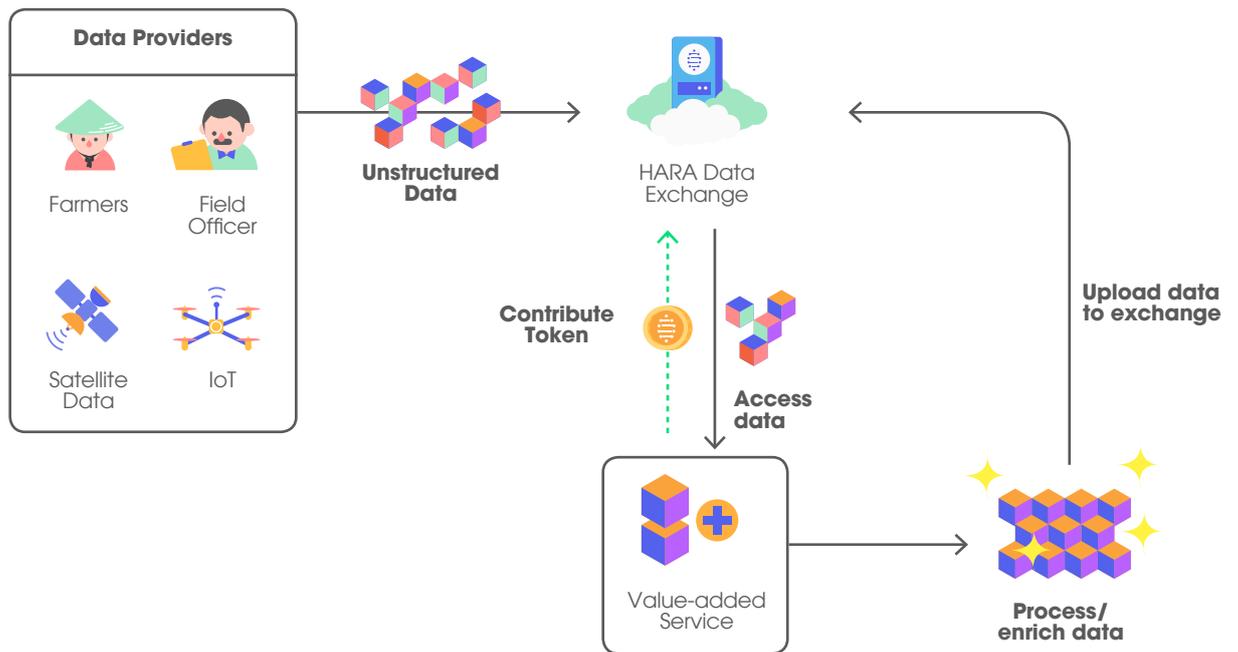
HARA also integrates a customized marketing platform where data buyers can directly offer their services, such as loans/insurance applications and general advertisements, with basic opt-in and subscription functionality directly within the HARA application. For example, insurance companies can now automatically target people based on a set of criteria - effectively creating leads in an ongoing manner.



Value-Added Services: Data Buyers Enriching Data

HARA is empowering data sharing in this collaborative ecosystem through the formation of an “enriched data” category. This allows data buyers to re-submit data they have accessed in a cleansed, analyzed and more processed format providing value-added ready-to-use data to other buyers. For example, a company may choose to use agriculture data set to produce seasonal harvest reports for companies to estimate the yield of a particular crop. The proceeds of these data sets will trickle back down to the original data providers.

Value-added service providers



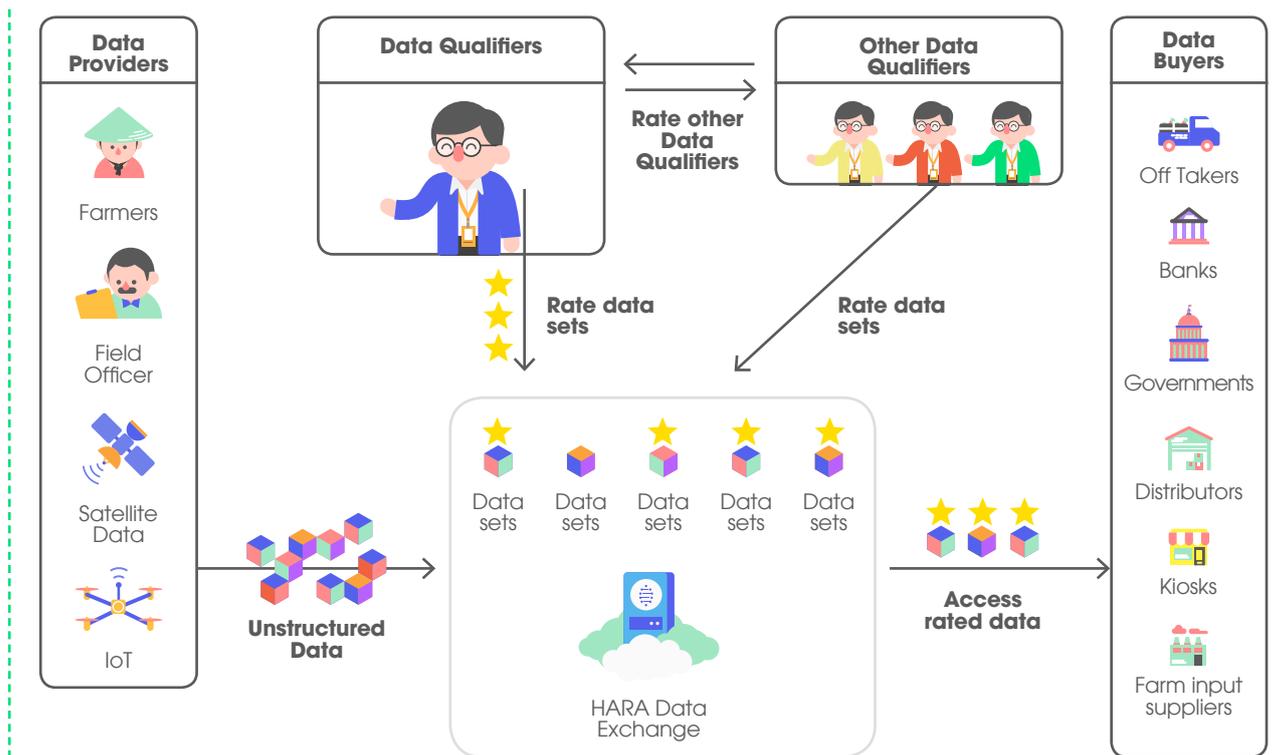
Data Qualifiers: Improving Data Quality

HARA is implementing a qualification mechanism to drive the accurate rating of data. Any data submitted on the exchange must earn a minimum basic rating before any exchange can occur. This adds a secondary level of information aggregation to allow for dynamic forecasting. Data providers can allocate more token in order to drive more qualifications, thereby increasing its rating.

Data qualification method will be gamified in various ways, such as:

- Swiping for image recognition or confirmation
- Providing photographic proof of requested items
- Answering questions related to the data

In addition, part of a data qualifier's rating comes from qualifying other data qualifiers in order to ensure high quality data is being submitted. The tokens for rating qualifiers are initially taken from HARA seeding fund then funded by portion of the proceeds from the ongoing transactions. This acts as a self-regulating mechanism to ensure that data qualifiers are providing accurate data and to avoid data qualifiers gaming the system. The rating that data qualifiers received enables them to have access to better tiers of mini tasks and automatically increase their credibility.



