



LET'S TALK ABOUT SOIL

a report for
IMPACT INVESTORS
written by
IMPACT INVESTORS

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Sources & Attributes at
www.pymwymic.com/soilreport

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INTRODUCTION

As impact investors, our job – and our joy – is to find the nexus where private capital can help catalyze solutions to our pressing global problems. So it's with particular pleasure that we notice the current interest in soil health, marked by 2015 as the UN Year of Soil. Soil gets a bad rap – or at least it does in English-speaking idioms. Whether something is 'treated like dirt' or 'as old as dirt' or that sense that something is vaguely 'soiled,' we've been generally conditioned to *land* as valuable, but *soil* as something of little consequence. Certainly, we're not very grounded into the reality that human life depends on healthy dirt.

So what can possibly be new about the very ground under our feet? What is new is the level of soil degradation, worldwide. For the 4.5 billion years the earth has existed, the last 100 years of intense chemical farming has taken a terrible toll. Now, an unlikely combination of scientists, organic farmers, ecologists, diplomats, bankers, and impact investors are joining voice to give notice to our fellow earth inhabitants: soil is disappearing. Becoming extinct. Blowing in the wind. As we collectively barrel towards a global population of approximately 9 billion by 2050 (who are all going to need food) the call is for consciousness: healthy soil is critical for food security, effective water usage, and even as a valuable carbon hedge against climate change.

For impact investors – including the Pymwymic community of investors, who have long responded to the challenge to 'Put Your Money Where Your Meaning Is,' this awareness also opens us to the innovation of discovering new market opportunity. Like healthy soil, our investments are assessed and tended through a lens of resilience and regeneration, a balance of input to output, with the intention being both financial return and impact yield. We believe investing into soil is a growth opportunity.

Writing this from Amsterdam, we're reminded that the intention of healthy soil is the very ground under our city's feet. Unlike the verdant vistas of the American plains, or the green pastures of France and Germany, Holland had more in common with the delta lands of India or Southeast Asia, carefully cultivating farmland from mud and swamp. In the 1100s, concerned that the salt from the open sea would occasionally back flood the farm fields of a young city, the Dutch made the decision to dam the Amstel River. The Amstel dam

became Amsterdam, so that soil wouldn't salinate, would remain healthy enough to feed inhabitants and grow crop for profit. The land is still there, efficient flat farmland now home to apartments, canal houses, greenhouses, and office towers. In Europe, 11 hectares of soil are sealed under expanding cities – *every hour*. 254 hectares disappear everyday. It stands to reason there will be a pressure for increased output of remaining farmlands. How do we feed the soil, so the soil feeds us?

We are a community of impact investors. This report contains information about soil that we think is interesting for other private investors. For this report, we are partnered with Triodos Bank, another global organization with deep roots in Dutch soil. Triodos' 35-year track record actionably demonstrates a commitment to healthy soil, to organic farms, and to sustainable value-chain practices. Together in this report, we hope to cultivate a healthy awareness that the long-term impact of healthy soil is the health of future generations.

This field-study of soil looks at ways how Impact Investing can play a role in seeking solutions, gives a sampling of concrete examples, and resources for growing your own awareness.

Get yourself grounded, and dig in.

**Offered with our best to you,
From the Pymwymic Field-Building Center**

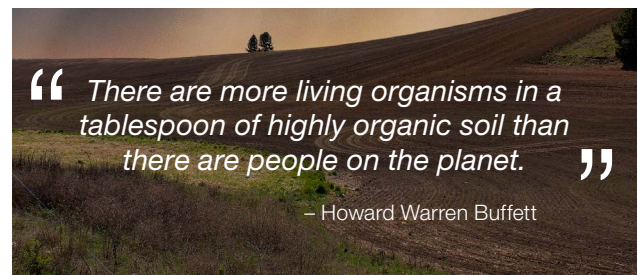
**The 'Put Your Money Where Your Meaning Is
Community' of Impact Investors**

WHY TALK ABOUT SOIL?

