

BUILDING BLOCKS FOR SUSTAINABLE ENTERPRISES

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Balancing growing demand
with responsible action

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ABSTRACT

This research paper can be segmented into three parts. The first segment aims to understand the concept of sustainability by looking at the evolution of the definition over time, as well as relevant scientifically founded frameworks that explain the root causes that have generated our current unsustainable state of society. The second segment looks at stories of enterprises that have managed to successfully integrate sustainability into their business model to develop sustainable on-going operations that have benefited all stakeholders involved equitably. The third segment is an initial assessment of the Peruvian alpaca wool sector to demonstrate some of the challenges entrepreneurs face to develop a sustainable enterprise, as well as probe applicability of the tools we developed from our work in the previous two segments.

Findings from the first and second segments of this paper served as fundamental basis for the development of our output: The Bottom-up pyramid model, and the Sustainability guiding principles. The Bottom-up pyramid model visually represents our understanding of the required components to develop a sustainable enterprise from the ground up. The main takeaway of this representation is that a sustainable enterprise should be founded on knowledge from the incumbent community home to a natural resource, and that business development and growth should be bottom-up, taking into account community concerns and points of view. The Sustainability guiding principles are a list of guidelines entrepreneurs can use to get a better understanding of some of the challenges they may face when attempting to develop a sustainable enterprise in a rural community. Ultimately, these instruments are aimed at providing guidance to leaders and entrepreneurs who want to establish business models with sustainable operations that do not compromise the long-term welfare of a natural resource and the community reliant on it.

The last segment of this paper aims to probe the tools we developed to iterate their practicality and relevance with a contemporary real-world situation. We chose the alpaca wool sector in Peru because it is representative of the types of hurdles leaders could face when attempting to initiate a sustainable enterprise. Additionally, one of the team's researchers had access to stakeholders in this sector, which provided primary research to complement and corroborate our literary review. This assessment is an initial step that needs further validation with more pragmatic information and on-site data for a more detailed analysis of the issues hindering specific communities in the Andes.

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INTRODUCTION

WHAT IS OUR OBJECTIVE?

The objective of this paper is to envision the building blocks required to implement and manage sustainable business initiatives for natural resources. Acknowledging the divergent understanding of sustainability as a concept, our research aims to distill its meaning into an actionable tool. Through the examination of businesses that use sustainability as a core pillar in their business model, we aim to extract the common characteristics that make these operations successful as well as to identify risks and challenges in each venture. Ultimately, our research aims to contribute to the global movement inspiring sustainable business. We aim to help empower vulnerable populations in rural areas where, untapped natural resources may be found. Additionally we aim to inform business

leaders about the importance of integrating existing social and biophysical systems into their business model.

Over the last decades, several definitions of sustainability have surfaced from various knowledge sectors in an attempt to capture its meaning and relevance to a particular field. Given the topic's complexity, sustainability can have different interpretations and implications under different contexts. Although, this paper eventually contributes a clear explanation of sustainability based on multidisciplinary scholarly knowledge, it is important to provide an initial notion of the concept. The following definition provides an overall rendering of sustainability as it relates to our research paper

"Sustainability is the protection and well-being of the living planet; the preservation and protection of the earth's natural cycles, the preservation and the protection of the millions of species of plants and animals, including humankind, from the destructive forces of anthropogenic manufacturing processes, technologies and human populations." (Sachs, 1993; Cash, Clark et al, 2003)

To demonstrate the applicability of our sustainability model, we probe the required conditions against a present-day case found in the Peruvian alpaca industry. Through the examination of the alpaca sector's unrealized value and innovation potential, we will attempt to illustrate the opportunity

to be championed in developing countries like Peru. In doing so, we aim to identify fundamental leverage points to ensure the development of sustainable value systems. Sustainability will be comprehensively explored by touching on dimensions including environmental impact, equitability and

fairness, ethics and other relevant dimensions. Through the investigation of the alpaca sector in Peru, we will illustrate the current state of its value system, including an analysis detailing stakeholder interactions and flow of value demonstrating to whom it accrues.

Establishing the current state of the alpaca sector will lead us to identify barriers that are limiting the socio-economic potential

of primary stakeholders and other stakeholders who could benefit from a systemic shift towards a more sustainable business model. To illustrate the magnitude of social impact inherent in establishing a sustainable value system, we begin to apply our research findings against the Peruvian alpaca sector. Furthermore, this exercise aims to shed light on the implications inherent in envisioning what a sustainable value system may look like.