Staking

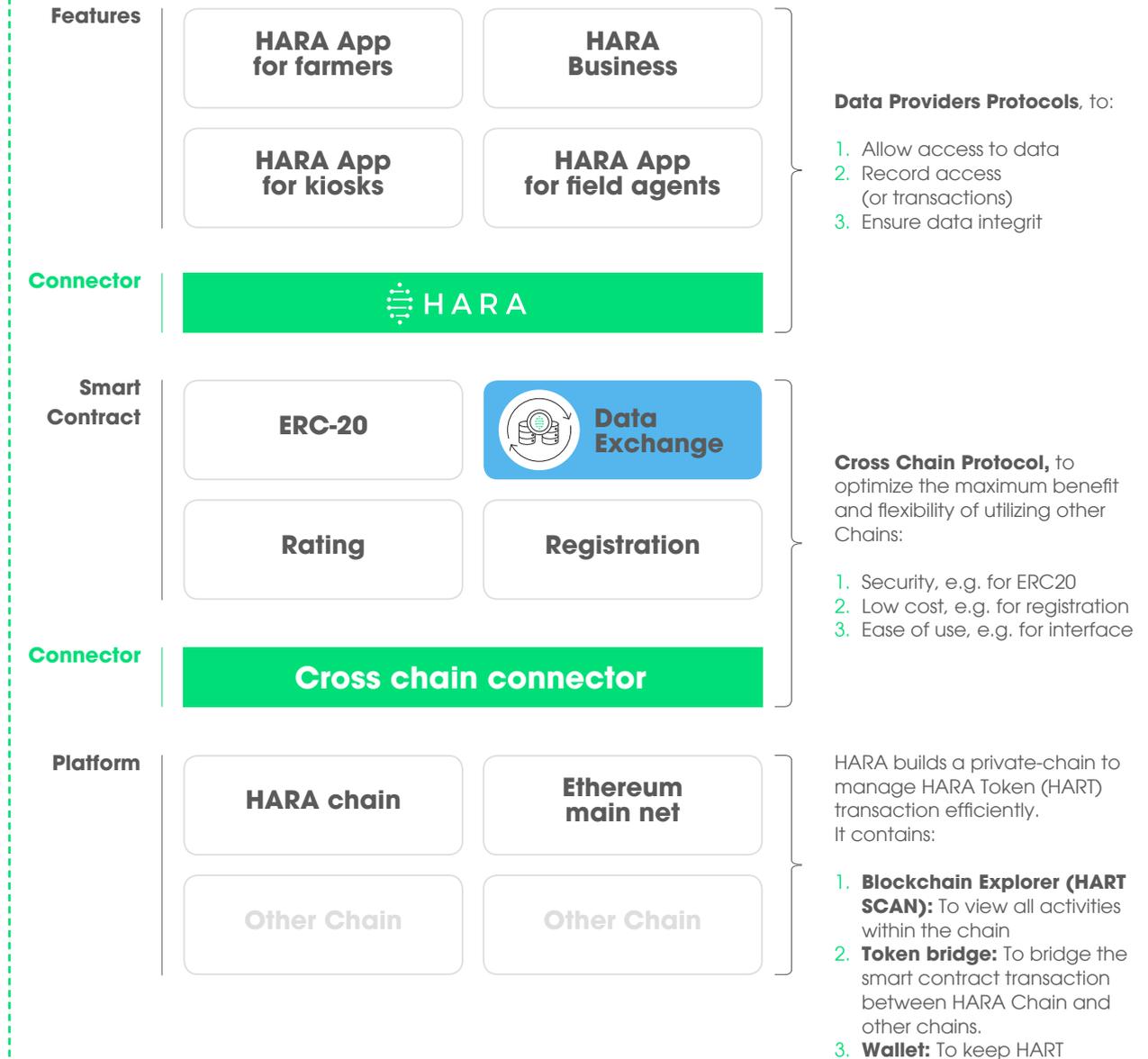
In order to maintain their accounts and get access to the platform, stakeholders (data buyers, value-added services, data providers, and data qualifiers) need to have a minimum staked balance. The minimum balance allows them to receive push notifications on any activities in the platform. Each notification will reduce their staked token balance.

Notifications can be customized to allow stakeholders to choose what they want to receive, including: relevant bounties, solicitations, and data set updates. Once the staking balance is below the minimum level, the account goes dormant. The account will be given a grace period and then ultimately will be frozen if no more activity is recorded. This allows the platform to differentiate between active and dormant accounts.



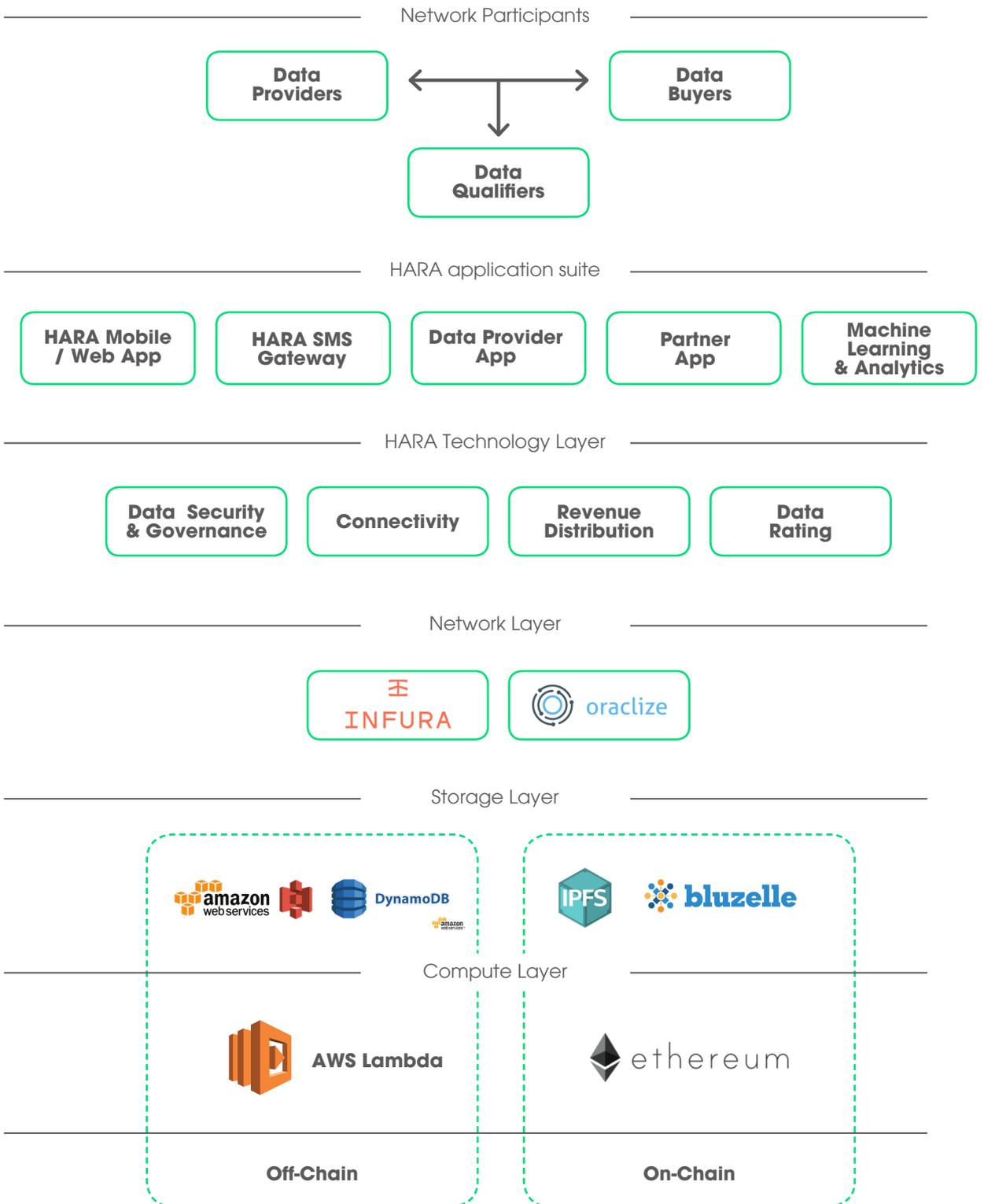
The purpose of HARA ecosystem is to create a prosperous data exchange economy that drives the use of informed data-driven decisions in society. Data providers use the platform to exchange their data for tokens, while data buyers can access quality data and crowd-source new data that can help them make better data-driven decisions.

HARA Suite of Apps Ecosystem





HARA Data Exchange



The interactions between data providers, data buyers, and data qualifiers in the open and secure HARA Data Exchange Platform are explained below:

- **Data providers** are incentivized for data submission, which they can monetize through token exchange.
- **Data buyers** can trace and trust the data source and gain access to valuable and validated data to achieve insights to achieve their objectives.
- **Data qualifiers** perform qualifications tasks to validate data and earn tokens.

The salient features of HARA Data Exchange Platform are:

- Secure, open, connected and decentralized access to data
- Traceable and transparent data history
- Decentralized and individual data access permissions
- Facilitation of fluid and borderless token exchange that could be globally transacted

Blockchain Technology

Blockchain is an immutable, transparent, public and append-only ledger. A peer-to-peer network that can maintain updates to the ledger and verifies those updates in a way that it is impossible to fraud or to alter data.

HARA Data Exchange Platform uses Ethereum to create smart contracts, trace and validate transactions and ownership rights, perform transactions through HARA tokens, and enable tokens to be traded on third-party token exchanges. Through smart contracts, we can optimize our activities. Currently, we are developing five categories of smart contracts:

- **Data acquisition:** Enables access control and data connection to supplementary data. It allows for automatic data generation and enrichment.
- **Data traceability:** Enables tracking the origin of data, who owns and use it.
- **Data rating:** Enables measurement on how useable the data is, like a rating system of the data by data buyers.
- **Data access permission:** Enables access to every data providers.
- **Proceeds allocation:** Enables the distribution of proceeds between participants.

Private (Permissioned) Ethereum Network

The decision to use Ethereum is because HARA is a running project that needs to be implemented fast using a proven technology. Ethereum has the biggest dApps projects and connection support to other layers through Oraclize, Infura, and so forth. It also has the most robust community and developer support while not closing the door entirely to other blockchain technology along the way. That is why HARA is also exploring research and development partnerships with other blockchain technology companies.