In our complex world, two interwoven imminent challenges are Long-Term Ecosystem Degradation and Food Security. To raise awareness about the importance of healthy soil as a source of necessary biodiversity, healthy food systems, better ecosystem services and improved adaptation to climate change, the United Nations' Food and Agriculture Organization (FAO) declared 2015 to be the International Year of Soils. The motto of the yearlong campaign: 'healthy soils for a healthy life.'

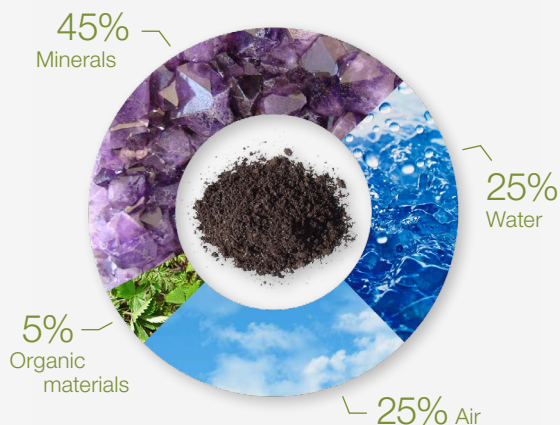
WHY THE FOCUS ON SOILS?

- Soils host a quarter of our planet's biodiversity.
- Healthy soils are the basis for healthy food production.
- Soils store and filter groundwater.
- Soils help to combat and adapt to climate change by playing a key role in the carbon cycle.



WHAT EXACTLY IS SOIL?

Soil is the thin layer of material on the Earth's surface, composed of layers of weathered mineral materials, organic material, air and water. As it is the material in which plants establish themselves and grow, the most widely recognized function of soil is as support for global food production. However, soil is increasingly recognized as contributing to the regulation of water and atmospheric gases and therefore plays an important role in carbon and climate regulation.



WHAT IS THE CURRENT PROBLEM?

According to the Food and Agriculture Organization of the United Nations, "Our soils are in danger because of expanding cities, deforestation, unsustainable land use and management practices, pollution, overgrazing and climate change. The current rate of degradation threatens the capacity to meet the needs of future generations."

We join the FAO in wanting to see more investment in sustainable soil management. With a long-term investment lens, cultivating healthy soil is ultimately cheaper than restoring depleted land. It is also a valuable commodity for food security and social stability for our rapidly increasing global population and a healthy hedge for climate change mitigation and overall sustainable development.

Why is it now up to us? The answer is time, and accountability. It takes the earth's natural process about 1000 years to create 2-3 cm of soil. Intensive industrial farming can degrade healthy soil in less than 10 years. The math seems pretty easy.

WHAT'S THE EXTENT OF THE PROBLEM?

In the time it takes you to read this sentence, another 30 football fields of fertile soil will be lost worldwide. Every year, 50.000 square kilometres of healthy soil, an area about the landmass size of Costa Rica (larger than Ireland, or Denmark) is lost, due to deforestation, unsustainable land use, overgrazing and climate change.¹

The United States is losing soil 10 times faster – and China and India are losing soil 30 to 40 times faster – than the natural replenishment rate.²

In Africa particularly, the impacts of land degradation are substantial: 65% of arable land, 30% of grazing land and 20% of forests are too damaged for food production.³

At the current rate of degradation, agriculture as we know it will not be possible within 60 years.⁴

THE DRIVERS AND COSTS OF SOIL EROSION

Soil is infinitely variable, so the increased salinization challenges of Northern Africa are unlike the depletion of soil after intensive chemical fertilizers in the USA. We must learn to be with the land on which we live. And economics is new to the realisation that ecosystem services have true value. One new effort, by the Economics of Ecosystems and Biodiversity Organisation, concludes that the earth incurs a loss of 20-30 trillion USD annually in natural capital.