WHO IS OUR AUDIENCE?

Given the nature of the problem to be tackled, we identified that business leaders who are in a position to build sustainable initiatives are potentially the strongest levers of change to drive a shift toward a more sustainable future. As with most complex social systems, there is a myriad of primary and fringe stakeholders within a natural goods value system. Considering the differing points of view of a variety of stakeholders is critical to understanding dynamic and complex problems, and while this was done throughout our research process, this report has ultimately been shaped with “change leaders” interested in implementing sustainable business practices as its primary audience. The following research is intended to inspire future leaders to integrate sustainability into their business model by illustrating the critical role sustainability plays in achieving and maintaining business objectives. In addition, a clear synthesis of pragmatic principles outlining the rationale required to successfully integrate sustainability into a given business operation is aimed to provide future change leaders with actionable takeaways.

Change leaders are entrepreneurs, business owners, managers and key decision makers who aim to inject “change” into a given organization. Change can come in many different forms, however in our research, we define change as an initiative that prioritizes people and planet in addition to profit as line items on a balance sheet. Our objective is to reach change leaders who align with similar values and philosophies outlined by B-Lab, a nonprofit organization that serves a global movement of people using business as a force for good (B Corporation, 2016). The vision of B-Lab is that one day all companies compete not only to be the best in the world, but the best for the world, and as a result society will enjoy a more shared and durable prosperity. B-Lab spearheads this systemic change by building a global community of companies that meet the highest standards of verified, overall social and environmental performance, public transparency, and legal accountability. Our goal is to contribute to the sustainability movement by providing change leaders with actionable building blocks to make sustainability a tangible outcome.

Change leaders who are inspired by B-Lab's vision and mission outlined above are the profile of people we hope to reach with this research. Today, there is a growing community of more than 1,600 Certified B Corps from 42 countries and over 120 industries working together toward 1 unifying goal: to redefine success in business (B Corporation, 2016). Ultimately, we decided to focus on change leaders because they represent influential stakeholders in the global business landscape, and can harness the resources and capabilities to shape the future of sustainable business practice. By targeting future leaders, we aim to support the movement to redefine what success means for truly sustainable businesses.

The emergence of Fairtrade, a certification scheme setting a standard for better prices, decent working conditions and fair terms of trade for farmers and workers (Nicholls, 2005) demonstrates a movement toward sustainable business that embodies the objective of this report. Fairtrade Canada states that “when you buy products with the FAIRTRADE Mark, you support farmers and workers as they work to improve their lives and their communities. The Mark means that the Fairtrade ingredients in the product have been produced by small-scale farmer organizations or plantations that meet Fairtrade social, economic and environmental standards” (Fairtrade Canada, 2016). Fairtrade is a unique business model in that its approach is based on partnership; one between those who grow our food and those who consume it. Additionally, Fairtrade is the only organization that is 50% owned by producers representing farmer and worker organizations. With an equal voice, producers have a say in decision-making. As of 2015, there were 1,250 fairtrade certified producer organizations in 75 countries which generated more \$1.6 billion in producer revenues in 2014-2015 (Waal, 2015). Organizations with Fairtrade principles integrated in their business mod-

el prove to leverage this new competitive advantage while positively impacting every stakeholder involved. Fairtrade is a standard that our report aims complement with a greater focus on actionability for future change leaders.

Taking all of this together, we resolved to provide insights and initial findings to change leaders as mission-aligned partners with significant influence to incite a shift in business practices. This approach was facilitated by our decision to conduct research with participants representing local farmers, entrepreneurs and community representatives. As we will explain below, these participants provided insights into the complex realities handicapping the sustainability of natural resources due to the economic and environmental pressures applied by businesses. These initial findings along with next steps that detail various points of engagement, are explained in subsequent sections of the paper.

As a team, we collectively decided to craft our initial recommendations with a view to their operationalization and implementation. With change leaders named as our primary audience, we sought to articulate a set of recommendations that would leverage the resident opportunities and challenges that may exist when dealing with natural resources together with various linked ecosystem services. In our research, our team identified change leaders as having the greatest capacity to shift the system, through their direct influence on business operations.

WHAT IS OUR APPROACH?