Inter Planetary File System (IPFS)

IPFS is a distributed file system protocol to connect all computing devices with the same system of files. IPFS is a versioned file system that can access, manage and store files. It can also track versions over time. IPFS also accounts for how those files move across the network, as it is also a distributed file system.

Infura

Use of Infura APIs and developer tools provide secure, reliable, and scalable access to Ethereum and IPFS. Infura enables HARA Data Exchange Platform to access IPFS seamlessly without the hassle of managing the infrastructure.



Oraclize

Oraclize is a data carrier for decentralized apps. As data carrier, it provides a reliable connection between Web APIs and HARA's App using enforced cryptographic proofs. It eliminates the need to open additional trust lines.

Bluzelle

A decentralized, on-demand, scalable database service for HARA data-exchange developers.

GDPR and PDPA Data Compliance

Blockchain technology enables decentralized data transaction that serves as a major basis for compliance of data protection. The platform generally fulfills Singapore's Personal Data Protection Act (PDPA) and Europe's General Data Protection Regulation (GDPR) requirements concerning privacy and protection of personal data. Following are the provisions in the HARA data exchange platform to adhere to the obligations:

Consent

Data providers agree to consent for storing personal data in an encrypted format. They can decide whether or not they consent to allow data buyers accessing their data.

In the HARA data exchange platform, document encryption is realized through the use of AES-256 algorithm in producing an encryption key. The encryption key is further broken down into several keys known as secret keys. The secret keys are distributed amongst data provider's wallet, HARA system and trusted third-party (e.g. government, value-added service providers). To decrypt the data, the minimum of three keys is required. Any party (other than the data provider) that possesses the key cannot decrypt the data without the consent of other key holders.

Purpose Limitation

Data buyers must inform data providers of the purpose of data set usage, which will be stated and mutually agreed upon purchase agreement.

Notification

Data providers are notified whenever data buyers want to access their data. This is realized through document provider smart contract that grants access permission to any stored data. When data buyers want to access data, the system notifies the owner of the data or data provider via blockchain. The blockchain verifies data availability using the proof of existence smart contract.

Access and Correction

Data providers have full ownerships of their data sets. They have full access and control to create, edit and modify the data. HARA only provides the access information in this ecosystem.

Accuracy

Every effort is made to ensure accurate personal data is collected. For example, in the case of farmer as data provider, field officers are assigned to assist farmer in verifying, uploading and maintaining data in the HARA application.

Additionally, the HARA data exchange platform provides a data qualification mechanism that is supported by data rating features to evaluate data sets based on input such as historical transactions, and buyer feedback and connected data points.



Protection

Data is securely stored and processed in the HARA data exchange platform. A combination of IPFS permanent web, Bluezelle protocols, and Amazon web services (S3 and Dynamo DB) will be implemented as data storage systems off the chain.

Proof of existence smart contract is deployed in the blockchain to ensure data is tamper-proof and uncompromised. Every data is signed with fingerprint-like proof. If the data is changed, then the associated fingerprint will also change. To verify the data, the fingerprint must match or it is considered as tampered. Nevertheless, data providers should also ensure that a safe and reliable data storage and accessible mechanism is maintained.

Retention

Data providers have full control on when the data is made accessible and can set the period to allow data access.

Breach Notification

The appointed data protection officer will notify to supervisory authorities and stakeholders (data providers, data buyers and value-added service providers) of any breach of data with high priority and without any undue delay.

Data Erasure

HARA data exchange supports the rights to rectification and erasure. Data providers are in absolute control of their data sets. When an account is deleted in the platform, private keys will be destroyed, implying loss of corresponding and encrypted data.

Privacy by Design

The platform architecture ensures:

- Data providers own the personal data and have full control over it.
- Personal data is always encrypted and data providers hold the key to decrypt it.
- Transaction of personal data in the ecosystem is carried out with explicit permission and consent from data provider. Data provider also understands how the data set is used and for what purpose.
- Personal data transactions are fully transparent and traceable on the blockchain and anonymity of trading parties is completely protected.

9 Roadmap

2017

2018

2019

2020

Q4 2017

HARA mobile apps

Q1 2018

Data Validation features

Q2 2018

HARA partner's app

Q3 2018

Data-Exchange PoC deployment

Sidechain PoC

Data Registration

Q4 2018

Qualification features

Data Qualification Mechanism

Q1 2019

Platform Launch

(MVP)

Q2 2019

Advance Features

Data Connectivity Service

Advanced Data Rating

Q3 2019

Decentralizing

Data-Exchange Platform

ID Management Platform

AI-Powered Verification

Integration with Bluzelle for Data Provider

General Data Provider Protocol

Network Operator Protocol

Partners' Sealer Node

Farmers' Wallet Apps

Q4 2019

Cross Chain Connectivity

Cross Chain Connector Protocol

Q1 2020

Value Added as a Service

On-Demand Data Processing

Q2 2020

Crypto-wallet Integration

Easy Access to Entire HARA Ecosystem



10 Team



Regi Wahyu
Founder and CEO

Regi is the founder and the driver of the whole business in HARA as CEO. His vision is to deliver world-changing solutions by leveraging on technology. He has proven track records as professional in the area of business development. He successfully developed a start-up business, turned around the “mature-declining” organization and managed growth strategies across the Asia Pacific region. He had worked for Development Dimension International (DDI), General Electric (GE) Asia Pacific, and Dupont. Regi is part of the high impact entrepreneurs of Endeavor network.



Imron Zuhri
CTO

As CTO of HARA, Imron leads the technical direction of the company by herding a talented pack of nerds, data scientists, and data engineers. Imron leverages his interests and expertise in mathematics, physics, analytics, and big data technology to continuously advance the company’s unique capabilities and technology solutions. Previously, Imron was the youngest person to hold a director position at one of Indosat’s subsidiaries.



Alexander Jatra
CFO

Alex spent 7 years in private equity and venture capital, beginning with Francisco Partners, a private equity firm in San Francisco, California. During this time, he worked directly with companies and financial sponsors across the United States and Europe to execute various investment transactions including M&A, IPOs, debt financing/restructuring and other equity offerings. Afterwards, he joined Kejora Ventures in Jakarta and worked closely together with startup founders to assess and analyze strategic opportunities, revenue generating models, and cost efficiency to drive the growth of the companies.



Farina Situmorang
CMO

Farina has more than 15 years of experiences in marketing for technology products. She co-founded Catalyst Strategy, a boutique data-driven marketing firm and led the digital marketing campaign for current President of Indonesia during the 2014 presidential election. She then led the agricultural policy delivery unit for the Presidential Transition Team. Prior to Catalyst, Farina worked for WhatsApp, BlackBerry, Microsoft and IBM. Farina holds an MBA from the Kellogg School of Management.



10 Team



Tom Malik
Head of Legal and Compliance

Tom has extensive experience in multinational and national companies such as Rio Tinto, Newmont and Burson-Marsteller holding various senior positions in public relations, stakeholder management, marketing in the Communications, Mining, Property, and Engineering fields. He joined Dattabot as COO in 2012. He holds a Master Engineering Degree from Cornell University.



Lisa Irawati
Head of Operations

Lisa has over 20 years of experience in the field of marketing, market intelligence, business development and strategic planning. During her service for Phillip Morris (HM Sampoerna Tbk) , she championed numerous innovation initiatives, such as Territory Management Digital Platform, Marketing Channel Optimization, and Community Based Marketing. In the last 5 years, she is also active as social entrepreneur in the field of education and culture. She is appointed as subject matter expert for Ministry of Education & Culture and UNESCO.



Larissa Sidarto
Head of Business Development

With a strong background in the finance and technology sectors, Larissa is experienced in business development and corporate strategy. Her core strengths includes strategic planning, consulting, and implementing new business endeavors. She is responsible for the whole Retail Business division portfolio at Dattabot, and has successfully overhauled its strategy for scalable product growth. Larissa is a graduate of Citi's prestigious Management Associate; a 3 years leadership development program with exposure to top leadership at regional level. She is also currently an active commissioner and management advisor for Burgreens; a social enterprise, organic fast food chain with focus in empowering women and farmers, as well as promote healthy eating. Prior to Dattabot and Citi, Larissa worked for Accenture, World Bank, and think tank Center for Strategic and International Studies.



Renée Corstens
Head of Partnerships

Renée has worked with local communities through her experience with Peduli Anak Foundation, a Dutch-sponsored NGO operating in Indonesia. Her tenure at the Economic Department of Dutch Embassy in Jakarta has equipped her with market knowledge in agriculture and sustainability. She also previously worked for Tax Department of Dutch Government and Delta Lloyd, a financial service provider. In 2017, she joined HARA team as a researcher and development advisor. She holds an MBA from the University of Amsterdam.



Changhyun Cho
Head of Investor Relations

Changhyun Cho is the CEO of FSN ASIA, an overseas business subsidiary of FSN and a leading ad-tech company as listed on Korean stock market. He is also the board member of FSN. Before he joined FSN, he worked as a partner at A.T. Kearney, a global management-consulting firm, with expertise in new business strategy and M&A advisory.



