CONSIDERATIONS FOR A SHARED VISION OF VERMONT SOIL POLICY

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EXECUTIVE SUMMARY

This research project began with an exploration of the intersection of agriculture and energy in the United States. At the heart of this convergence is an incredibly rich and growing focus on the role of agriculture in combatting climate change. This combines a scrutinizing of agriculture as a contributing factor (accounting for roughly 9 percent of U.S. emissions) with an exploration of agriculture as a mitigating factor (by drawing down and sequestering carbon in agricultural soils). This research began on the second prong, but what soon became clear was that the two areas are intricately entwined. Thus, the potential goes well beyond the opportunity to offset carbon emissions by actively drawing down carbon from the atmosphere for storage in agricultural soils. A review of the literature shows that not only can agriculture sequester carbon, but in many cases, the methods that accomplish this entail reduced energy use, indicating additional potential to reduce agricultural reliance on fossil fuels. In the face of climate change, air and water pollution, soil contamination, and the state's growing interest in transitioning to a renewable economy, the full potential of soil carbon sequestration in agriculture holds extraordinary promise. It is therefore not surprising that healthy soils legislation is gaining in popularity across the United States.

Healthy soils programs – which exist in several states today – generally recognize that soil health benefits both agriculture and the environment and therefore can help in combatting climate change.[1] Given the interest, and Vermont's economic and environmental goals, we set out to explore key considerations for policy design and opportunities for further progress. Our purpose was to sample the public value of soil health in Vermont and discover relevant issues for developing healthy soils policy in the state. With this goal in mind, we interviewed a multi-sectoral selection of 32 Vermonters – researchers, legislators, regulators, technical assistance providers, farmers, and advocates – to learn their perceptions of soil health and the processes that relate to soil health work and policy. Summarizing what we learned from interviews, this report also recognizes that there are many questions yet to ask, and people to engage. We do not claim to describe the complete array of perspectives on soil health, but to begin mapping key arenas, stakeholders, and topics for further exploration and engagement.

Ultimately, we found that when we asked people to talk about soil health, what they talked about was whole landscape function, farm viability, and agricultural economies that embody ecological values. They talked about climate, water quality, and biodiversity. They told us about market failure, global commodity markets, and the price of milk. We learned that "soil health" encompasses far more than its name discloses, and that it is critically important to (1) understand the connection between soil and landscape function and the importance of a holistic perspective, and (2) support and fund further exploration of the public value of stewardship of natural resources like soil. Therefore, there appears to be a meaningful role for the state legislature to play in developing effective healthy soils policy, building on community led collaboration. In summary, policy is perceived to function best when rooted in a shared vision, informed by rigorous research and development, shaped by collaborative processes, and revised in response to multidirectional feedback and consistent evaluation.

1 *See, e.g.,* Cal. Food & Ag. §569 (2016) ("the program shall seek to optimize climate benefits while supporting the economic viability of California agriculture by providing incentives, including, but not limited to, loans, grants, research, and technical assistance, and educational materials and outreach, to farmers whose management practices contribute to healthy soils and result in net long-term on-farm greenhouse gas benefits."); *see also, e.g.,* N.M.S.A. §76-25-3 (2019) ("the purpose… is to promote and support farming and ranching systems and other forms of land management that increase soil organic matter, aggregate stability, microbiology and water retention to improve the health, yield, and profitability of the soils of the state.").

FRAMEWORK

The framework that emerged from the data is a cyclical composition of six distinct but interconnected components: (1) vision, (2) research and education, (3) standards and metrics, (4) law and policy, (5) evaluation and feedback, and (6) collaboration. This section includes a brief description of each component, introduces relevant findings, identifies aspects at each stage of the framework that are already well-established in Vermont, and highlights further opportunities.

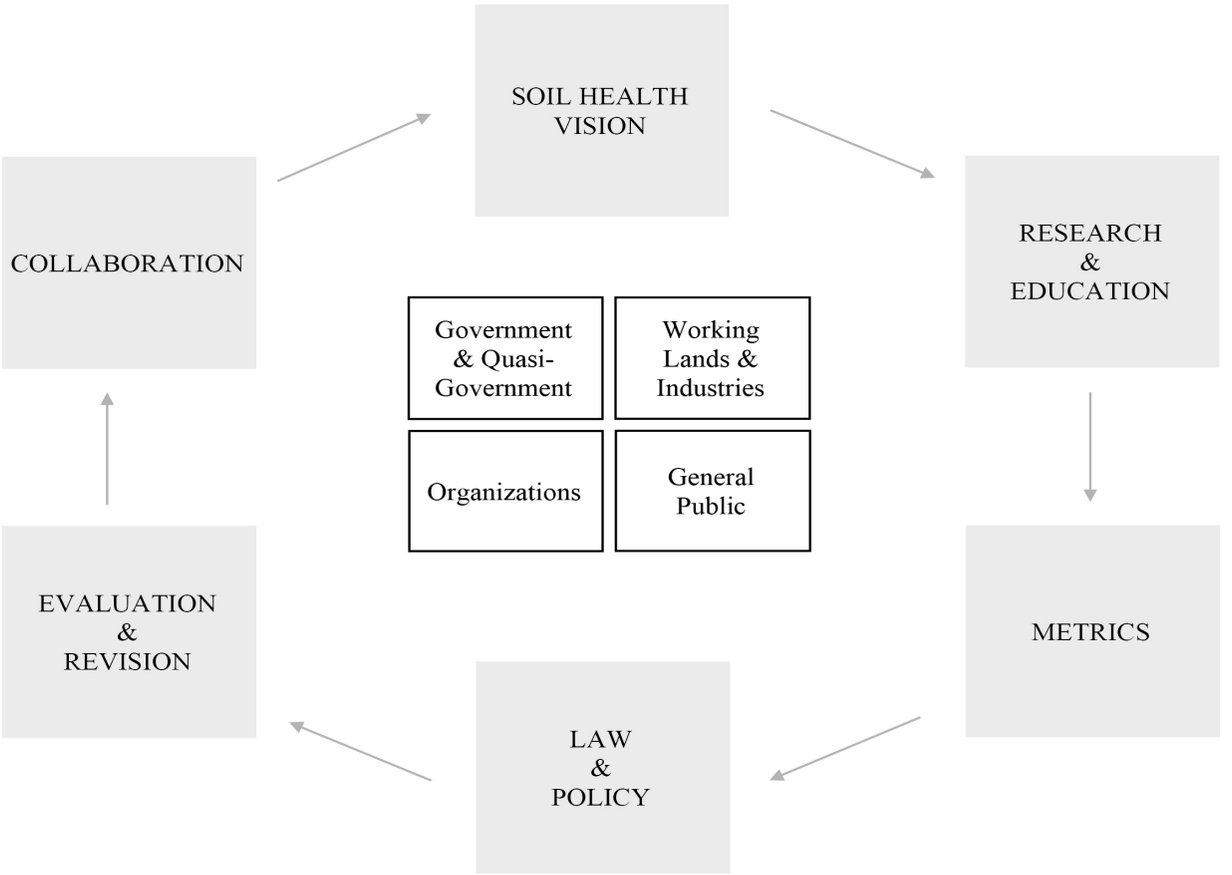

Figure 1. Framework

SPHERES OF INFLUENCE

Four major spheres of soil health influence emerged in conversations with stakeholders: (1) government and quasi-government, (2) working lands & related industries, (3) organizations, and (4) the general public. These became apparent by grouping responses describing influences on Vermont soil health, producing a visual model based on participants' observations of how influential parties are functioning within a larger ecological agricultural system.

