
SUSTAINABLITY TECH | SMARTHYDRO SYSTEMS

WHO ARE WE?

Specialsing in rural tropical landscapes engaged in agriculture, forestry and fisheries. Sustainability Tech is a technology startup implementing custom built monitoring and evaluation (M&E) systems. Using a combination of the internet of things (IoT) enabled smart monitoring devices and digital survey applications, we provide integrated systems that aide companies, governments and communities in achieving better managed, more sustainable, data driven landscapes.

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Our mission

Evening install of the Lora gateway (which receives the messages from the peatland) in Sumatra by our local field staff

Food security, climate change, biodiversity loss are but some of the critical issues facing the planet today. We at Sustainability Tech believe that technology not only will but must play a major role in meeting the global challenges ahead. Pressure is mounting on companies and governments to move away from the business as usual approach to production and growth. From a model where — historically — the inherent value of ecosystems and nature has been largely ignored. Sustainability Tech is on the front lines providing the capacity for improved management through technological innovation and a drive to make significant positive change towards profitable, equitable, transparent and sustainable land use.

Maintaining a sustainable productive planet and conducting profitable business does not need to be mutually exclusive. Without private sector involvement, investment and commitment to sustainable practices, the already daunting planetary challenges ahead will likely continue to grow unabated. Whether small-holder or big player, our mission is to bring the principles of big data to areas and sectors that are lagging behind in technological innovation and yet are likely to benefit the most from data driven solutions. Sustainability Tech is aiming to be the world leader in developing the systems to deliver these solutions.

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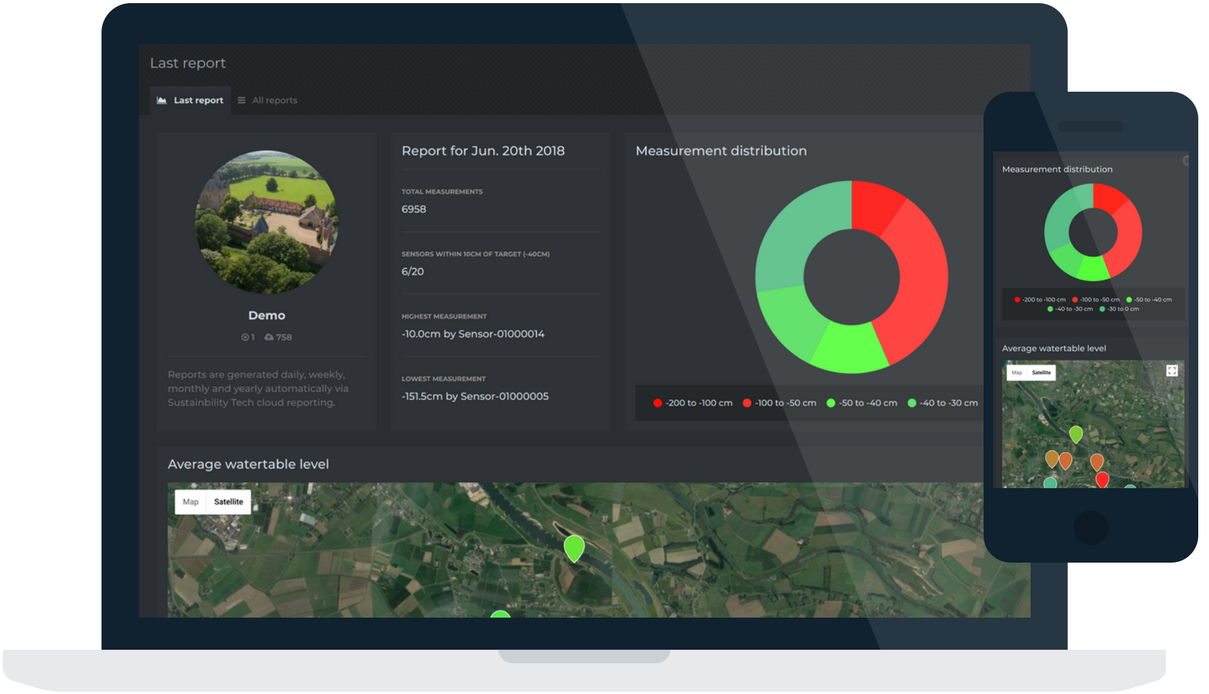
Products & Services

All rural agricultural environments – especially in the tropics – present their own unique challenges when it comes to developing and deploying technologies. Harsh conditions and varying levels of infrastructure of varying quality and capacity means that a one size fits all approach is unlikely to be successful. Our solution is to offer custom built, project specific systems for our clients. Our systems are modular. We combine a number of different elements to put together an almost off the shelf package to meet our clients needs, allowing us to build custom end products whilst maintaining cost effectiveness.