The Drivers of soil degradation are:

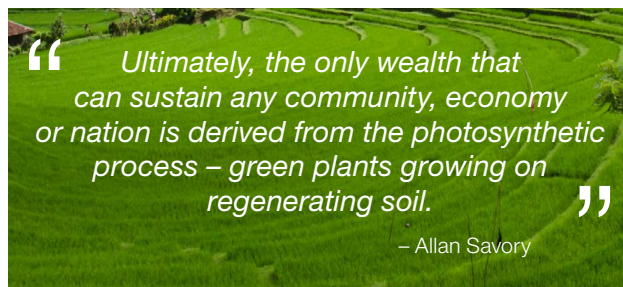
- Deforestation; unsustainable soil management; urban expansion; pollution & waste; and changes in climate.

The Types of soil degradation (amongst others) are:

- Salinization; compaction; erosion; loss of nutrients & microorganism; and loss of carbon.

The Consequences of soil degradation are:

- Water scarcity; food insecurity; poverty; loss of biodiversity; climate change; reduction of ecosystem services; and further soil degradation. Other long-term consequences are loss of healthy nutrition in our food (due to the lower nutritional value of soil).



SHORT VERSUS LONG-TERM VIEW

Conventional large-scale farming relies on costly chemical inputs to create fertility, investing into a short-term yield output without considering long-term consequences. Simultaneously, this short-term outlook and 'business as usual' is ignoring the long-term risk of increased weather instability, increased food-chain safety issues, and increased pressure on diminishing water tables.

Healthy soil reduces the need for chemical input, reduces water usage and runoff, holds more micro-organisms and nutrients that support biodiversity, improves healthy food production, and can even help sequester carbon.

With a long-term focus on creating healthy soil, the Economic Land Degradation Initiative calculates that improved land management could deliver up to \$1.4 trillion globally in increased crop production, or 35 times the value of estimated losses.

AND THEN THERE IS THE QUESTION OF MORAL IMPERATIVE

While all of us are ultimately affected by loss of the earth's healthy soil, the most immediate impact will be on the poorest of the poor. Increased drought, famine, forced relocation, systems pressure and additional cost to individual small-hold farmers: these are not first-hand affects that will be felt by the wealthy. Those living closest to – and most dependent upon – the land will be the most immediately effected.

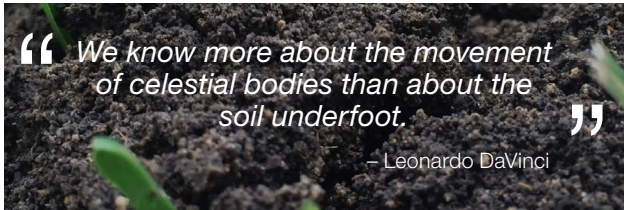
The recent Montpellier Report found that in sub-Saharan Africa alone, the economic loss of soil degradation is estimated at \$68 billion per year, and affects an estimated 180 million people.⁴

4 ¹ <http://www.fao.org/soils-2015/news/news-detail/en/c/329290/>

² http://www.ids-environment.com/Common/Paper/Paper_83/Soil%20Erosion.pdf

³ "No Ordinary Matter: Conserving, Restoring, and Enhancing Africa's Soils" Montpellier Panel December 2014,

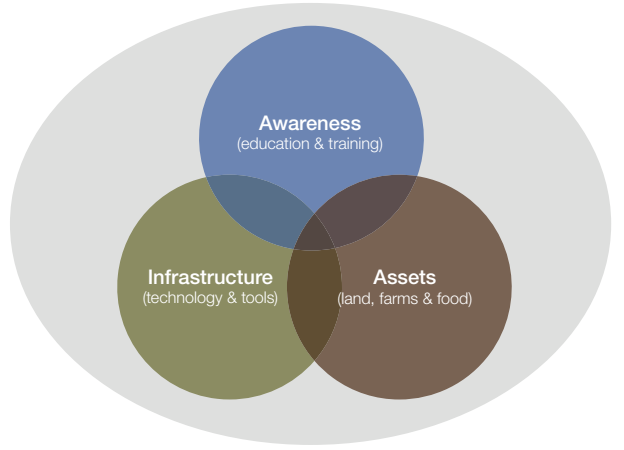
⁴ www.soilassociation.org/soils



HOW CAN PRIVATE OR VISIONARY CAPITAL PLAY A ROLE?