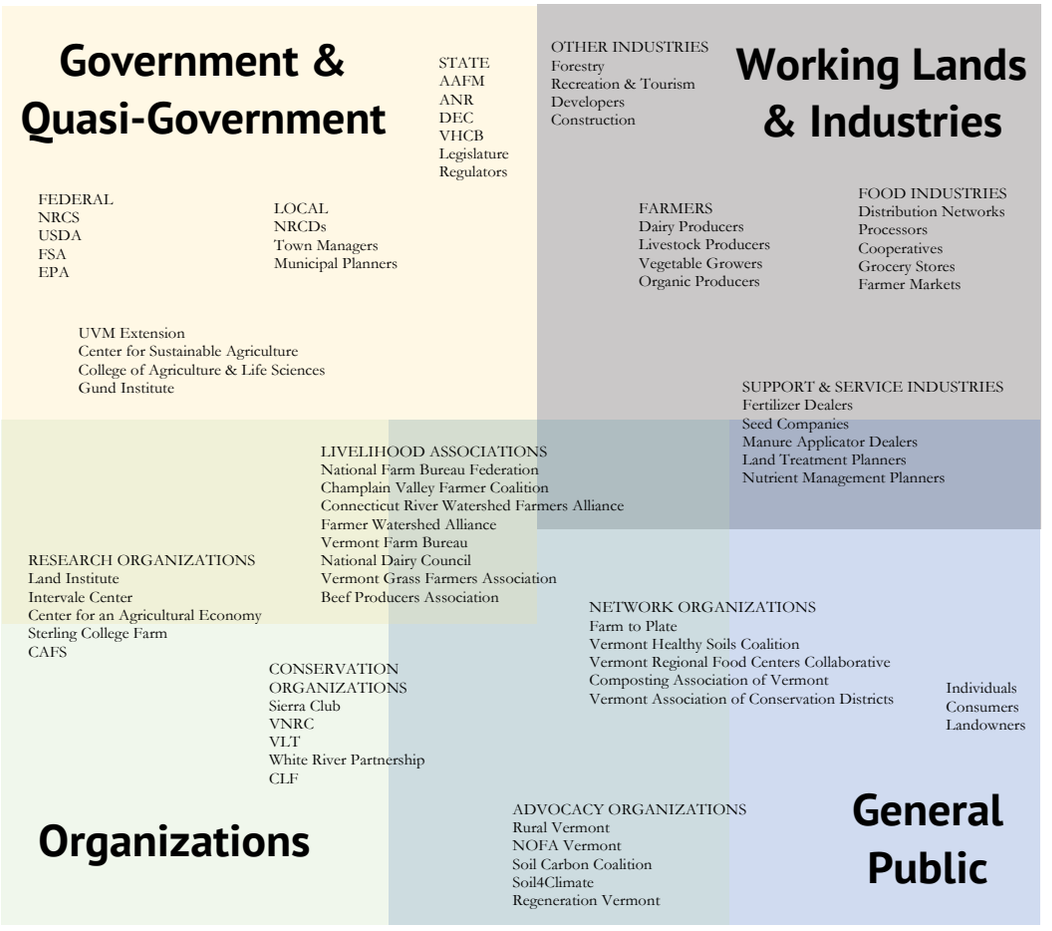

Figure 2. Spheres of Influence

Notably, participants themselves did not fit neatly within any one sphere. Instead, they often wore more than one hat, either contemporaneously or over time, a characteristic often attributed to Vermonters generally. While this adds complexity to analysis, it also illuminates a powerful tool available for Vermont. At such intersections of people and disciplines we find an emergent incubator for innovation, long-term viability, and sustainable growth across agricultural, developed, and natural landscapes.

VISION

A key part of the framework is identifying a shared vision and establishing a direction around which to collectively strategize. The vision describes the ideal, an achievable goal, and a desire to accomplish that goal together. According to respondents, this must be done collaboratively and democratically because it can be harmful and ineffective to "impose a vision on people." People talked about "necessary first steps" as needing to understand soil health, identify where we are, and determine collectively where we want to be. While there was quite a difference in opinion of whether "where we are" is presently understood, most agreed that common ground has not yet been achieved regarding "where we want to be." Most people said, however, that some kind of agreement itself is a critical step.

"The single most beneficial thing the state could do is set specific goals for soil health outcomes."

Some described the particular role of government as setting the minimum requirements above which further improvement would be encouraged and rewarded. A "clear end goal" can provide a reference point for progress and a key measure to use in revising the process. Additionally, the clearer the goal, the clearer and more specific the strategies can be. One person gave the example of renewable portfolio standards as a strategy for reducing carbon emissions to demonstrate the effect that goal setting and state standards can have. Additionally, standards can evolve over time, and even accelerate if implementation rolls out faster than anticipated.

Far from settled are meanings of terms like "soil health", pathways to outcomes, effectiveness of practices, whether practices are indicative of outcomes, what measurements to use, what scientific evidence actually shows, and what standards are adequate, fair, and feasible. One theme amongst responses was actually a belief that the very lack of agreement about what soil health means is a barrier to accomplishing its benefits. Several people remarked on the amount of debate that arises over soil health and related concepts such as "regenerative agriculture" and "grass-fed". Debates were observed amongst research professionals, legislators, agency employees, and the public. Thus, according to one participant, the idea of soil health can serve to bring different perspectives together.

RESEARCH AND EDUCATION

There seems to also be a general perception that research and education are an important priority for state funding in order to develop a shared vision. According to some participants, the role of research in policymaking is well valued by the Vermont legislature, which is generally regarded as accessible to the public, receptive to evidence and research, and interested in new ideas and innovation. Therefore, several respondents said funding for further research and education is the most important action that the state could take to further support soil health. A few people named specific targets for such funding, including UVM Extension, which the interviews suggested is widely regarded as having a positive impact within the agricultural community and in the policy context. Respondents talked about basic scientific research, policy research that explores market-based options through an interdisciplinary lens, research that explores successful programs in other countries, and identifying existing barriers and counterincentives. Others described a need to promote "peer-to-peer networks" which are perceived as extremely effective means of knowledge exchange farming communities.

The interest in research reflects the current demand for evidence-based policy. A number of people talked about "lack of clarity of the science." There appear to be questions about what works across farm types and sizes, and concerns about implementing standards that do not allow for variability. Others, however, believe that the science is clear, and no further evidence is needed to take action. This split was described by researchers, farmers, and legislators, indicating an interesting sort of disagreement about not only how to accomplish a vision, but where exactly we are in the process and what we know so far. Laying out the full spectrum and breadth of evidence would be a valuable undertaking. Another value of research is, according to one respondent, "the more research we see on this, the more we talk about it."

"The public needs to understand their food comes from the soil, not the store."