The methodology of this research project aims to achieve two goals. Firstly, to communicate sustainability in a way that is universally understood, and secondly, to provide change leaders with tools to put sustainability into action. To accomplish this, our methodology follows a four-phase approach. The initial two phases aim to gather information and distill our findings about sustainable enterprises, while the last two phases aim to probe our findings through a real-world example that falls under our intended scope of applicability. Phase one is an in-depth literature review, covering a broad range of secondary research topics. Phase two is an assessment of three well-documented enterprises that have successfully implemented sustainability into their core business model. Phase three is an assessment of the Peruvian alpaca sector, which is accomplished by coupling literary review and semi-structured interviews with diverse stakeholders to extract insights, identify barriers and opportunities, and challenge assumptions in the Peruvian alpaca sector. To probe our principles in the last phase, we first describe and assess the value system of the alpaca sector, and the underlying barriers preventing the advancement of rural farmers.

PHASE 1: LITERATURE REVIEW

To build a comprehensive understanding of the building blocks for a sustainable enterprise, our team started by conducting an in-depth literature review using contemporary news periodicals along with accredited academic journal and government reports on topics including sustainability, supply chain dynamics, and natural systems among other knowledge areas pertaining to our study. In doing so, our research team

Finally, in phase four we apply our findings about sustainable enterprises by assessing the alpaca sector in Peru with a focus on rural farmers. The resulting output is evidence of the pragmatic utility of the tools we have developed.

In terms of the division of tasks and workload, our team tried to be as equitable as possible given our individual strengths and skills. That said, we strived to synthesize all information as a couple to make sure we were sanity checking our assumptions and deductions. Using the apportionment of our approach, our team divided our efforts equally for phases one and four. However, given the amount of Spanish literary review involved in the assessment of the alpaca sector, Raul Valenzuela took a larger portion of the effort for phase three. Consequently, Michael Berman tackled a bigger portion of the literary review for phase two, the assessment of sustainable enterprises. Nonetheless, all synthesis of findings and deductions were done in concert to build more comprehensive arguments, and make sure we were not missing complementary knowledge in our arguments. The following paragraphs explain our four-phase methodology in greater detail.

aimed to triangulate the concept of sustainability in the context of natural resource harvesting. All team members were responsible for ongoing research and continuously scanned sources for incorporation into a central database. Our research process started with a literary review on sustainability, which enabled us to have an educated discussion on the evolution of sustainability as a scholarly concept, and its relevance to

natural resource harvesting. Acknowledging the evolution of sustainability and the critical analysis of experts over time, an on-going literature review allowed us to grasp the principles that underlie sustainability, but more importantly the criticism it has

garnered. Through group and participatory research tools, including Ackoff's D.I.K.W. framework (Aven, 2013), we generated insights, shaped plausible hypotheses, identified bias, and articulated key assumptions.

PHASE 2: ANALYSIS OF SUSTAINABLE ENTERPRISES

Next, we analyzed three enterprises that had a successful implementation of sustainability principles in their business operation. We use Abraham Maslow's approach to researching human psychology, where he studied the healthiest 1% of the college student population to help describe the pattern that human motivations generally move through (Muula, 2009). Our team hypothesizes that to determine the building blocks necessary to implement a sustainable enterprise, we should study cases that have been known to successfully implement and uphold them.

Through the assessment of enterprises that have defied conventional business practice by looking beyond the bottom line to ensure long-term viability, we are able to identify the conditions required to foster sustainable business practice involving natural resources. To select sustainable enterprises of interest, we determined three dimensions that allow for a comparative analysis of examples while providing a diverse variable set to consider. The criteria by which our team identified sustainable enterprises are as follows: 1) Resource Type, 2) Scale of Operation, and 3) Origin of Operation. Based on the criteria highlighted above, we analyze three sustainable enterprises including honeybees in Zambia, lobsters in Maine and goose down used by Patagonia. In determining wins, call-outs, and risks inherent in the sustainable enterprises we assess, our research attempts to demonstrate the wide-range applicability our findings have across resources, geog-

raphy and operation-size. To illustrate our findings, we developed a visual model that synthesizes our core insights and helps convey the potential scenarios that may arise when key variables are altered.

During the assessment of the selected enterprises, we came across a number of inflection points, in which we had to resort to alternative information sources to corroborate and/or complement the knowledge we had synthesized. Our assessment process can be metaphorically described as a vast research landscape, where each enterprise represents a cluster of knowledge, and the valleys in between are complementary and corroborative information depicting the overall panorama of information gathered about sustainable enterprises

The concluding portion of this project involves probing our research output against a natural resource with characteristics that fall under our intended scope of applicability. We chose the alpaca wool sector in Peru mainly for two reasons. First of all, the sector has characteristics aligned with the scope and objective of our research. Secondly, our team had access to primary research through interviews from various stakeholders who make up the value system of the alpaca sector.