10 Team



Raditya Alwafi Surachman
Head of Software Engineering

Raditya has over 8 years experience in the field of Product Development and Engineering. He co-founded Etomotiv, a platform for the Automotive Industry and worked for Traveloka, Style Theory, Tencent and Garena. Currently, he is leading the Engineering team for HARA development. Raditya holds a Bachelor Degree in Computer Science from the Binus University.



Bembi Prima
Head of Cloud Operations

Bembi has over 8 years of experience in the field of Information Technology and expert in DevOps, SRE and Native Cloud Operations. He started his career at Nielsen as Data Processor and joined Dattabot in early 2014. Bembi is managing the Cloud Infrastructure for HARA. He holds a degree in Information Technology from the University of Indonesia (UI).



Jaewoo Hwang
Korea Representative
Business Development

Jaewoo is the head of new business department at FutureStream Networks (FSN), the no. 1 ad-tech company in Korea. He has experiences in expanding overseas market such as China, Taiwan, Thailand, and Indonesia by establishing new products and services. Before he joined FSN, he has worked at A.T. Kearney, a global management consulting firm, and Hyundai Capital, a financial arm of Hyundai Motor Group.



Robert Lee
Korea Representative
Business Development

Robert Lee is a deputy manager at FSN ASIA, an overseas business subsidiary of FSN. He has managed numerous projects in different countries and has led the team to enter Thailand, Vietnam, Indonesia and Taiwan since 2015. Before joining FSN, he worked at Woori Investment and Securities, a leading Korean financial firm, as well as at A.T. Kearney, a global management consulting firm, specializing in new financial products and business strategy.



Andy Laver
Japan Representative
Business Development

Andy developed strong skills in strategic planning, corporate strategy, and financial control during his work for Deutsche Bank, Citibank and Deloitte. Afterwards, he co-founded Asia Strategic Advisory (M&A Advisory) and Asia Strategic Human Capital (Executive Search). He is passionate to contribute on the development of entrepreneurship in Indonesia, especially in digital and creative industries. He is involved in many nationwide initiatives such as Mekar Exchange (Putera Sampoerna Foundation), IMULAI (Microsoft -USAID) and GEPI (Global Entrepreneurship Program Indonesia). He holds an MBA from International University of Japan.



10 Team



Edoardo Baldoni, PhD
Europe Representative
Data Scientist

Edoardo is a PhD in Economics and an R programmer. He currently works as Research Fellow at Università Politecnica delle Marche, Italy. His research interests span several areas but are mostly focused on the measurement and analysis of agricultural Total Factor Productivity (TFP) using farm-level data. He has recently published scientific articles on the relationship between agricultural productivity and emission intensity at the farm-level, on the contribution of migrant work to agricultural productivity for Italian farms and on the spatial properties of TFP measurements.



Camilo A. Cupitre A.
Latin America Representative
Business Development

Camilo is an experienced researcher and practitioner in the field of Social Innovation applied to rural areas. During more than 10 years long career, Camilo has been working with multiple Nonprofits Organizations and Social Enterprises in Indonesia, The Dominican Republic and Malaysia; including the National Cancer Council Malaysia – MAKNA and the Singaporean CSR consultancy firm GreenShoots Communications, conducting a diverse range of projects related to microfinance, rural development, education, social Entrepreneurship and Cancer Prevention. With a background in Business & Economics, currently he is finishing a MSc. in Social Entrepreneurship & Management at Roskilde University in Denmark.



Joshua Agonya
Africa Representative
Business Development

Joshua is determined to transform Africa's socio-economic landscape through business and innovation. Joshua co-founded Pearl Trek Adventures after graduating from African Business Institute of which he holds a Business Degree. During his studies, Joshua was part of the Business Advisory from ABL and performed market research for international companies. Over the last couple of years Joshua worked with several NGO's on youth leadership programs, marketing, community training and development programs. His aim is to make information accessible and simpler to use by the common man through teaching and technology.



Viridi Permana, PhD
Sr IoT Expert

Viridi has over 18 years of professional working experiences as an engineer and researcher in technology and IoT fields. He got his PhD from University of Denver and accelerated his career at Carrier-United Technologies, Johnson Controls and Boland Trane-Ingersoll-Rand. During his career, he obtained excellent accreditations of CEM, CMVP, CEA, LEED GA. After spending more than a decade advancing his career and engineering credentials in the United States, he returned to Indonesia in 2016 to lead business development for Industrial Internet.



Hasan Yusuf
Sr Digital Expert

Hasan has over 6 years' experience in digital marketing. Through his work as Data Analyst, he strengthened his skills in data discovery and transforming data into business value. His recent works cover FMCG, retail banking, telecommunication industry and online media. Hasan holds a master's degree in finance mathematics and actuarial science from the University of Stuttgart.



10 Team



Arkan Gilang
Sr Blockchain Developer

Along with Imron, Gilang is the brain behind the HARA platform. Previous cross-functional experience such as engineering and data scientist and his passion in cutting-edge technology like blockchain bring him to leadership position for the HARA platform. He previously worked as a creative designer for two years at Ayuta Samarthya, an event organizing company. Gilang holds a degree in Mathematics from the University of Indonesia.



Wisnu Pradana
Sr Data Scientist

Wisnu has years of experience in the field of Data Science. Along with Imron he is developing the pricing mechanism, incentive distribution and data rating algorithm for HARA. He is currently a PhD candidate in Mathematical System and Control Theory of the University of Twente-Enschede.



Anatasof Wirapraja
Sr Product Manager

Anatasof has over 8 years of experience in the Information Technology Industry. He is an expert in Product Design and serial entrepreneur, he co-founded GDllab (Design Strategy) and Nuleu (a blockchain-based art platform). Recently he worked for Red Tree Asia on Strategy Design, Uber as Ambassador and Kudo, an online-to-offline platform to connect small businesses. He holds a Bachelor Degree in Art from Institut Teknologi Bandung (ITB).



Juwita Winadwiastuti
Blockchain Developer

Juwita is one of the Blockchain Engineers for HARA. She joined Dattabot in 2016 as a Data Engineer and developed her career further as Scrum Master and Developer. Currently, she is the brain behind the development of the smart contracts and API building. She holds a Bachelor Degree in Informatics Engineering from Gunadarma University.



Our Advisors



Muhamad Chatib Basri, PhD
Economic Policy Expert

Dr. Basri is a leading expert on international trade, macroeconomics and political economy. He had served in numerous distinguished roles in government and academia, including as Minister of Finance of Indonesia, Vice Chairman of the National Economic Committee of the President of Indonesia, Senior Fellow Harvard University at the Harvard Kennedy School, Pacific Leadership Fellow at the University of California San Diego Centre on Global Transformation, and professorships at the Australian National University, University of Indonesia, and at the National Trade Union Congress. He holds a PhD in Philosophy from the Australian National University. As an economic policy expert, Dr. Basri advises HARA token on the viability and feasibility of the tokenomy aspect of the ecosystem.



Yos Adiguna Ginting, PhD
Stakeholder Outreach Expert

Dr. Ginting is a blockchain promoter in the service industry. He is the secretary general of the Association of the Indonesian Agricultural Society and serves as chairman of the board of directors at Indonesia Services Dialogue. Furthermore, after progressing through several important positions at Sampoerna, he now holds a position on the board of commissioners. Previously, Dr. Ginting was the director of government affairs and stakeholder outreach at Philip Morris International. He has a Bachelor of Science in Chemistry and a PhD in Theoretical Chemistry from the University of Tasmania in Tasmania, Australia. With his expertise in outreach activities, Dr. Ginting advises HARA on community development and supports engagement with blockchain and agriculture industry experts and business leaders.



Raoul Oberman, PhD
Global Agriculture and Technology Investor

Dr. Oberman is a McKinsey senior partner and Director Emeritus. He is an experienced boardroom counselor in multinational settings and practiced facilitator of change at scale. He has worked in Europe, Northern Asia and South East Asia. His areas of expertise in the private sectors range from agriculture power to financial services. In the public sector, Dr. Oberman has worked extensively with central banks/regulators and finance ministries. He has also dedicated his time to various non-profit organizations, including Partnership for Sustainable Agriculture Indonesia and Endeavor Indonesia. He holds a PhD in Economics from the Frankfurt University and a Master's degree in Economics from the University of Cologne. As a long-time respected consultant who is passionate in the agriculture sector, Dr. Oberman advises HARA Token on its strategy to penetrate stakeholders within the agriculture sector.



Our Advisors



Constantin Papadimitriou
Blockchain Expert

Constantin Papadimitriou is the president of Pundi X, a global blockchain company which aims to transform retail businesses with its blockchain-based point of sale solution. Before joining Pundi X, Papadimitriou accumulated over 17 years' experience as founding CEO of two Indonesian fintech companies - Infine Networks and E2Pay. He has an MSc in Computer Science from Purdue University. As an advisor, Papadimitriou will lend his knowledge of the blockchain ecosystem and market to help ensure HARA's success can follow that of Pundi X.