The interest in education reflects the demand for soil health literacy among the public, within the legislature, and throughout the state. People seem to agree that soil health relies on a public understanding that their enjoyment of the environment, clean air, and good food, come from "good soil." Others observed the need to value the "benefits of good land stewardship", the

important role of "farmers and their skills", and the "value of the land". Among suggestions for increasing soil literacy were soil tours, distributing information to the public, and generally teaching people about "the connection between the soil under their feet and the food that they eat". According to one farmer, these re-connections are made "through food."

This educational need was described as present at individual and institutional levels, in the legislature, in public education, in corporations and business endeavors, and across communities whether urban or rural. On this topic, respondents addressed the need to increase funding for education and communication about soil, its importance to the environment and flood resiliency, and to Lake Champlain, citing the "disservice" we do to ourselves "by not recognizing its value." One person described the related need for a perception change, from viewing soil as a medium, towards viewing it as "the really integrated ecosystem that is the soil". The state's role would be to communicate soil health as a priority for economy-wide investment.

METRICS

There also appears to be a role for the state in developing an evidence-based system of metrics for tracking – and remunerating – improvement over time. Responses suggest a perception that metrics for measuring soil health improvement have yet to be designed. Several respondents asked, "how are we going to measure it?" Agreeing we don't have this ability currently, responses differed as to why. Some cited the historic focus of agricultural research on "naked productivity" while others blamed the structure of regulations.

"Our regulatory schemes tend to look at what is mainstream and apply that to large numbers of entities, but don't typically leave enough flex in the system to invest in the resource itself."

People described different ways of measuring – and thinking about – soil health. Some respondents "eyeball it" and look for a combination of indicators, others rely on one or a combination of various soil tests, and many do both. As the meaning of soil health – and the opinions on whether the term captures that meaning – is variable, responses related to

measurement demonstrate that how soil health is defined influences how it is measured and accounted for. Additionally, soil itself differs across Vermont, and a few respondents commented that different kinds of soil have different issues, so they need different metrics and standards of "healthy". While some believe that a "clear measurement system" is needed, it seems to be just as important that soil standards and associated measurement systems account for this variability.

Participants largely agreed about the importance of understanding that tests measure different aspects of soil, based on differently valued outcomes. One participant pointed out that "many tests are relative" and were designed that way, such that "we don't have absolute metrics that say if you're over this percent nutrient or organic matter or type of biological diversity, then you have healthy soil." Instead, "how we measure looks at all of the soils in a given region and says the ones at the upper end of the scale are 'healthy'." A researcher noted that certain measurement aspects of tests can and should be adapted geographically as well, to account for specific characteristics of Vermont farms and land. Another researcher provided examples of how the use of different measurement indicators can lead to different conclusions about soil quality. For example, there are different ways to measure carbon in soil, by looking for "liquid carbon", "old static carbon", or by looking at how the soil is cycling carbon. Rather than look at carbon at all, a measurement could count nematodes and look at bacteria and fungi, according to this researcher, who also highlighted the risks of deceptive results using different measures. Some tests, for example, attempt to measure the amount of respiration through carbon dioxide release which could be an indicator of loss of respiration and biological activity, but this researcher pointed out that this outcome also results from tillage, a practice considered counter to healthy soil management. Thus, such methods of measurement "don't necessarily get you all the pieces of the information" necessary to accurately assess the health of the soil.

LAW AND POLICY

Policy is the sum of the tools that constitute the strategy for moving towards the vision. Through the research, we learned that the perspectives on what policies work best and are most needed vary widely, but most can be described as either funding for support and assistance, payment for ecosystem services, incentives, regulations, or a combination of these.

For some, a gap exists between understanding information and translating that into practice. This is sometimes attributable to barriers such as lack of equipment, knowledge, additional costs. Many respondents talked about the lack of resources as one of the biggest barriers to improving soil health. Several related that Extension and Natural Resources Conservation Districts (NRCDs) are doing a lot of good work to be resources, focusing on both soil health and water quality. However, gaps appear to still exist. Specifically, people talked about these needed resources: money (or absorbing cost), time, labor, knowledge, training, capital, and awareness of practices (the how). From a farm management perspective, according to one researcher, having resources provides the flexibility needed to change practices.

More than half of respondents suggested devising some means of assisting or supporting farmers as the best way for government to take action. Some described this as technical assistance, others described it as "public investment" or "helping farmers in a way that helps the environment". Others talked about providing grants and offering state support to set and meet climate goals, using the state's "power of encouragement", or simply further supporting the effective work already going on – such as cost sharing and grant matching programs. Some described support generally as funding for more resources. One person talked about ensuring that Vermont farms remain rural and that farming is economically viable, which would protect "precious agricultural land from development" and promote stewardship within agriculture. Finally, for some, support includes ensuring that the agricultural industry remains diversified, which is valued from an economic perspective as well as from an environmental one. Participants noted that diversification should be encouraged culturally and supported financially but should not be required.

A significant number of respondents espoused compensating farmers for ecosystem services. Ultimately, people perceive that the problem solved by payment for ecosystem services is that farmers are not paid a price that reflects the value of soil health. Because this is a market failure, one of the best things the government can do, according to many respondents, is pay that price in recognition of the ecosystem-wide public good provided by soil health. Some talked about this as providing financial support if the state is going to ask farmers to transition to different kinds of farming because this benefits everyone. Others emphasized that farmers should be paid for "the whole", rather than for discrete, already existing practices, because this is "fair and ensures that innovation is not ruled out." Others pointed out that

programs are not the same as payment for services, and that we need to shift from incentives to payments for outcome verified practices, or according to others, avoid practices altogether and pay for outcomes.

Overall, people said the government can help these efforts by paying to test what a payment scheme looks like, establish a pilot watershed area (perhaps not in Champlain Valley but elsewhere that gets less attention and financial support), look into a public-private partnership to leverage private investment, and explore whether a state-led effort is really the best option. Here, people expressed concerns that we design evidence-based policy, have metrics to accurately measure improvement, research alternatives, adopt a "whole systems view", and design a system accessible to all farmers – and ideally all landowners and managers. Several people clarified that while the state has an important role in funding research, convening, and planning stages, this should ultimately be run by another entity such as Extension.

Incentives were also discussed frequently in interviews. Twelve people talked directly about the need for effective incentives to encourage behavior that supports healthy soil. Some described economic incentives, while others did not narrow the term to any particular type of incentive. One person said incentives for going beyond the minimum expectation would have a positive influence, and according to another, while mandates may be "too aggressive", incentives "could go a lot farther." Notably, people talked about the need to design incentives that are equally helpful for farms of all types and size.

"We need more of the carrot and less of the stick."

Some people want to expand state incentives generally. Examples included encouraging farmers to rotate crops and cover, expanding the Vermont Environmental Stewardship Program and other "voluntary options", promoting grass-based livestock, and encouraging perennial cropping. One person described the need to "continue and expand programs that help farmers implement practices they want to implement that are going to help meet water quality expectations on-farm, and also improve soil health." This person explained that the state should "expand funding to help support farmers but allow them to make the choice to manage differently and not have it stress them financially." Others see incentives as "a good start."

Finally, regulations came up in conversations about policy options with participants. Believing that regulations are an important tool for improving soil health in the state, a few respondents specifically recommended more regulation. These respondents explained that the government, as steward of common resources, has a duty to enforce standards, regulate how soils are managed, and prevent "bad actors" from doing harm. Others said that regulations are necessary because soil organic matter is "a resource that we're losing."