Viewed through the impact investment landscape, healthy soil can be an intentional impact focus, with opportunity for market growth ahead. Even when viewed through a more traditional investment landscape, healthy soil is increasingly seen as a hedge against financial markets volatility and climate risk. A recent sampling by the GIIN suggests that the combined AUM of impact directed investments in Agriculture & Food and Habitat Conservation only accounts for less than 10% of overall impact investing.

At Pymwymic, we address healthy soil investment through three lenses: Awareness, Infrastructure, and Assets.



INVESTING IN SOLUTIONS

Awareness: Increasing awareness about the degraded state of our soil is an impactful investment in the future, and we thank those who have donated or invested to put money to work in this way. A Pymwymic member matched her money and conviction by helping to underwrite our 'Let's Talk about Soil' education event for 30 other European investors. In the USA, friend and author Woody Tasch (who describes himself as "an earthworm in the soil of a restorative economy") has founded the national Slow Money movement, 'rebuilding the economy from the ground up.' There is likely a chapter near you, filled with knowledge on healthy soil. In the UK, the Soil Association and Sustainable Food Trust are leading awareness-building activities. Also heartening are the Next-Gen online efforts to draw attention to healthy soils, a number of which are listed on our website at pymwymic.com/soil-resources/

Infrastructure: The intentional rebuilding of healthy soils is creating diverse cross-sector innovation, from deploying mycorrhizal fungi for organic fertilizer, to the coding of algorithms for remote soil sensors calibrated by satellites that measure water evaporation and soil fertility. This is an exciting and growing field of possibilities, which we at Pymwymic are interested to help develop. Financial instruments which stably and at scale support investor interest for sustainable and healthy land also serve as infrastructure for a new economy: we have highlighted one Triodos Fund making a significant difference to Dutch organic farmers.

Assets To regenerate soil, it is helpful to have land. There are a few pioneering impact investors who have made investments in acquisitions of degraded farm and/or grasslands, with intention of returning the land to a resilient, nutrient-rich, and sustainable landscape. These projects are early in their development, and serving as pilots and examples to the global agricultural sector.

INVESTMENT EXAMPLES

Awareness

ONE ACRE FUND

One Acre Fund builds awareness with smallhold African farmers by providing them training and financing to grow their way out of hunger and poverty. One Acre Fund has a hundreds-strong network of peer 'field officers' who meet with local farmers once a week all year round, to train them on topics as diverse as new planting methods, fertilizer, financial planning, and solar lighting. According to One Acre Fund, farmers who enrol in the training program experience between a 50 and 100 percent increase in income on every planted acre. One Acre Fund delivers these services within walking distance of the 200,000 rural farmers they serve. One Acre Fund relies on donations and grants to rollout training.

Pymwyc investors have supported One Acre Fund for the Malawi country launch.

Infrastructure

PLANT HEALTH CARE

Plant Health Care is a leading provider of scientifically proven biological products for the agricultural industry. The Company offers products based on beneficial microorganisms called mycorrhizal fungi to improve the health, vigor and yield of major field crops such as corn, soybeans, cotton and rice, as well as specialty crops such as fruits and vegetables, which triggers growth and self-defense mechanisms within plants, stimulating more robust plant health and fruiting, which increases yield. Additionally, each plant can draw more nutrients and moisture out of the soil, strengthening plant health. This makes it possible to save drastically on pesticides as well as on fertilizer. The user achieves at least the same production at lower cost and the plant is healthier. Recently, the European division has been renamed Plant Health Cure, indicating a more proactive approach to whole-systems health.

In 1996, Pymwyc invested €500,000 for the company's expansion. In 2008, Plant Health Care had an IPO at the AIM market in London, and Pymwyc's investment realised a value of €2,250,000, a multiple of 4,5x.