Charles Pyo
Blockchain Expert

Mr Pyo is a Korean technology entrepreneur and blockchain evangelist. He is the CEO and founder of Chain Partners, the first blockchain company builder in Korea that has numerous subsidiaries operate in every core area of the blockchain world. Mr Pyo is also known as the youngest founder of a company in Korea, having started his first business at the age of 14. He was included in Business Week's Top 25 Entrepreneurs in Asia for his contribution to the spread of Widget in Asia. He became a director of the Venture Business Association at the age of 29. Mr Pyo holds a Bachelor in Communications and Business from Yonsei University, South Korea. With his vast expertise of growing blockchain ventures, Mr Pyo advises HARA to ensure its growth reaches its full potential.



Richard Yun
Business Development Expert

Mr Yun is the Chief Operating Officer of Coinplug, a leading South Korean bitcoin brokerage and service provider. The company is famous for developing blockchain solutions for corporations like Hyundai and LG. Mr Yun started his career at Exio Communications where he served as the head of Finance, M&A and Operations department. Afterwards, Mr Yun worked for Cisco Systems and Mobile Agent Technology as finance M&A and business development specialist. In 2006, he founded Conaxtech, Inc., a tech-based satellite receiver company. He obtained his BA in Economics from University of California at Berkeley, USA. With his vast knowledge, Mr Yun helps accelerate the widespread adoption and implementation of HARA Token and its social impacts to the ecosystem.



Our Advisors



Darius Rugevicius
Blockchain Venture Capitalist

Mr Rugevicius is the Managing Partner at Connect Capital, a blockchain and digital assets investment fund that takes a venture capitalist approach. The company aims link industry pioneers and prosperous advocates by providing a platform that thrives through its strong network and dedication to accelerating success. Mr Rugevicius previously held a position as Value Engineer at CIVITA, in which he was part of a VC team responsible for numerous startup initiatives in Europe, and was a Partner at Prime Block Capital, an investment fund focused on blockchain technology. Mr Rugevicius obtained a Bachelor's degree in Business/Managerial Economics from the ISM University of Management and Economics, Vilnius, Lithuania. Mr Rugevicius' experience with guiding the development of blockchain companies from a VC perspective will be invaluable to the success of HARA.



Jonathan Lee
Digital Marketing Expert

Mr. Lee is the Chief Corporate Officer of Yello Digital Marketing Group (YDM), who leads the company's corporate development and M&A (mergers and acquisitions) investment. YDM is the number one digital marketing and ad technology group in Korea with over 20 companies across Korea and South East Asia region. As the second employee to join YDM, he played a key role in developing YDM's growth strategies and South East Asia expansion. Prior to joining YDM, Jonathan served as the Business Development Director for the WPP Korea, where he was responsible for the group's country strategies and M&A. Previously, Jonathan was also part of the International Business Team and Corporate Strategy Team at the CJ Music and CJ Mnet Media (currently CJ E&M). He holds a BS degree in Management Science from the University of California San Diego. With his extensive experience in East Asia's crypto investment, Mr. Lee advises HARA Token on its ICO fundraising process.



Nizam Ismail
Legal Expert

Mr. Ismail has led the RHTLaw Compliance Solutions, a dedicated financial services compliance consultancy/solutions provider in Singapore, Malaysia and Indonesia. He has also managed the Financial Services Practice of RHTLaw Taylor Wessing LLP. He had more than 25 years of experience and expertise in financial services regulatory compliance and litigation. Mr. Ismail spent six year as regulator at the Monetary Authority of Singapore, where he had worked with other regulators, exchanges, markets, banks, broker-dealers, commodities firms, fund managers, trust companies, and financial advisers. He had also worked with a variety of FinTech firms, cryptocurrency firms and ICO/TGE issuers. As an expert in financial services regulatory compliance and litigation, Mr. Ismail advises HARA Token on all aspects in legal and compliance of FinTech and ICO.



Our Advisors



Vachara Aemavat
Technology Expert

Mr. Aemavat is the co-founder and co-CEO of SIX.network, a blockchain platform to reinvent digital economy. He is also the co-founder of Computerlogy, a leading startup focusing on the social media tools for enterprise in Thailand with a range of products from social media analytics, command center, chatbot, and more. He departed his first startup to join Yello Digital Marketing Group (YDMG) in 2016, where he assumed the role of Chief Technology Officer. With his experience in developing blockchain-based platforms, Mr. Aemavat advises HARA Token on technical aspects of developing and rolling out blockchain-based technology.



Tiago Alves, MBA
Digital Asset Expert

After leading its Series-A round, Mr. Alves has become the VP Asia Pacific at Aptoide (Android App Store with 200M active users). Recently, his role was instrumental in raising USD 17 million in AppCoins' ICO. He is a regular attendee and speaker at tech events, such as Echelon, Tech in Asia, GMASA, GOAB, RISE, and Android Meetups. Prior to joining Aptoide, Mr. Alves spent 12 years at Portugal Telecom where he had several technology-related roles. He holds a bachelor's degree in software engineering from the University of Macau, a master's degree in Mandarin from the Beijing Language and Culture University, and an MBA in Tech Management from the University of San Francisco. He is a Fulbright scholar and Dean's Medal awardee. As a technology expert with successful fundraising experience, Mr. Alves advises HARA Token on its ICO process.



Jefrey Joe, MBA
Venture Capital Investor

Mr. Joe is a venture capitalist with technology, product and consulting background. Prior to co-founding Alpha JWC, Mr. Joe was the Chief Operating Officer (COO) of Groupon Indonesia, the leading daily deals site in Indonesia, where he focused on technology, customer experience and logistics. Before Groupon, Jeffrey was a strategy consultant at The Boston Consulting Group (BCG) where he primarily worked on strategy development, market assessment, and business plan development projects for some of the leading corporations in Indonesia. Jeffrey also spent a few years at Ernst & Young Advisory Services where he specialized in performing share valuation projects relating to M&A and IPO situations. As an experienced crypto investor, Mr. Joe advises HARA Token on the contributor climate in Southeast Asia.



Our Advisors



Wolf Kluge
Microfinance Expert

Mr. Kluge decided to invest his time in Indonesia 18 years ago to rebuild the finance industry after the crisis. As a pioneer in providing financial access to Indonesians, he created a wide range of lending products and the base for digitalization of loan approval process for smallholder businesses. Until the beginning of 2018, he held a position in the board of directors of BTPN, one of the largest private banks in Indonesia. Previously, he had experience in Deutsche Bank, Aegis Korea and Danamon in several countries. As a seasoned financial risk expert, Mr. Kluge advises on the development of HARA Token in lending products.



Taco Bottema, PhD
Agriculture and Economic Policy Expert

Dr. Bottema has more than 20 years of senior managerial experience from the United Nations, the European Union, and the Asian Development Bank. His previous projects revolve around livelihoods, agriculture, natural resource management and capacity and institutional development at the local and central level. Currently, Dr. Bottema strives to improve sustainable agriculture in South East Asia through his ventures and consultations for Indonesia state-owned fertilizer company, Pupuk Indonesia, by helping them to introduce sustainable agriculture products to the market. With his extensive knowledge in sustainable agriculture, Dr. Bottema advises the development and implementation of HARA Token and its social impacts to the ecosystem.



Koji Shima
Technology Investor

Mr. Shima has been the President Commissioner of PT Mitra Pinasthika Mustika (MPM) Finance and PT Mitra Pinasthika Mustika Rent since 2013. He has also served as the President Director of PT MPM Tbk since 2013. Prior to joining MPM, he spent 20 years with Japan's major trade and investment house, Nissho Iwai Corporation. Mr. Shima had more than 30 years of experience in international trade, retail sales, and investment experience in America, Europe and Southeast Asia. He received his Bachelor of Laws degree from the University of Tokyo. With his investment experience around the world, Mr. Shima advises HARA Token how to approach new investors in cryptocurrency.