However, several people said soil health should never be regulated because it is overstepping and is impractical. They explained that regulations risk reductionism, unintended consequences, and breed distrust between regulators and farmers, which can be harmful towards the end goal. According to another respondent, the problem with regulations is that they regulate what comes off of farms, but not what goes onto farms. Another said it is wrong to place the burden of environmental quality on the back of an industry so marginal, fragile, and exposed to risk, as farming. Others see a middle ground on the issue of regulation, that perhaps the government's job is to set a standard or expectation and leave it up to farmers to decide how to meet that goal.

"It is really difficult to prescribe rules that work across the State and across farm types, and one size fits all is pretty hard in Vermont, which has such unique topography and hydrology."

Alternatively, another person suggested "flexible guidelines" instead of regulations. Some said that the inflexibility of regulations compromises their effectiveness in a state like Vermont. Others cautioned that we don't know enough to regulate soil health according to a "certain soil health standard unit." According to one researcher, "we should have programs that promote soil health, but we shouldn't regulate to a certain soil health standard unit. I don't think science supports a legislative action like that. We know soil health is a good thing, but we don't know what level of soil health gets us the environmental outcomes that we seek."

EVALUATION AND FEEDBACK

As laws and policies are implemented, it is important to build into the strategy mechanisms for constant evaluation, reflection, and feedback. The most effective policy, according to the data, will be flexible and adapt, evolve, and respond to changing circumstances, unintended consequences, new knowledge, and innovation. Periodic evaluation of the policy process requires that feedback loops are built into the system so that feedback is not only welcomed, but it is considered and serves to inform the third piece of this stage, revision. Revising the process and adapting to new circumstances and information is key to an effective and sustainable process. This means that when people come forward with new ideas and evidence of the impacts of existing programs, that these perspectives and facts are incorporated into the evolution of the framework. This also means that incentives are updated, and metrics revised to reflect evolving goals and standards.

Additionally, feedback should be multidirectional. This means that not only is the legislative process open to public participation, but that those making progress on farms and in the community are receiving feedback from agencies and the legislature. At a minimum, people saw an opportunity to heighten public acknowledgement of progress being made on farms and to adjust policy requirements, goals, and compensation accordingly. This is further evidence of the importance of standards, metrics, research, and education.

COLLABORATION

A major challenge – and opportunity – emerging from the data relates to the expressed need for a collaborative and inclusive process rooted in the perspectives and voices of communities. It is important for the legislature to engage perspectives reflecting the diversity of farmers in order to build on the bottom-up cooperative work that is occurring within farmer and watershed management networks. As one participant put it, "the trouble with Vermont farmers is you can't generalize about them". In other words, it is important to bring in perspectives of a variety of farmers to accurately reflect the diversity of voices that should be present in the process. Thus, a crucial stage of the policy cycle is to establish a "collaboratory" that brings all of these perspectives and all of the missing voices into dialogue.[1]

"There is a disconnect, but there is also really fruitful collaboration. Both can exist in the same five minutes."

Most participants said there are areas of collaboration in Vermont, or "success stories", emergent over the "last few years", but that there are also gaps. But a few respondents pointed out that few collaborative efforts relate directly to soil health. According to others, "there are so many different groups with a vested interest in this emerging networking space, innovation, trial and error, ideas being put forward, and the intersection of different interests." And that, "there's a lot of interest in soil health at the center of that." Regarding who is collaborating, one respondent described the "superstructure of the conversation", noting there are "many players and much complexity". For the most part, the interconnectedness of groups discussed here mirrors the strong influence exerted by these groups. And as to the process generally, some think "we do it pretty well in Vermont," with the exception of some deficiencies in oversight and leadership. Others described obstacles, offering concrete examples of opportunities for improvement.

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1 *See* William Wulf, The national collaboratory – a white paper. In: Lederberg, J. and Uncaphar, K. (Eds.), *Towards a National Collaboratory: Report of an Invitational Workshop at the Rockefeller University*, March 17–18 (Appendix A), at 19 (1989) (coining the term and defining it as a "center without walls, in which the nation's researchers can perform their research without regard to physical location, interacting with colleagues, accessing instrumentation, sharing data and computational resources, [and] accessing information in digital libraries").

As one person said, the people who are "at the table" collaborate "pretty well." It is the people who are not at the table, who have trouble gaining access, who are left out. Thus, a key piece of collaboration is making sure that there is access, opportunity for input, and mechanisms for participation. This should build on existing channels for knowledge exchange and reflect the characteristics of successful collaboration. The legislature in Vermont is perceived as being very open to public participation and input. Some, however, said they would love to see more farmers and fewer lobbyists in the legislature. As we've discussed here, those who are present are influential. It's also important to "begin collaboration with farmers", because there is a perception that "beginning with the public and putting pressure on farmers" breeds distrust and hampers progress. Additionally, there is a perception that the division of topics by legislative committee presents a barrier to integrated policymaking and the development of a holistic vision.

"Siloed legislative committees hinder whole systems policy design and multisectoral collaboration."

Relatedly, the collaboration process faces the challenge of addressing the "environment and agriculture divide." Similarly, respondents described a relational divide between the agricultural community and "the non-farming public." According to one person, "we have horrendous problems with that." Another "gap" raised in several responses is the divide between farmers and the state in its regulatory role. According to one technical assistance provider, "there's pretty much a brick wall between farmers and the state as regulator."

A collaboratory can nurture spaces wherein groups perceived to be in opposition can share visions of what they want Vermont to look like, which will likely reveal shared ground. For example, it's unlikely that groups will say they want anything but clean water, or that they want to see Vermont farms turned into condos. Fostering this space is a very valuable objective for policy makers – including government and trusted networks and other resources and entities. However, in creating the collaboratory, it is crucial not only that everyone has a place at the table – watershed groups, indigenous groups, environmental groups, and the public, but that the design of the group is collaboratively developed. This is important because it will only function effectively if everyone buys into – and trusts – the model.

A few additional themes emerged from the data that illuminate pathways toward further collaboration. One overarching theme was the prominence of Extension in collaborative work. The values of collaborative on-farm projects to "demo the benefits" and of funding "to do outreach and research that government entities are not set up to do" were described in the interviews. Some described this as mutually beneficial: "Extension educators and outreach people promote state and federal programs" and "the government provides critical funding". A third of respondents noted effective collaboration between Extension and NRCS "to get the word out about soil health." This was also described as multidirectional: "Extension shares the soil health tunnel and rainfall simulators from NRCS and NRCS uses Extension's soil health recommendations." In addition to working together, both were described as often participating in similar collaborative groups.

"Collaboration starts with the farmers. They have their support industry that provides seed and equipment, their advice industry – Extension, and their financial support – NRCS or the state."

Responses indicate that "peer to peer collaboration between farmers" is invaluable, and that Extension plays a critical role in bridging divides within farming communities. One respondent gave the example of forming the Champlain Valley Farmer Coalition:

"The intention was to open it up to any type of farmer, which has been hard, but it's working. When we brought in organic wheat and vegetable farmers, there was suspicion. Extension plays a very important role in saying 'no we're going to have a farmer group but we're going to treat each other equitably. That guy is as important as you with your thousand cows.'"