We have built a cloud based dashboard tool for monitoring and data reporting that handles and processes incoming data. Our dashboards can be tailored to be as complex or as simple as desired. With its fine grained user management system we can enable/disable all preexisting modules and easily develop new ones to meet diverse client needs.

The other half of our system is our sensor networks, these are 24/7 connected to the cloud sending back realtime data from the field. We have developed base nodes that can plug in any type of sensor required. If there is a sensor on the market we can utilize it.



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Connectivity 1/2

Although the Facebooks and the Googles of this world are trying to make the world one connected place. We are seeing work areas with no or very limited connectivity. This means that we have to come up with our own way of transmitting data securely.

The traditional methods — WiFi, GMS/LTE — have significant downsides, making them suboptimal options in many of the landscapes and projects we work on. Some key factors are:

- **High power usage**, systems with these wireless protocols are power hungry meaning they require frequent battery changes.
- **Limited range**, WiFi especially is not suited for areas where you have to deal with heterogeneous landscape configurations containing trees, forests or other signal attenuating elements.
- **Subscriptions costs**, although GSM/LTE have the range (provided the network structure is in place and sufficient reliable coverage can be attained), operating a large number of sensors requires each sensor to be equipped with a sim card. This is not a viable option if the goal is to maximise system coverage with a high density of sensing nodes.
- **Phasing out old technologies**, old 2G networks are often the best alternative, because of lower costs and longer range (due to lower operating frequencies). Unfortunately, these networks are being phased out in favor of modern mobile networks that have more bandwidth and so will become unavailable in the long run.

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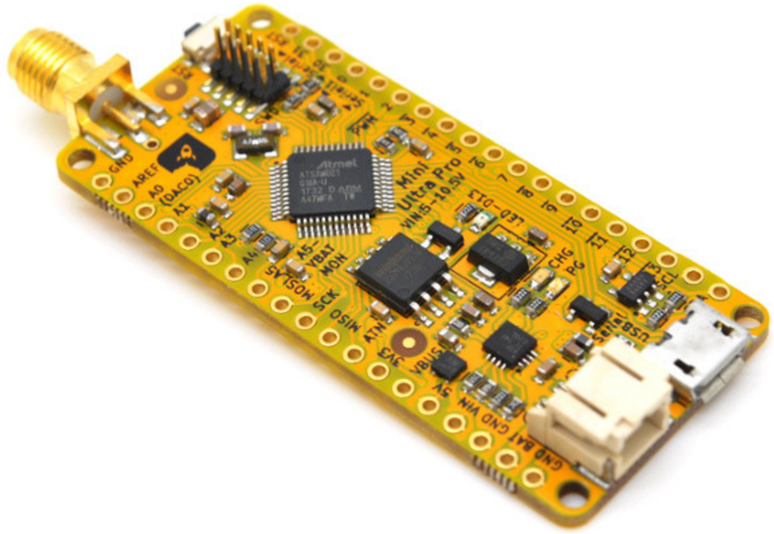
Connectivity 2/2

LoRa checks for us all the boxes as a data transmission technology. This is a system that mitigates all the aforementioned issues. LoRa is low cost, low power and long range. There are no data subscriptions required and the transmission module can be run on a single AA battery for years. It is fast becoming a new global standard and it is not going anywhere soon.

	Long range	Low power	Low costs	No subscription
WiFi			●	●
GSM/LTE	●		●	
Satellite	●			
Sigfox	●	●		●
LoRa	●	●	●	●



We have built our LoRa nodes on top of The Things Network, which is a global open source infrastructure that handles all the data transmitted between our gateways (LoRa receiver stations in the field) and our data/application servers (dashboards). This enables us to take advantage of the open source community and end-to-end AES128 encryption to keep the data secure.
Further cost reductions are made possible, as there is no need to operate additional servers to get our data around the world. We are also set to benefit from the relentless innovation of The Things Network.