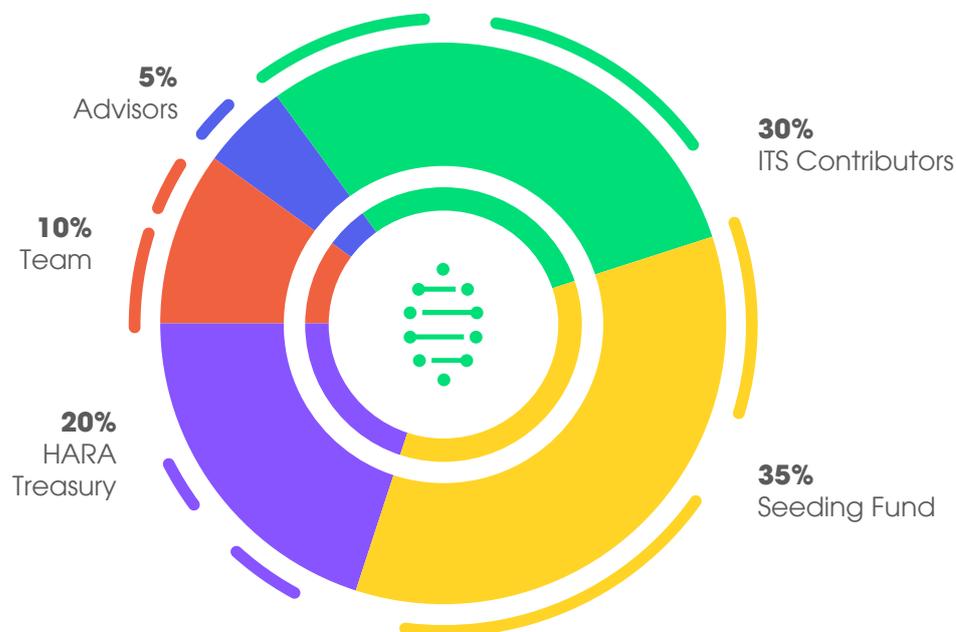
Fact Sheet

Utility Token

Token Name	HARA
Token Symbol	HART
Token Type	ERC20
Total Token Supply	1,200,000,000
Tokens for Sale	360,000,000 (30%)

HARA is seeking to raise **US\$ 17,000,000** hard cap in ETH.

Token Allocation

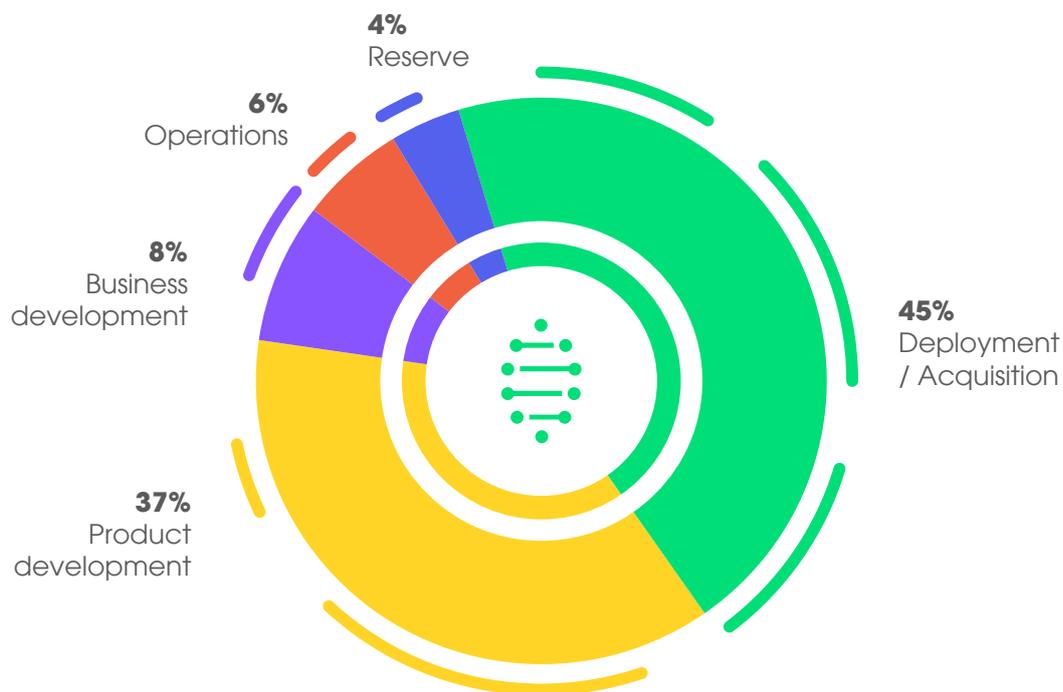


A total of 1.2 billion HARA tokens will be pre-minted at the Token Generation Event, with 30% of tokens distributed to contributors of the Initial Token Sale. The HARA Token is issued as a pure utility token and does not represent any form of security under Singapore law, rules, and regulations. Careful thought was given to the distribution of HARA tokens to create a thriving and sustainable ecosystem. This includes:

- **Initial Token Sale Contributors:** Tokens distributed to private sale, presale, and public sale contributors. Private sale and presale participants may receive bonus tokens for their support, however their tokens are subject to prorated vesting schedules.
- **Seeding Fund:** Tokens used to incentivize platform growth across data providers, buyers, value-added service providers, bounties and airdrops (if required).
- **HARA Treasury:** Tokens used to support the HARA Treasury function, liquidity management, network operator and ongoing operations.
- **Team:** Tokens distributed to the team and early contributors. Tokens are locked for the first 6 months, then vesting on a prorated basis over the next 18 months.
- **Advisors:** Tokens allocated to key advisors, critical to the success of the project.



Use of Funds



Hard Cap **46,000 ETH**

HARA will use the proceeds raised from the Initial Token Sale to continue building data exchange platform and to grow and expand HARA Ecosystem. This includes:

- **Deployment/Acquisition:** Covers the deployment and acquisition costs of engaging and onboarding data providers and buyers at scale. Initial focus will be directed at onboarding smallholder farmers and other data providers while establishing strategic partnerships with cornerstone data buyers and value-added service providers.
- **Product Development:** Covers the cost of developing HARA blockchain data exchange and related services, including but not limited to, creation of the blockchain and platform infrastructure, machine learning algorithms, and smart contracts.
- **Business Development:** Covers the expansion of HARA across Southeast Asia and globally, with focus on countries on the equator line. This includes the cost of entering and establishing operations in new markets.
- **Operations:** Covers operating expenses required to scale up the HARA business, including fees for external consultants such as legal and accounting.
- **Reserve:** Funds for contingency reserve.



12 Our Partnerships



Dattabot

Enriching HARA data with Dattabot - the pioneer of big data analytics in Indonesia



BNI

One of the largest financial institutions in Indonesia utilizing HARA data to disburse microcredits



Pundi X

HARA has teamed up with Pundi X to promote financial inclusion and bring digital payments to an untapped market of smallholder farmers in rural Indonesia.



Blockchain for Social Impact

HARA is a member of Blockchain for Social Impact Coalition (BSIC) — ConsenSys' initiative to solve UN Sustainable Development Goals through blockchain solutions



Asuransi Parolamas

HARA and Parolamas are developing digital insurance products for smallholder farmers together



Trace Alliance

HARA joined the Trace Alliance, a network of companies and parties that are working on real blockchain solutions.



Japan International Cooperation Agency

HARA is partnering with the Public-Private-Partnership-Project for the improvement of the agriculture product marketing and distribution system. This is the technical cooperation project assisted by the Japan International Cooperation Agency (JICA)



PRISMA

PRISMA, a multi-year program under the AIP-Rural, and HARA collaborate together to help spur growth in the agriculture value chain



HEXA Agro

HEXA Agro (offtaker) will act as data buyer in HARA ecosystem and will help to establish a closed loop farming ecosystem



12 Our Partnerships



BridgeX Network

BridgeX Network will help facilitate the conversion between crypto and fiat currencies in the HARA ecosystem.



African Business Institute

ABI represents HARA in Africa and will serve as a bridge of communication between various key stakeholders



BOI Research

HARA is engaging with BOI Research - the research partner who enriches data from exchange



XCHNG

HARA is partnering with XCHNG, a blockchain-based framework for the digital advertising ecosystem



Synchro

HARA partners up with Synchro, a data transmission and distribution service from Indonesia



Universitas Muhammadiyah Gresik

HARA and UMG are conducting a study on the developments of blockchain in the agriculture sector in Indonesia.



TeleCTG

HARA expands to the healthcare by partnering with TeleCTG, a medical technology start-up.



Liquid

The upcoming pre-sale and public sale of the HARA Token (HART) can be joined through Liquid, the exchange run by QUOINE.