KEY FINDINGS

Within the above framework, five major findings emerged from our conversations:

#1. A VISION OF WHOLE LANDSCAPE FUNCTION

Although we set out to learn about soil health, it quickly became apparent that the term was not always the most useful point of reference. When we asked people to talk to us about soil health, people described the integration of a whole, well-functioning ecosystem. Thus, it appears that soil health is part of a vision of whole landscape function. A vision that embodies this value is supported by the following observations.

"Some farmers just call it 'really good dirt.'"

First, many people talk about the same values without using the term "soil health". Several respondents noted that farmers, for example, often don't even use the term "soil", and instead say "ground" or "dirt." According to one farmer, "someone might have really good knowledge of managing soil without using that term." Another farmer noted that farmers often don't use the term "soil" at all – they say ground, dirt, or "really good dirt". One farmer explained that his father used draft horses on the farm and while he didn't call it managing for soil health, "that's exactly what he was doing." Another farmer said that all farmers are soil scientists, "we just label ourselves differently." In fact, one farmer explained, the term can be alienating because some farmers consider it to be "politically correct, academic, scientific, or a hippie word."

However, according to one technical assistance provider, soil health is talked about with farmers "mostly in the public forum, and less in the halls of the college." He explained, "it's a relatable term, it's popular, so we use it a lot with clientele," referring to farmers. Combining these perspectives, it may be that the term "soil health" both facilitates public dialogue and excludes important voices and perspectives from the collaborative process. Thus, critical considerations in developing a shared vision are "the importance of language" and the full diversity of perspectives on the term.

“Farmers don’t get together and talk about soil health, because it’s a given. You don’t get a group of farmers talking about everything they do with maintenance on equipment because it’s a given. If you don’t maintain your equipment, it doesn’t last. They don’t talk about the maintenance of the tractor – they talk about the power of the tractor – ‘I got a tractor that’s got 400 horsepower.’”

Second, many respondents said that how soil health is defined depends on how it is valued and used, and thus the term is "multidimensional and relative". A few participants explained this relativity by analogizing soil "health" to water "quality", and degraded soil to "impaired water" or "water pollution". Perspectives included ecological views, scientific perspectives, academic definitions combining physical, chemical, and biological parameters, environmental perspectives that soil health is important in agriculture and developed landscapes, and agricultural perspectives that it is a "miracle substance", "the key to life", and the source of "all our food and fiber". Some considered it as a medium in which to grow something and others described it as a natural resource that has independent value. One person appreciates the "intellectual side of agriculture", valuing education programs and public walking trails that promote the knowledge that "fertile soil produces good food." Another person considers soil health to be a "marketplace opportunity" to transform on-farm challenges into "foundations for the next economic activity."

Third, responses indicated a shared belief that soil health is integrated with and inseparable from the whole ecosystem. Emphasizing the connection between water, soil, climate, and agriculture, people described soil health as just one indicator of ecosystem function, a conceptually inseparable part of the whole. Several comments cited the role of soil in supporting "whole", "agricultural", and "below-ground" ecosystems. This is similar to how NRCS defines soil health, as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans."[2]

"If we look at what a healthy below-ground ecosystem can accomplish - now that's exciting."

Functionality was central to responses about soil health, as participants defined it by describing its ability to function in some way. Functions named included productivity and quality of crops, food, and livestock; climate regulation; and environmental and water quality. Thus, soil health is determined by indicators that it is performing those functions. Indicators included whether it is supporting plant growth and plant health, sequestering or capturing carbon, handling water well, cycling manure and minerals, and managing nutrients.

2 Natural Resources Conservation Service, *Soil Health*, https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/ (last visited Jul. 7, 2020).

This model is consistent with the NRCS explanation that "healthy soil" performs five essential functions: regulating water, sustaining plant and animal life, filtering and buffering potential pollutants, cycling nutrients, and providing physical stability and support.

"Soil is the foundation of ecological health in the system."

Indicators related to supporting plant health and growth included "the nutrient quality of food and forages, "how well things grow", "fertility", whether plants are growing well and healthy, "how forages perform", rate of growth, "how workable [soil] is", the "color of pastures", "what we're producing out of the soil", whether sufficient nutrients are present to support plant growth, "steady organic breakdown" to "feed plants long-term", and whether soil "stays put" because "manure runoff runs off value". One respondent even uses soil health "as a betterment tool to monitor crop health". Another said that healthy soil brings up nutrients "from deep in the soil into the forage where livestock can access those minerals, vitamins, nutrients, which they need to grow".

Several respondents consider soil to be healthy if it provides climate change resilience. The primary indicator of soil health in this category was soil carbon content, although several respondents pointed out that soil carbon alone does not render the soil healthy, but instead is one indicator amongst many. Further, while soil carbon was important for those valuing climate resilience, it was not exclusively valued by these respondents.

A number of responses related to the water regulatory function of soils. Most responses that included water regulation as an aspect of soil health referred to water holding capacity (about half). Others used terms such as "infiltration", efficient use, water retention, drainage, "doesn't erode", and "acts like a sponge". Generally, people commented that healthy soil absorbs water when it rains and retains water during periods of drought. Several comments referred to management, balancing, or "cycling" of nutrients, minerals, and manure as an aspect of soil health. Additional examples of this indicator were "manure breaks down", "mineral cycle working well", "manages nutrients", "pH getting balanced", "contains micronutrients", "cycling nutrients in a healthy way", "retains nutrients", "has reserve nitrogen in the soil", and "holds minerals like phosphorus."

Others look for biological activity. Nearly half of respondents referred to the presence of biological activity in the soil as an indicator of soil health. Three people said that "soil is alive" or is a "complex living organism". People look for "number of earthworms", "worm casings", insects, "good biotic nature", and "soil microbes". One respondent looks at the "ratio between fungal and terrestrial communities", and another seeks to keep the soil in "as original a state as possible with micro rhizomes". One response emphasized ensuring that organisms present are not under stress. In addition to the presence of biological activity, about one third of respondents emphasized the importance of diversity of life both in the soil and above-ground. Soil health therefore involves not only "microbial communities in the soil", but also is indicated by the "presence of plants and animal species" and "insects and bees" above-ground.

"It's when you look under a dry cow patty and see 20 to 100 bugs, worms, centipedes, and beetles all just happy in it."

The final indicator of soil health discussed by respondents was "organic matter." Some referred to organic matter "as a percentage", a few look for "lots of micro- and macro-organisms" or "soil microbes", and some others value practices like composting because it "drives up organic content", or the presence of "enough residuals" that "add to organic matter". Others included reasons that they consider organic matter to be an indicator of soil health, stating it "increases moisture holding capacity", "improves the ability to absorb and hold water", "keeps nutrients from leaching out", and "the whole profile of soil improves". Some also noted that a greater number of "different nutrients are able to bind to organic matter" and organic matter promotes "healthier root systems for plants". Finally, some people look at the physical properties of soil to determine quality, including "little compaction", "loose soil", "oxygen levels", "porosity", "type and depth of different layers of subsoil", and whether the soil "structurally holds in your hand."

"We are lucky in Vermont because the average consumer knows more than in a lot of other states. Many people here have agricultural backgrounds in their lineage and are still geographically close to it."