Infrastructure

ELEAF

eLEAF is developer and owner of a set of algorithms that transform meteorological and remote (satellite) sensing based data into quantitative crop-, water- and climate parameters per pixel. This technology results into data components that form the building blocks for agricultural applications and management systems worldwide. eLEAF offers consultancy, remote sensing science and operational applications for agricultural and water resources management.

This investment is championed and supported by a Pymwyc investor member.

Infrastructure

TRIODOS GROENFONDS⁵

Triodos Groenfond is the largest green investment fund in The Netherlands, with close to EUR 600 million assets under management. Triodos Groenfond primarily provides loans to projects that have formally been 'declared green' by the Dutch government and that contribute to a more sustainable and greener environment In the Netherlands. Since 2014 the fund also provides loans to a limited extent to renewable energy projects in emerging markets. Sectors of investment are renewable energy (44.3%); organic agriculture (17%); sustainable real estate (12.3%); and nature & landscapes (8%).

Focusing on the contribution to better soils, Triodos Groenfond contributes to regeneration of our soils by financing organic (biodynamic) farming practices.

An example of such a loan is the financing of 'De Lepelaar' for acquiring 23.5 hectares of traditional agriculture land that will be converted to biodynamic land. Another example is De Keizersrande, a modern biodynamic agricultural and dairy farm, based on the concept 'Farmers for Nature,' whose premise is that agricultural exploitation of the land is fully in service of the nature- and landscape values of the area. They strive for a closed loop business, where the grains from the agriculture activities and the grasses of the meadows are used as feed for the livestock, which in turn fertilizes the land.

INVESTMENT EXAMPLES

Asset

MANITOBA HARVEST

Manitoba Harvest Hemp Foods was founded in Canada in 1998, and is the world's largest hemp food manufacturer. Manitoba Harvest grows, makes and sells their own brand of hemp food products. 90% of product is recycled, biodegradable, and/or contains environmentally preferred materials. Manitoba Harvest considers itself 'stewards of the land' and continues to educate farmers on healthy food production. Manitoba Harvest Hemp Foods' organic products are certified by Pro-Cert and except for hemp oil gel caps, all of Manitoba Harvest products are Non-GMO Project Verified.

In 2008, Pymwyc invested €65.000 in a 2nd round of financing. In 2015, a 87% majority of Manitoba Harvest was sold to a US holding company, with Pymwyc realising a value of €455.000 (7x multiple to cost).

Asset

GRASSLANDS

Grasslands, LLC is the land management arm of the Savory Institute, and the pioneer of the Holistic Planned Grazing Model (HPG) for cattle-trod grasslands. By managing grazing cattle in larger, tight herds, and by actively managing the grazing and recovery of the plants and land, HPG results in a significant increase to the land's productivity while increasing soil organic matter and biodiversity.

Founded by two individual impact investors in 2010, and to-date still privately held, Grasslands is currently at work on lands in the Northern Great Plains of the United States, Hawaii, and New Zealand's South Island. John Fullerton, one of the Grasslands LLC principals, is founder of the Capital Institute, and an international speaker on Regenerative Economics. John Fullerton calls Grasslands 'true wealth creation.' "We are building biodiversity, soil fertility, sequestering carbon, and generating financial returns. And if my belief of what will happen to ecosystem services plays out, we will make a lot more money with these assets than with most financial assets."

Asset

AGRO-ECOLOGICAL

Agro-Ecological is an active asset management business focused on the transformation of conventionally managed agricultural land into resilient, robust, organic production systems. Agro-Ecological is currently active in New Zealand, in dairy, sheep and organic kiwifruit, where they use native plantings that attract beneficial insects to create biodiversity and pollinate the crops, and clover to avoid synthetic nitrogen.

This investment is championed and funded by a Pymwyc investor member.