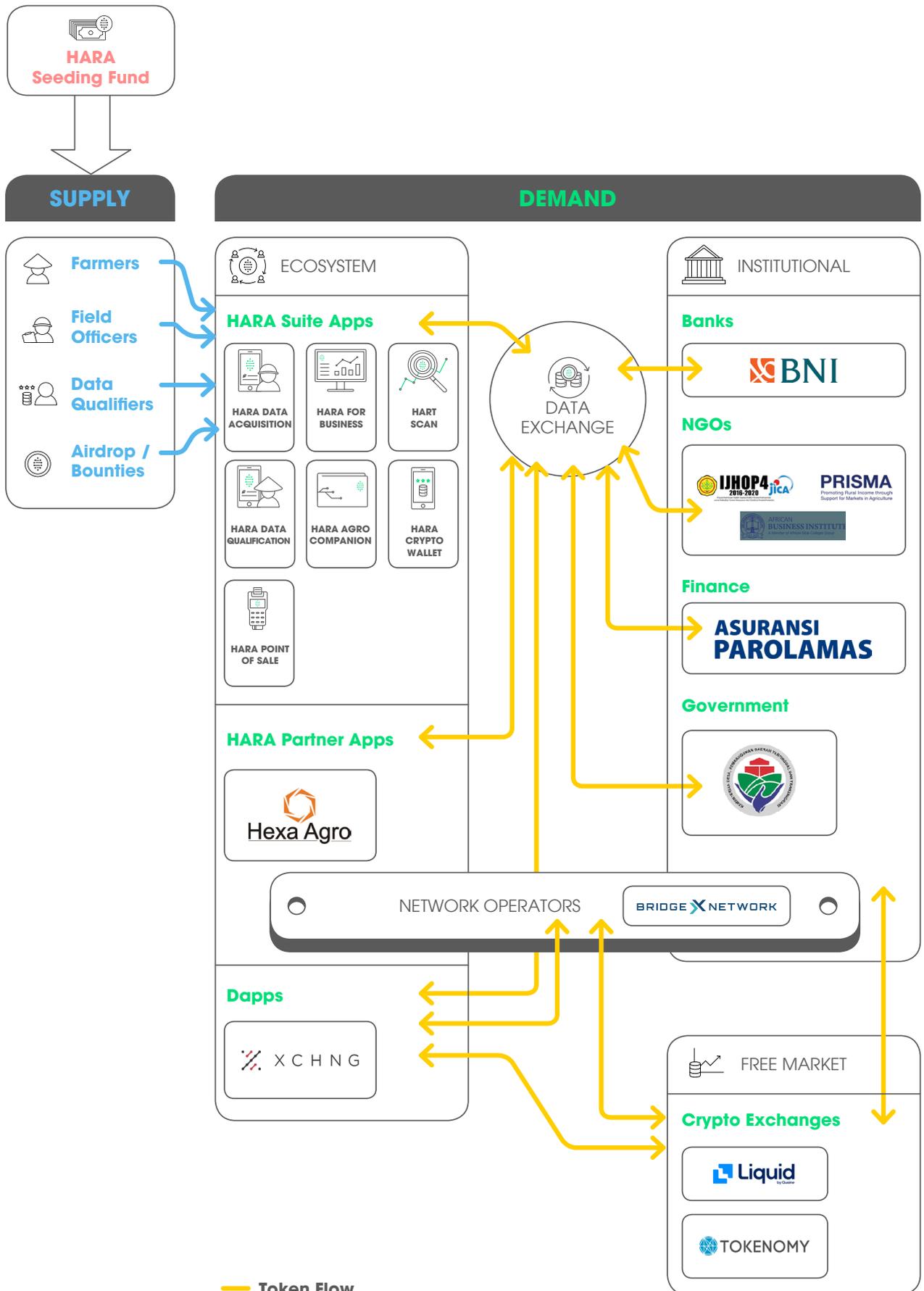


Tokenomy

The upcoming pre-sale and public sale of HARA Token (HART) can be joined through Tokenomy platform.



13 Token Flow



4 Concluding Remarks

Databot, as a leading big data company in Indonesia, has been successfully providing access to data and bring valuable insights across industries since its establishment in 2003. With our experience in combining AI and blockchain technology, we believe it is now the time to pursue the next phase of our mission: data democratization for the world's most socially impactful sectors. We began with the agriculture and food sector because we believe we should start at the bottom of the pyramid and touch the largest, yet the most likely to suffer from economic and informational inequalities. If we agree that the agriculture and food sector is the foundation of how we can alleviate poverty and bring economic and social benefits to many, then this is where we need to start.

Rapid growth of the world population has made food security a critical issue in the near future. The challenge is not only to increase production but also to reduce productivity loss that counts almost 30% across the value chain. We believe that near-time valuable data are crucial for the agriculture and food sector to become more productive, inclusive, and resilient. To address this challenge, we are developing HARA as the first end-to-end solution for all stakeholders in the data exchange market and starting with agriculture and food sector value chain. The greater the access to valuable agriculture data, the more applications of the data that people will find. Furthermore, it is only the beginning. The HARA Data Exchange Platform will expand to the value chains of health, transportation, education, and recreation sectors to amplify the impact of HARA tokens to larger population.

The challenge now is to encourage adaptation and implementation of HARA Data Exchange Platform as impactful and as universal as possible. Contributing tokens to HARA platform will create opportunities to transform the lives of others.

Together, we can empower billions, one byte at a time.



15 Important Notices

THE HARA TOKENS ARE NOT SECURITIES OR UNITS IN A COLLECTIVE INVESTMENT SCHEME OR BUSINESS TRUST, EACH AS DEFINED UNDER SINGAPORE'S SECURITIES AND FUTURES ACT (CAP. 289) ("SFA"). ACCORDINGLY, THE SFA DOES NOT APPLY TO THE OFFER AND SALE OF HARA TOKENS. FOR THE AVOIDANCE OF DOUBT, THIS INITIAL OFFERING OF HARA TOKENS NEED NOT BE ACCOMPANIED BY ANY PROSPECTUS OR PROFILE STATEMENT AND NO PROSPECTUS OR PROFILE STATEMENT NEEDS TO BE LODGED WITH THE MONETARY AUTHORITY OF SINGAPORE ("MAS").

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16 Risk Factors

Regulatory risks. The regulation of tokens such as HARA Tokens is still in a very nascent stage of development in Singapore. A high degree of uncertainty as to how tokens and token-related activities are to be treated exists. The applicable legal and regulatory framework may change subsequent to the date of issuance of this White Paper. Such change may be very rapid and it is not possible to anticipate with any degree of certainty the nature of such regulatory evolution. HARA TECHNOLOGY PTE LTD does not in any way represent that the regulatory status of HARA Tokens will remain unaffected by any regulatory changes that arise at any point in time before, during, and after this offering.

No regulatory supervision. None of HARA TECHNOLOGY PTE LTD or its affiliates is currently regulated or subject to the supervision of any regulatory body in Singapore. In particular, HARA TECHNOLOGY PTE LTD and its affiliates are not registered with MAS in Singapore as any type of regulated financial institution or financial advisor and are not subject to the standards imposed upon such persons under the Securities and Futures Act, Financial Advisors Act, and other related regulatory instruments. Such persons are required to comply with a variety of requirements and standards concerning disclosures, reporting, compliance, and conduct of their operations for purposes or maximizing investor protections. Since HARA TECHNOLOGY PTE LTD is not subject to such requirements or standards, it will make decisions on those issues at its own discretion. While HARA TECHNOLOGY PTE LTD will have regard to best practices on these issues, holders of HARA Tokens will not necessarily enjoy the same extent and degree of investor protections as would be the case should they purchase products or services from regulated entities instead.

Regulation from jurisdictions other than Singapore. The regulatory risks described herein take into consideration Singapore law only. If it is anticipated that HARA Tokens will be sold or resold outside Singapore, this would subject HARA TECHNOLOGY PTE LTD or your HARA Tokens to non-Singapore legal requirements. These legal requirements may be significant. Non-Singapore regulation could involve the same types of changes and outcomes described above with respect to Singapore regulation, and may negatively affect the value of HARA Tokens or cause HARA TECHNOLOGY PTE LTD to cease operations.

No fiduciary duties owed. As HARA TECHNOLOGY PTE LTD is not a regulated financial institution, it does not owe investors in HARA Tokens any fiduciary duties. This means that HARA TECHNOLOGY PTE LTD has no legal obligation to always act in good faith in the best interests of holders of HARA Tokens. While HARA TECHNOLOGY PTE LTD will have regard to the interests of holders of HARA Tokens, it is also permitted to consider the interests of other key stakeholders and to prefer these interests over the interests of HARA Token holders. This may mean that HARA TECHNOLOGY PTE LTD is permitted to make decisions that conflict with, or are not necessarily in, the interests of HARA Tokens holders. Not owing any fiduciary duties to holders of HARA Tokens also means that holders of HARA Tokens may have limited rights of recourse against HARA TECHNOLOGY PTE LTD and its affiliates in the event of disputes.

Tax risks. The tax characterization of HARA Tokens is unclear. Accordingly, the tax treatment to which they will be subject is uncertain. All persons who wish to purchase HARA Tokens should seek independent tax advice prior to deciding whether to purchase any HARA Tokens. HARA TECHNOLOGY PTE LTD does not make any representation as to whether any tax consequences may arise from purchasing or holding HARA Tokens.



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Risks from third parties. The tokenized nature of HARA Tokens means that they are a blockchain-based asset. The security, transferability, storage, and accessibility of blockchain assets depends on factors outside of HARA TECHNOLOGY PTE LTD's control, such as the security, stability, and suitability of the underlying blockchain (in this case, the (Ethereum) blockchain), mining disruptions, and who has access to the private key of any wallet where HARA Tokens are stored. HARA TECHNOLOGY PTE LTD does not represent or otherwise assure that it can prevent such external factors from having any direct or indirect adverse impact on any of HARA Tokens. Persons intending to purchase HARA Tokens should note that adverse events caused by such external factors may result in the loss of some or all HARA Tokens purchased. Such loss may be irreversible. HARA TECHNOLOGY PTE LTD is not responsible for taking steps to retrieve HARA Tokens lost in this manner.