The benefits attributed to soil health - and the perceived beneficiaries of its benefits - further reveal both the public value of soil health and a broader vision of ecosystem integrity:

Landscape function / resource maintenance	**13**
Climate regulation	**14**
Water quality / water regulation	**19**
Public health	**10**
Food production / quality	**19**
Storm protection / avoided costs	**10**
Recreation / aesthetics	**5**
Nutrient cycling	**7**
Fewer chemical inputs	**3**
Farm profitability	**11**
Long-term resilience / farm viability	**8**

Figure 3. Benefits of Soil Health

Everyone	**25**
Farmers / Landowners	**13**

Figure 4. Beneficiaries of Soil Health Benefits

Finally, a vision of whole landscape function addresses the concerns raised that a "reductionist perspective has harmful consequences" and is a sort of "siloing". Some thought focusing on "soil health" is thinking too narrowly, because it suggests a limited focus on crops, yields, and nutrients, while others think the term "soil health" is too broad, because it fails to describe any specific concept. Whether because it is not an entity that stands alone or because it contains too many different meanings, there was prominent concern amongst participants that the concept of "soil health" itself is problematic. Concerns were also expressed over using the term "soil health", including the risk of misleading measurements (by focusing on carbon content alone) and the misperception that soil health is one choice among conflicting possibilities towards which to allocate funding, such as water quality. While participants themselves emphasized that water quality and soil health are interconnected, and most believed that their colleagues are making this connection increasingly, a few government respondents had observed a lack of conceptual integration of these amongst colleagues. Others disagreed.

Soil health does come up in other contexts of collaborative work - like water quality, farm viability, and payment for ecosystem services - but according to some people, because it is seen as a separate issue, cohesion – and true vision – is a particular challenge. Some stated the water quality collaborations directly focus on soil health, but most found them relevant based on their own connection of water quality and soil health, and their perception that others share this perspective. As a result of a "reductionist approach", some describe the challenge in establishing a vision as framing the issue in a way that speaks to "hot" issues in Vermont such as water quality and "the broader issues for agriculture." Framing the issue refers to crafting the lens through which vision is developed. For some, the "silver bullet" is farm viability, and for others, the "magic term" is water quality. Others describe the challenge of backing out of "silos" and shaping vision through a "whole system change" lens. Perhaps a powerful vision not only properly frames the issue, but also rather than siloing, conservation is pursued "across sectors" – in "water, soil, and agriculture". Thus, many participants proposed focusing on "overall ecological stewardship" rather than "limiting it to soil health."

#2. LONG-TERM PUBLIC INVESTMENT IS NEEDED

With respect to a vision of whole landscape function, or ecosystem integrity, a further theme that emerged is the importance of contemplating long-term investment. One person said that long term maintenance is a key part of the vision, and another described a vision of "regaining what we have lost", referring to topsoil as it relates to ecosystem health. Responses indicated a widespread tension between expectations for immediate results and the need for planning time to "get it right" and for long-term investment. In the policy context, respondents expressed the challenge of trying to rush to create policy to address urgent issues like climate change, water quality, or farm viability, where it is important to "take the time to get it right."

According to one government agency employee analogizing how the state is addressing water quality, "we're dealing with the legacy of recommendations made in the past and how the problem took more than 20 years to develop, and people want to see water cleaned up quickly, but it's not going to happen quickly." According to others, the nature of the problem requires long-term planning, which some respondents said is complicated by structural realities like term limits of legislators and administration changes. Others agreed that long-term planning means taking the time to "get it right". Because policy can happen "really quickly" in Vermont, which is not a bad thing some noted, it can require conscious effort to ensure the time and effort is put in to consider all factors and provide access for input from interested parties. The risk in "rushing it" can also lead to higher expectations than are feasible for the timeframe. Taking the time will mean policy makers are fully informed before designing a policy, and that long-term considerations are taken into account.

In the soil context, some participants also pointed out that the short-term returns are not as enticing for some or the long-term value does not justify the up-front costs of practical changes on the farm. After all, the promise is long-term sustainability and not necessarily short-term profit for farmers. Some respondents talked about how "regenerating soil actually takes a really long time", which others notably disagreed with. According to some, this is a misperception that is harmful. Nonetheless, there was largely agreement that long-term investment both at policy and farm levels is necessary and presents a challenge.

#3. POLICY SHOULD CONSIDER COUNTERINCENTIVES

At least half of respondents talked about the need to research – and better understand – the role of federal policy in contributing to the precarity of the current economic condition of the Vermont agricultural industry. Some talked about federal policy as problematic as it influences behavior in a significant way and is deeply rooted in conventional agriculture. Some people would like to see a shift in federal policy so that it "actually rewarding land management that grows and improves SH and all its benefits." Specifically, people pointed to dairy subsidies, crop subsidies, and other federal policies that operate within a global economy and therefore result in economic challenges for some Vermont farmers.

One person said federal regulations "are not tailored to Vermont in the way we'd like them to be", meaning that we "can't serve whole milk in schools", that federal policy "is not aligned with state food and farm policy", that there is insufficient demand for organic milk, and that commodified agriculture "is part of why Vermont cannot be economically taken over by small goat farmers and produce." One person said Vermont "should support small farms because the feds don't", suggesting federal policy disfavors small farms. Relatedly, a few comments suggested that some farms feel more accountable to the federal government than to state agencies because of well-established relationships. For example, one person described the impact on relationships between farmers and the State of farmers reliance on federal support, noting that so many farmers report to the FSA and the U.S. Department of Agriculture because compliance with their requirements dictate eligibility for participation in federal programs. This is true, according to this respondent, even though state regulations also involve inspections and require reporting for things like nutrient management plans.

"Farmers feel most accountable to the USDA because we can't survive without them."

According to one farmer, federal programs such as the Environmental Quality Incentives Program (EQIP) often reward farmers for "high production" but "not necessarily for managing land well."

"It's not their intention, but the effect of EQIP – and everyone kind of knows it – is that it rewards big farms who do things that are not great for soil health to do slightly better things for soil health. If you create a resources concern, you rank highly, and get assistance. But a farmer like me won't qualify because I'm not making a big enough mess."

In a related vein, five people talked about "economics" as a key challenge to improving soil health, which according to one respondent, is a combination of policy and market forces, which cannot be separated. Many respondents attributed economic challenges to federal agricultural policies. For example, one person said that "economics cause concentrated animal feeding operations", another said that consolidation is the result of an economic problem, and two others said that economic problems are the result of "trouble with access to money".

A number of respondents specifically described the economics of dairy farming: "there is a huge import of embedded nitrogen in grains grown elsewhere to feed cows in Vermont", "there is a huge amount of cow excrement to deal with that exceeds the real capacity of Vermont soils", and "the economics of dairy farming doesn't work without nitrogen and phosphorus subsidies". For others, the problem is that "You can't have healthy soils and clean water with the kind of dairy farming we have, and you can't have other kinds of dairy farming because they wouldn't actually provide profit for dairy farms." For another respondent, the solution to the "international commodity marketplace" is to compete for the top of the marketplace and build a value added supply chain" rather than "fight for the bottom, where you're competing with farmers across the globe who are unregulated and decimating the environment, not paying people, and not providing safety in the workplace." However, for one farmer, the decline in dairy farms in Vermont actually signals a loss of soil health because dairy farms "are a great source of manure" for other farms.