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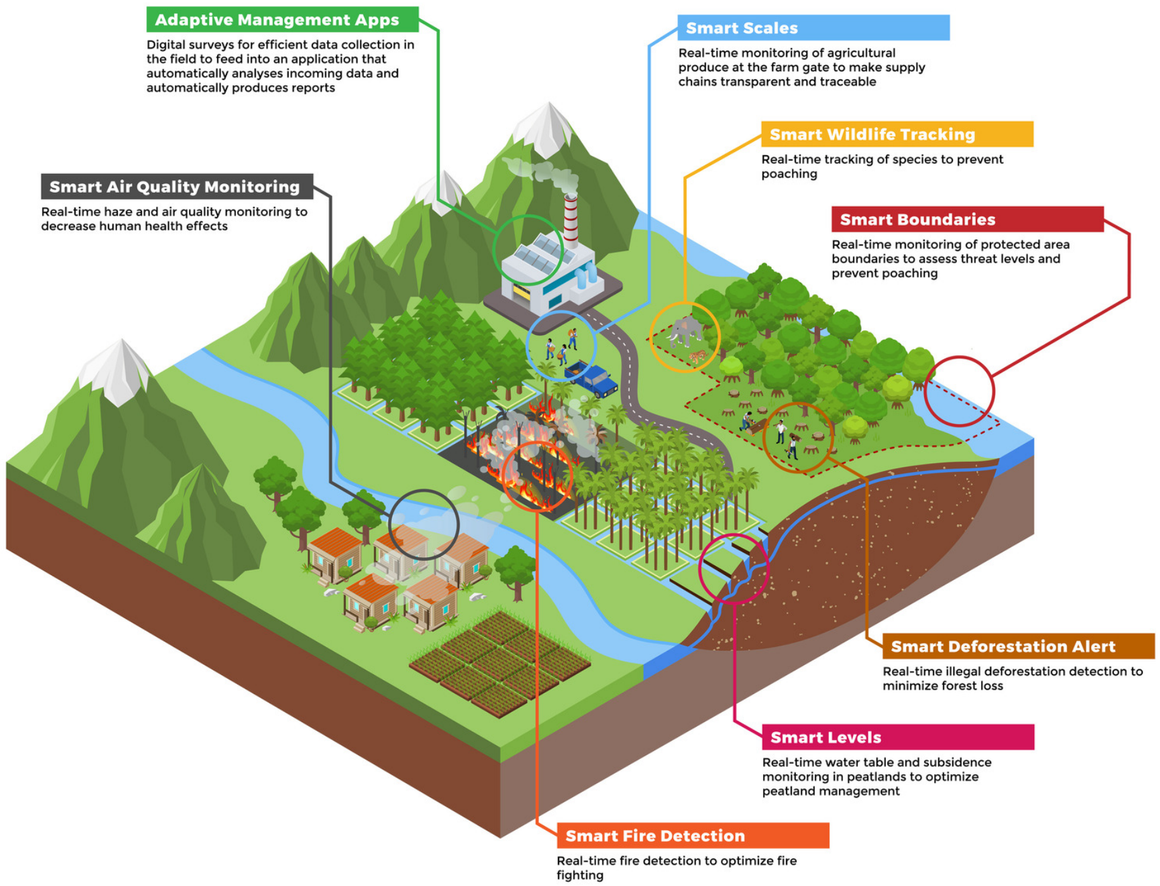
Our sensors



Alternative fields where Sustainability Tech is looking to expand

We design our printed circuit boards (PCBs) in-house. This enables us to have a board that can plug and play any type of sensor. The LoRa PCBs are built by our Malaysian partner who design top quality low costs LoRa modules that squeeze out every last milliamp from the components to maximize battery longevity.

SmartHydro

Sustainability Tech has identified peatland and water management as a key area for the application of new technologies in the tropics. Governments, businesses and producers are increasingly recognizing the need to better manage their land. This is particularly important in Indonesia where issues of land use are at the forefront of both national and global environmental agendas.

Whether monitoring water for maximizing productivity, predicting fire risk or meeting sustainability and government requirements, accurate and efficient data collection should be easy and cost effective. Currently, most stakeholders manually measure groundwater levels in their concessions, sending field workers out intermittently to record levels at individual dip wells. For those who have implemented expensive data loggers, most still require field workers to go and manually download the logged data from the devices, input the data into a analyzable form and conduct analyses to produce reports.