Risks of purchasing HARA Tokens. HARA TECHNOLOGY PTE LTD cannot and does not guarantee or otherwise assure that there are no risks in relation to your purchase of HARA Tokens. The purchase of HARA Tokens may, depending on the manner in which the relevant purchase is effected, involve third parties or external platforms (e.g., wallets). The involvement of such parties or platforms may introduce risks that would not otherwise be present, such as misconduct or fraud by the third party, or your failure to receive HARA Tokens upon duly making payment because of a third-party wallet's incompatibility with HARA Tokens. HARA TECHNOLOGY PTE LTD is not responsible for any risks arising due to the involvement of third parties, including the risk of not receiving (or subsequently losing) any or all HARA Tokens you attempt to (or successfully) purchase.

Vulnerability to cyberattacks. The platform and Services are available for use in part by leveraging on distributed computing and storage resources available through wide area network connections (the "Cloud"). As a result, the Services are susceptible to a number of risks related to Cloud-based computing and data storage. While HARA TECHNOLOGY PTE LTD does not have access to the encrypted contents of the data stored through the Services, the Services may involve the storage of large amounts of sensitive and/or proprietary information, which may be compromised in the event of a cyberattack or other malicious activity. Similarly, the Services may be interrupted and files may become temporarily unavailable in the event of such an attack or malicious activity. Because users can use a variety of hardware and software that may interface with the platform, there is the risk that the Services may become unavailable or interrupted based on a failure of interoperability or an inability to integrate these third-party systems and devices that HARA TECHNOLOGY PTE LTD does not control with HARA TECHNOLOGY PTE LTD's Services. The risk that the Services may face increasing interruptions and the platform may face additional security vulnerabilities could adversely affect the platform and, therefore, the future value and utility of your HARA Tokens.

Vulnerability to mining attacks. As with other decentralized cryptographic tokens based on the (Ethereum) protocol, your HARA Tokens are susceptible to attacks by miners in the course of validating the Token transactions on the (Ethereum) blockchain. Such attacks include double-spend attacks, majority mining power attacks, and selfish-mining attacks, among others. Any successful attack presents a risk to your HARA Tokens and the platform, including, but not limited to, accurate execution and recording of transactions involving your HARA Tokens.

Disruption in operations. Technical difficulties may affect HARA TECHNOLOGY PTE LTD or its affiliates. Such disruptions may prevent your access to or use of HARA Tokens or the platform. While HARA TECHNOLOGY PTE LTD will take all reasonable steps to prevent or mitigate the impact of such disruptions on its provision of services and its operations in general, there can be no guarantee that all such disruptions may be successfully prevented.



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No guarantee of value of HARA Tokens. There is no guarantee that your HARA Tokens will hold their value or increase in value. You may lose the entire, or part of the, amount of any payment you made for HARA Tokens. If you are financing your purchase of HARA Tokens and the value of your HARA Tokens decreases, you may be unable to repay the loan used to purchase your HARA Tokens. There is considerable uncertainty about their long-term viability, which could be affected by a variety of factors, including market-based factors such as economic growth. In addition, the success of your HARA Tokens will depend on whether blockchain and other new technologies related to your HARA Tokens turn out to be useful and economically viable. HARA TECHNOLOGY PTE LTD does not control any of these factors, and therefore may not be able to control the long-term success of your HARA Tokens as a feature of the platform, or the ability of your HARA Tokens to maintain their value. HARA TECHNOLOGY PTE LTD provides no guarantee that the amount of your HARA Tokens you purchase will retain their value. You may lose all or some of that value. HARA TECHNOLOGY PTE LTD does not plan to maintain any type of bond or trust account designed to protect holders of your HARA Tokens. Even if HARA TECHNOLOGY PTE LTD did so, you should be aware that any bond or trust account maintained by HARA TECHNOLOGY PTE LTD for the benefit of its customers may not be sufficient to cover all losses incurred by holders of HARA Tokens.

Volatility of HARA Tokens. The volatility and unpredictability of the price of HARA Tokens relative to other virtual and fiat currencies may result in significant loss over a short period of time. Although HARA Tokens cannot be purchased with fiat currency, the value of the cryptocurrencies that may be used to purchase HARA Tokens can be. As a result, the value of HARA Tokens may in part be affected by or derived from the continued willingness of market participants to exchange fiat currency for cryptocurrencies. Changes in such currencies relative to each other as well as to fiat currencies may accordingly affect the price and, in turn, the value of HARA Tokens.

Level of demand for HARA Tokens not assured or constant. It is possible that there will be minimal to no demand for your HARA Tokens. In such an event, the short-term and long-term viability of your HARA Tokens and the platform will be in doubt, and HARA TECHNOLOGY PTE LTD may terminate your HARA Tokens and cease all operations. Moreover, the cryptocurrency market is a new and untested market, the characteristics and behavior of which, in the context of domestic and global markets, is not fully understood. The level of demand for HARA Tokens cannot be accurately predicted or projected.

Use and continued acceptance of HARA Tokens. Although HARA Tokens may be accepted as payment at any point in time, there is no assurance that HARA Tokens will still be accepted as payment (or as a medium of exchange) at any subsequent point in time.

Risks in holding HARA Tokens. If you store your HARA Tokens in a hot wallet or certain types of cold wallets, your HARA Tokens balance will be associated with the public key address of your wallet and, in turn, your private key address. You are responsible for knowing your private key address and keeping it a secret. Because a private key, or a combination of private keys, is necessary to control and dispose of HARA Tokens stored in your digital wallet or vault, the loss of one or more of your private keys associated with your digital wallet or vault storing HARA Tokens will result in the loss of your HARA Tokens. Moreover, any third party that gains access to one or more of your private keys, including by gaining access to login credentials of a hosted wallet service you use, may be able to misappropriate your HARA Tokens. HARA TECHNOLOGY PTE LTD and its affiliates will never ask you for your private key address, and you should never share this information with someone you do not know and trust.



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Reversal of transactions. Transactions of HARA Tokens may be irreversible. This includes transactions made fraudulently, erroneously, or accidentally. HARA Tokens involved in such irreversible transactions may not be recoverable. HARA TECHNOLOGY PTE LTD does not anticipate that it will redeem HARA Tokens from holders of HARA Tokens for any reason.

Token supply. The supply of HARA Tokens may decrease for various reasons, including reasons outlined in this section on risk factors. In addition, if a wallet is lost, HARA Tokens stored therein may not reenter the Token supply. Alternatively, HARA TECHNOLOGY PTE LTD may burn any number of HARA Tokens. Burning HARA Tokens will destroy the HARA Tokens and reduce the overall HARA Tokens supply. The supply of HARA Tokens may increase should HARA TECHNOLOGY PTE LTD decide, after having issued and distributed the maximum number of HARA Tokens in its initial token offering, to have one or more token generation events.

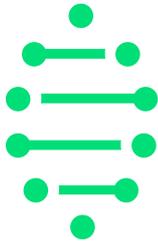
Subsequent sale and exchange. HARA Tokens may be sold on exchanges or directly between parties after the close of the initial token offering for fiat or other cryptocurrencies. However, there is no guarantee that such a secondary market will develop or that mechanisms for such secondary trading will develop or be available at any given time. HARA TECHNOLOGY PTE LTD is not involved in operating these exchanges and is not responsible for encouraging them or any other person to transact in HARA Tokens. It should additionally be noted that cryptocurrency exchanges may be newly established and subject to little or no regulatory supervision and, as a consequence, more vulnerable to attacks, fraud, or manipulation. Fluctuations in the value ascribed to HARA Tokens on any cryptocurrency exchange may affect the value of HARA Tokens on other cryptocurrency exchanges. Regulatory restrictions may apply on the resale of HARA Tokens, whether under Singapore law or the law of any other jurisdiction.

No assured use of HARA Tokens on platforms other than the platform. HARA Tokens are designed for use on the platform. Although third parties may also build systems that also allow the use of HARA Tokens, HARA TECHNOLOGY PTE LTD does not anticipate any involvement in those uses of HARA Tokens and has no responsibility for them. There is no guarantee that any third parties will develop alternative uses of your HARA Tokens.

No participation in operations. Holding HARA Tokens does not confer any right to vote on, be consulted about, or have a say in (i) any aspect of HARA TECHNOLOGY PTE LTD's management or (ii) how the platform is administered, developed, or governed. As a result, HARA Token holders will not have control over the platform or HARA Tokens and may not prevent or prohibit HARA TECHNOLOGY PTE LTD from making decisions that may adversely affect the platform or HARA Tokens.

Cessation of operations. There is no guarantee that HARA TECHNOLOGY PTE LTD or any of its affiliates will continue as viable companies. The utility and value of HARA Tokens depend on HARA TECHNOLOGY PTE LTD's success and support of the platform. If HARA TECHNOLOGY PTE LTD ceases operations and goes out of business, you may lose 100% of the value of your HARA Tokens.





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