#4. CHARACTERISTICS OF INFLUENCE AND SUPPORT

The qualities that make groups and people particularly influential inform policy design. Responses indicate that people considered groups to be influential who exhibited certain characteristics. Common traits include those who go to the state house regularly, researchers and educators, technical assistance providers, community builders and groups that promote and facilitate knowledge exchange and farmer to farmer learning, and those that connect people and specifically the public, including school kids, to the soil and to farms and the land.

Mostly, however, it appears to be the interactions among groups that make them influential. Those that are most interconnected in multiple directions – and in different ways – with other groups have the most influence. A frequent example was how Extension is connected with the legislature, agencies, and with farmers, and they provide not just technical assistance but also facilitate knowledge exchange and promote research. Seventeen responses described the strong and consistent influence of Extension in multiple arenas. People describes how Extension has "great relationships with the agriculture community", has "people on the ground working one on one in farm communities", and is "the most knowledgeable because there is a perception that state agencies enforce, penalize, and make regulations". Thus, networks and partnerships involving a variety of parties appear to have particular influence.

Participation in the legislative process was another particular characteristic of influence. Six respondents named groups with lobbying influence to be particularly influential, including "big food lobbies", the Dairy Council, and the Farm Bureau, which according to one person, has a particular political influence on farming practices. Others said that "whoever comes to the state house" is influential.

Several respondents talked about general categories of specifically supportive influence. One characteristic of both influence and support is "anyone working directly with farmers" or those who work "one on one with farmers", which several people talked about as a support. A few people similarly said that "farm service providers" are supportive, particularly those "who work directly with farms", as well as "business planners", and "nutrient management planners".

"Those who promote farmer to farmer learning about soil health are especially influential."

Extension and NRCS were described as most supportive. This is because they are "trusted sources of substantial knowledge", promote "farmer to farmer learning", facilitate "back and forth exchange", and build community, which responses suggest are all incredibly influential and supportive characteristics. In contrast, the Agency of Agriculture, while it offers support to agriculture, is not considered to be particularly supportive because its role as regulator means that it is "not a trusted resource." Some people described this as a "fundamental contradiction at the core of the Agency of Agriculture", and others described as problematic the "fraught" dynamic between the Agency of Agriculture and the Agency of Natural Resources. Thus, trust is one very important indicator of support.

Other characteristics of "supportive" were cost-sharing, financial assistance, technical assistance, involvement in research, providing educational resources, "combining different levels of governance", "voluntary programs", "collaborative", "offering community", "carrots", and "meeting people where they are" or "meeting stakeholders where they are and allowing them to move forward." Other entities considered supportive are Northeast Organic Farming Association of Vermont, Natural Resources Conservation Districts, Vermont Land Trust, Vermont Natural Resources Council "and other watchdogs", Vermont Healthy Soils Coalition, Composting Association of Vermont, Vermont Vegetable and Berry Growers Association, Vermont Grass Farmers Association, and "government-supported community efforts."

#5. THE STATE'S ROLE IS TO STEWARD THE COMMONS

While there was largely agreement amongst participants that effective policy relies heavily on farmer leadership at the forefront and throughout the collaborative process, there was also a strong indication that government has a meaningful role to play. Responses indicated a shared belief in the role of government to "steward common resources", "protect our natural resources", and "protect the commons". For many, the commons include soil. For some, this is because "you need good soil health for water quality," "waterways are the responsibility of the state" and "a State responsibility is to protect waters of the state." For others, this is because soil "spills off the land, so it's a community issue." Thus, responses indicated beliefs in the responsibility of government to protect "our gorgeous landscape", to "ensure farmland is still farmed", to "enhance wildlife and pollinator habitats", to "increase the water holding capacity of soil", and to "reduce runoff." Others talked about the role of government in addressing climate change, human health and rural economic well-being. According to one person, it is government's role to "look out for the short-term and long-term well-being of society." Emphasizing the importance of agriculture to the state of Vermont, respondents highlighted the role that stewardship can play in the sustainable long-term function of natural resources like water and soil.

CONCLUSION

According to the data, out of the State's stewardship role arises a responsibility to prioritize soil health. This responsibility includes identifying a shared vision, defining the goal, and providing the resources and policy framework to make it happen. According to one person, legislation that outlines the importance of something like soil health or whole landscape function, can have a big impact by stimulating activity towards that goal. Several respondents were quick to also point out that it is as critical that government provide support for the ongoing efforts at the grassroots level and promote community work rather than design vision and policy from the top down. A state endorsement of a vision that values agriculture and farmers for their full contributions to whole ecosystem function could be transformative.

Vermont has an incredible opportunity to realize the full potential that agricultural soils have for two critical aspects of the State's public policy: a healthy agricultural economy and a healthy environment. Whether in furtherance of emissions reduction goals, water quality standards, or towards a vibrant rural economy, it is a worthy endeavor to further explore the public value of soil and to commit to long-term investment in whole landscape function. The Vermont legislature can prioritize soil health, invest in the democratic exploration of a shared vision, and fund the collaborative development of a plan to make that dream come true for all Vermonters.

"Civilization is completely dependent on soil."

APPENDIX 1. RESEARCH METHODS

The first stage of this research was a scoping process. During this stage, we conducted an extensive literature review of scholarly research articles related to soil health, water quality, ecosystem services, and agrienvironmental policy. We also engaged a variety of stakeholders throughout the scoping process to evaluate the current discourse on healthy soils policy in the United States and to narrow the focus of our research inquiry.

The second phase of the project was the research design. This involved determining the sample of participants to interview as well as designing the various research tools we would use to gather data. Research tools we incorporated into our project design included consultations with stakeholders about interview question development, consultation with researchers about research methods, development of interview questions and interviewing protocols, design of a research information sheet, and the design of a observational notes form which would be used by research associates during interviews.

The third phase was preparation, during which time we obtained approval of our research methods from Vermont Law School. This stage also involved training research associates on interviewing protocol and methods. Finally, preparation consisted of inviting individuals to participate in interviews, which was done by email. Each invitee was provided with the research information sheet as an attachment to the invitation email.

The fourth phase was data collection. Data was gathered using semi-structured interviews These were a combination of in-person interviews, phone interviews, and walking interviews at participants' farms. All interviews were audio recorded with the exception of two (recordings failed to save) and each was accompanied by contemporaneous notes. Most interviews were conducted by me, while research associates created observational notes using the pre-designed form. One interview was conducted by a research associate while I observed and took notes. A few interviews were conducted by research associates, using the questions, protocol, and project recorder. In gathering data, we elicited informed consent from each interviewee, verbally and on record, having provided the interviewee with a copy of the research information sheet. Throughout data gathering, we maintained confidentiality of each interview participant.