“ As a farmland asset manager, soil limits you, demonstrates your understanding, and defines your farm investment performance. ”

– Rufo Quintavalle, Agro-Ecological Investments

Asset

COMMONLAND

Commonland undertakes large-scale restoration projects, and has a holistic view of what restored landscape returns in financial, natural, social and inspiration capital. Commonland has a 20-year investment outlook, with a goal to realise large-scale landscape restoration with local farmers, land-users and experts, based on sustainable business cases. With an excellent international team, the new Commonland Fund hopes to launch in early 2016, investing either through equity or debt capital in viable landscape restoration projects and related businesses. Founder Willem Ferwerda says: "We need to make business and investors part of the solution. In 20 years, we can rebuild complete ecosystems, grow the future, and grow returns."

We look forward to working with Commonland on their upcoming Fund, and joining in the long-term outlook.



HOW DOES AN IMPACT INVESTOR ASSESS FOR HEALTHY SOIL?

As a peer community of impact investors working with global partners these last 21 years, we are pleased to note the increase in innovative soil- focused business models arising. We have looked at an increasing number of organic fertilizers and soil sensors, at urban rooftop farms, worm farms at scale, and at some of the new models in emerging markets that will collect human waste to create compost. At Pymwymic, we look for teams or companies that understand the pressing need to begin global soil restoration, who practice holistic and healthy agricultural management, and who have built a solid business model that promises both financial and biodiversity return.

Triodos Bank reviews hundreds of propositions for the Groenfonds annually. “We can no longer afford to keep a world view that thinks of agricultural land as the starting point for a limitless process of extraction. Rather, agriculture needs to be seen within the context of a natural system,” says Marilou van Golstein Brouwers, Managing Director of Triodos Investment Management. “This system includes nutrients, water, biodiversity, animal welfare and social conditions. Triodos stimulates the creation of more sustainably farmed land by financing the conversion of land from conventional to organic approaches and we support a healthy development of the wider food sector through financing food producers who meet the growing demand for organic food.”

WHAT CAN YOU DO?

If you are convinced, as we are, about the imperative need to bring attention to the health of soil, please put ‘boots on the ground,’ and take a step towards action.

Impact Invest: On the simplest level, your consumer choices are a type of investment, and can support healthy food and healthy soil. If you are a small investor, look first to your bank to see what your cash accounts are supporting. Do you agree with what your bank finances? Similarly, your local crowdfunding platforms are helping to source financing for local farms and farmers; considering joining. For more experienced impact investors, we invite you to join the Pymwymic community, or our colleagues

at Toniic, in investing directly in innovative companies targeted at ecosystem restoration. To diversify your investment risk and support a significant effort for the infrastructure of a healthy economy, consider investing part of your assets in one of the land managers listed, or in a fund like the Triodos Groenfonds.

Share your knowledge: By reading this report, you have already invested into building awareness. Thank you. Share what you have learned with others, and especially with your Next-Generations. Perhaps you can support one of the organisations mentioned.

Walk the talk: In your own gardens, stop using chemical weed killer. Use compost and worm farms to improve soil health, and support nutrient rich microbes, and consider planting fruit and vegetables which encourage and maintain a diversity of birds and bees. Buy organic produce, which increases the demand for sustainable farmland.

And then pick up a handful of local dirt. Remember that the earth has existed 4.5 billion years, and the material in your hand has supported life, health, food, and climate. Ground yourself into the importance of celebrating the soil, and dig in to help. The 9 billion people expected by 2050 will soon be walking our way.

IN GRATITUDE

We would like to express our thanks to Triodos Bank, who supported the creation of this report, and who has a demonstrated track record of leadership in understanding the value of investing into healthy soil.

Thank you also to soil advocates and colleagues who shared their work and their thoughts, and special thanks to the quiet community of families, foundations, and individual Pymwymic impact investors who consistently put their money where meaning is, in service to global solutions.

And... well, we'd be a bit silly if, after singing this song of soil, we didn't express our gratitude to the earth, and to the beauty of biodiversity – of which we are all a part.

We used several reports and publications as source material for this report. The attributions and general sources are listed on our website at www.pymwymic.com/soil-resources/