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The SmartHydro System

As a first step, we will conduct an on-site feasibility study. This will include an assessment of the individual dip well sites, the surrounding landscape configuration and the existing infrastructure. We then work with our clients to develop a deployment plan.

At a minimum each system will require one gateway which depending on the configuration will have a range of 5-10km. The number of sensors communicating with each gateway is unlimited, however the relative positions of the required sensors will determine the gateway position and number of gateways required to achieve the most efficient full network coverage.

Once deployed, each sensor transmits tiny packets of data to the gateway which is connected to the internet. The data is then sent to a network server where we collate, analyze and present it in our custom built dashboard. This makes all the latest hydrological data easily available and easily interpretable by the end user. The dashboard also provides the platform for notification settings, implementing warning systems, automated reporting, heavier data analysis and modeling.

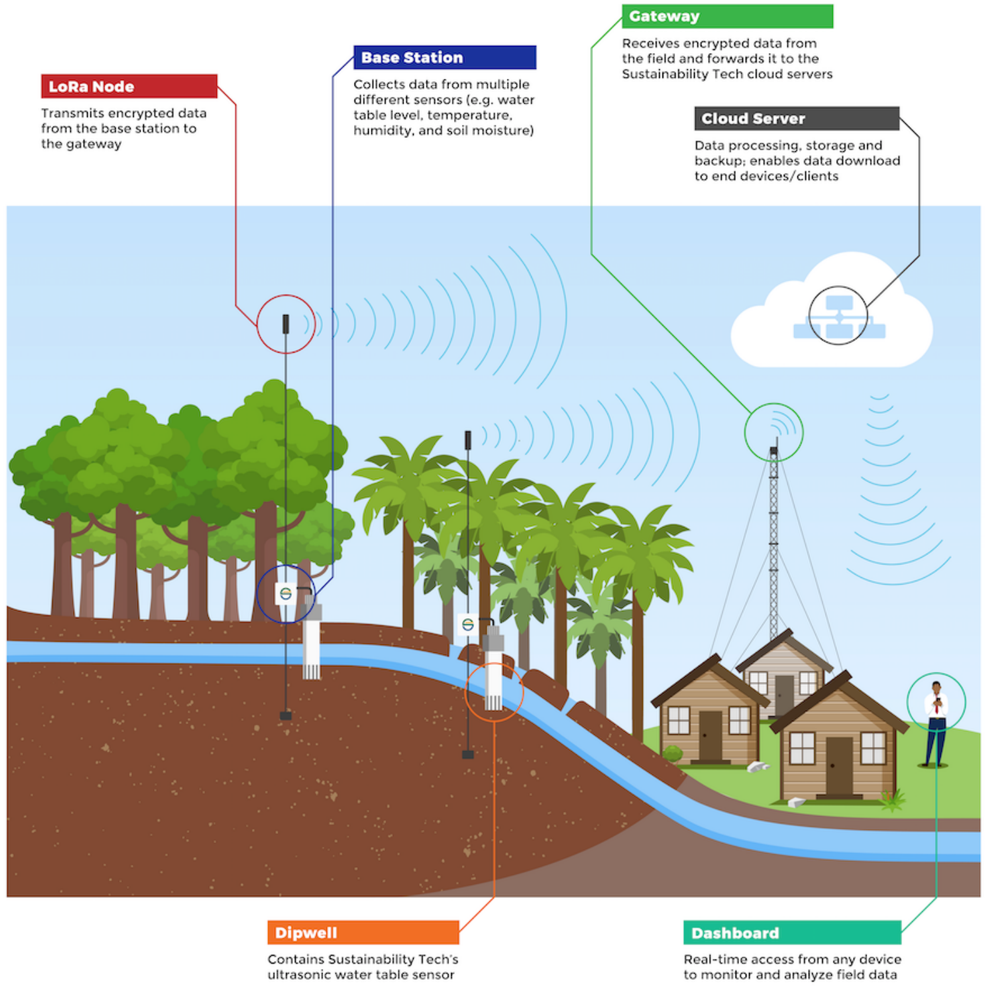

Diagram of a LoRa network connecting sensor nodes to a customer dashboard.,

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