The final project stage was data analysis. Each interview recording was saved using a unique identification number and a designated category. These categories were not systematically carried over into the analysis unless they were determined to be particularly meaningful or contextually necessary. Each recording was transcribed by hand or using the software program Temi with researcher review and error correction. All identifying information of participants was removed from text and file names. To analyze the data, we qualitatively coded interview transcripts. First, transcripts were coded by question and identification number, with some questions collapsed for clarity. Next, responses and partial responses were grouped according to a priori themes that emerged during analysis. For some categories, the next level of coding was conducted inductively, and for others, it was done deductively using typologies from the literature. We partially relied on the Millennium Ecosystem Assessment to group responses describing soil health.[1] We also incorporated typologies of civic society to code and analyze data related to spheres of influence.[2]

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1 *See generally Millennium Ecosystem Assessment, Ecosystems and Human Well-Being: A Framework for Assessment*, 53-62 (2005), *available at* https://www.millenniumassessment.org/documents/document.300.aspx.pdf.

2 *See e.g.*, Betsy Taylor, *"Place" as Prepolitical Grounds of Democracy: An Appalachian Case Study in Class Conflict, Forest Politics, and Civic Networks,* 52 American Behavioral Scientist 826 (2009).

APPENDIX 2. INTERVIEW QUESTIONS

Part 1. Perceptions of Soil Health

1. Agriculture is deeply entwined – economically, culturally, and politically – with the history, heritage, and landscape identity of Vermont. The ways that Vermonters relate to agriculture – in both personal and professional ways – are often complex and multidimensional. How would you describe your relationship to agriculture?

2. Related to agriculture is the topic of soil, though some might feel they connect to soil in a context other than agriculture – forest ecologists, gardeners, or composters, for example. This connection might arise out of interest, in the pursuit of profitability, it might be related to climate goals, or it might be related to farm decision-making. How would you describe any connection that you have with soil?

3. People might think about what soil health is in different ways. Maybe they define it, observe it using certain indicators, or maybe it's quantified and verified through measurements. They may use different terminology to describe it. How do you define or think about soil health?

4. I'd like to ask you about the importance of soil health. Some might think of it as important on its own or they might consider its importance in connection to other topics like water, energy, biodiversity, and climate to name a few. Maybe it's the starting point of these discussions or maybe it comes up in other contexts, if at all. What do you think is the importance of soil health and for whom?

5. What are the key challenges you face or are aware of to improving agricultural soil health in Vermont and how do you consider these to be challenges?

6. Do your colleagues talk about soil health? In what ways and in what contexts? (energy, climate goals, agricultural policy or management, carbon sequestration, for some examples) Any examples?

7. What types of people or groups do you think have particular influence - positive or negative – on soil health in Vermont? Do any stand out as most or least influential?

Part 2. Governance

8. What do you consider a government's responsibility to be in soil health management? Is this different from the role you see it playing in Vermont?

9. Are there existing programs or resources that you consider to effectively support soil health?

10. What do you think about the effectiveness of existing regulations or rules that may impact soil health, however indirect?

11. What is the most important action you think the state can take to support soil health?

Part 3. Policy Making and Efficacy

12. How are people working with each other across sectors (private, public, research, etc.) to support soil health?

13. Do you think there is a need to revise the policy making process (and application of that policy) around soil health?

APPENDIX 3. RESEARCH INFORMATION SHEET

Institute for Energy and the Environment
Vermont Law School
164 Chelsea Street, PO Box 96
South Royalton, VT 05068
(802) 831-1054

Healthy Soils Research Information

Title: Soil Stories: exploring perceptions of soil health in Vermont

Principal Investigator: Katherine Oaks, Global Energy Fellow, Institute for Energy and the Environment, VLS

Purpose and Scope
You are invited to participate in this research because of your experience and interest in issues related to agriculture, soil health, and/or the environment in Vermont. The purpose of this research is to learn the ways that people in Vermont relate to soil and what varieties of importance it holds for people across the state. We hope to identify ways that the state is supporting soil health management and understand the ways that information flows between and amongst interested stakeholders. We are also interested in developing an understanding of how people in Vermont think about and engage with soil health policy and if there is a need for greater support for soil health in the state. Any and all perspectives on these topics are important and welcome.

There are no anticipated risks to you as a participant in our research project. To protect your privacy and anonymity, the information that we collect from you during this interview will be kept confidential in order to avoid any potential risks. We will avoid accidental disclosure of your information by ensuring that no identifying information about you is recorded during the interview. There are also no costs to you as a research participant and you will receive no compensation.

This is a project of the Farm and Energy Initiative in the Institute for Energy and the Environment at Vermont Law School, and the purpose and procedures have been approved by the law school administration. The project is funded by the USDA National Agricultural Library.

Procedures
If you would like to volunteer, we will ask you to participate in a 30-60 minute interview, wherein we will ask you some questions about your perspective on soil management and soil health policy. We will record and transcribe the interview. Interviews will be conducted by either Katherine Oaks, Jesse Womack, or Russell Mendell.

Confidentiality
We will make every effort possible to keep your information confidential throughout this research process. This means that we will not disclose your identity or any information that would identify you. If you do answer a question in a way that identifies you, we will make sure to secure your anonymity when transcribing the interview. Data collected will be stored without using your name or other identifying information. This is to ensure that only the primary researchers can match you with your answers. Data will be stored on secure servers behind password protection and firewall security, and only the researchers will have access to that data. After your interview is transcribed, we will destroy the audio recording.

Participation and Withdrawal are Voluntary
Participation in this research project is entirely voluntary. You are free to choose to not take part in the research. You are free to not answer any questions if you choose. You are also free to withdraw at any time, should you change your mind and decide you do not want to continue with the interview.

Contact Information: If you have any questions about this project now or at any time in the future, please feel free to contact Katherine Oaks at katherineoaks@vermontlaw.edu.

Voluntary Participation: Your participation is completely voluntary. At any time – now or during the interview – you are free to refuse to participate without penalty of any kind.

APPENDIX 4. KEY TO ACRONYMS

USDA	United States Department of Agriculture
NRCS	Natural Resources Conservation Service
FSA	Farm Service Agency
EPA	Environmental Protection Agency
CES	Cooperative Extension Service
LGCS	Land Grant College System
ANR	Agency of Natural Resources
DEC	Department of Environmental Conservation
VHCB	Vermont Housing and Conservation Board
AAFM	Agency of Agriculture Food & Markets
UVM	University of Vermont
ALS	College of Agriculture and Life Sciences
CSA	Center for Sustainable Agriculture
NRCD	Natural Resources Conservation Districts
VBGA	Vermont Vegetable & Berry Growers Association
VBPA	Vermont Beef Producers Association
VGFA	Vermont Grass Farmers Association
NOFA VT	Northeast Organic Farming Association of Vermont
NDC	National Dairy Council
NFBF	National Farm Bureau Federation
VFB	Vermont Farm Bureau
FWA	Farmer Watershed Alliance
CVFC	Champlain Valley Farmer Coalition
CRWFA	Connecticut River Watershed Farmers Alliance
CAFS	Center for Agriculture and Food Systems
CAE	Center for an Agricultural Economy
SCF	Sterling College Farm
CLF	Conservation Law Foundation
VNRC	Vermont Natural Resources Council
VLT	Vermont Land Trust
WRP	White River Partnership
F2P	Farm to Plate
VHSC	Vermont Healthy Soils Coalition
VRFCC	Vermont Regional Food Centers Collaborative
VACD	Vermont Association of Conservation Districts
CAV	Composting Association of Vermont
RV	Rural Vermont
S4C	Soil4Climate
SCC	Soil Carbon Coalition