PHASE 3: SEMI-STRUCTURED INTERVIEWS WITH PRIMARY STAKEHOLDERS

To capture firsthand knowledge about the alpaca sector from primary stakeholders, our research team gained approval from the OCADU Research Ethics Board to conduct interviews with rural alpaca farmers from the province of Huancavelica in the highlands of Peru. These semi-structured interviews were a compelling source of insights from stakeholders directly affected by the ramifications of the alpaca sector. To perform the interviews we resorted to a proxy, Guilfo Rebata, a university-trained Bachelor in Communications, who works as a market researcher specializing in rural populations. He possesses an adequate balance of post-secondary education and professional experience to conduct interviews with these populations. The information gathered by the proxy allowed us to better understand the afflicting experiences and shortcomings rural alpaca farmers encounter.

All farmers interviewed were from the town of Saccsamarca, which is located approximately five kilometers southwest of Huancavelica city, the largest urban hub in the area with close to 50,000 inhabitants. Rural farmers care for and herd their alpacas in pastures outside of Saccsamarca town, up to 20 kilometers away and 3,700 meters above sea level. Given the remote location of these people and the tricky topography of the area, it takes half a day of trekking and traveling in horse or motorcycle from the city of Huancavelica to reach their ranching sites. More information on the location and context of rural alpaca farmers is given in the concluding portion of this paper.

The objective of these interviews was to gain an intimate understanding of rural farmers' everyday lives and the issues most afflicting them. Furthermore, the activity

allowed us to corroborate literary review findings in terms of the living conditions and their participation in the value system generated by the fibre's trade. In addition to the interviews, pictures and video footage of the research process served very helpful in understanding intricacies and nuances that shaped our insights. The visual documentation also provided us a refined understanding of dynamics rural farmers face as primary stakeholders in the Peruvian alpaca sector.

Reflecting on the interviews, a couple of drawbacks should be acknowledged to understand how the first-hand research process could have been strengthened. The first drawback is pertinent to the quantity and diversity of the stakeholders interviewed. Ideally, we would have liked to interview more rural farmers to have a larger data set to draw conclusions from, and discern overlapping patterns. Given our focus was on rural farmers, it would have been valuable to have a larger pool of interviewees. Furthermore, it would have been ideal to conduct interviews with several rural farmers from different locations within the Peruvian highlands to see commonalities and differences in their livelihoods. From our research we know that certain provinces are more developed in the trade and processing of the fibre. Therefore, it would have been interesting to contrast the successes and failures from different communities to identify gaps, and potential ways to tackle issues that have been addressed by other farmer groups.

The second drawback is pertinent to the research methods employed with the interviewees. We would have liked to tap into the latent and tacit knowledge of these people by employing participatory or generative research methods to leverage the

intrinsic knowledge of rural alpaca farmers. Given our limitations in terms of time and resources, we were not able to develop catered research tools to engage these people. However, we think it would have been valuable to complement the interviews with other research methods that would afford the triangulation of information and more criticality in our findings. A summary of the details about the interview can be found in the appendix.

In addition to the rural farmers, we also interviewed stakeholders from other links of the system such as retailers and inter-

mediaries. These interviews were useful to triangulate information we had gathered through other research channels, and to realize a clear understanding of the salient underlying dynamics driving the system. A continual process integrating different research sources, allowed us to discern a holistic understanding of a value system inherent in the alpaca sector. Our research protocol comprises a number of research methods to elicit insights profoundly shaping the alpaca value system, and thus, our overall understanding of the sector as a whole.

PHASE 4: PROBING OUR OUTPUT & UNDERSTANDING THE VALUE SYSTEM

To conclude the paper, we perform an assessment of the alpaca sector with our research output: The Bottom-up pyramid model and Guiding Principles questionnaire. The purpose of this assessment is twofold. Primarily, to probe the framework we have developed against a contemporary real-world situation. Furthermore, we can explore and shed light into the building blocks change leaders would need to put in place to establish sustainable enterprises involving rural communities. We employed Gharajedaghi's Iterative Process of Inquiry to develop and refine our understanding of the value system inherent in the Peruvian

alpaca sector. (Gharajedaghi, 2004). We first laid out a number of subsystems and stakeholder relationships in a map that consolidated our initial knowledge. This map provided the basis upon which we further built and enhanced with insights from diverse research sources and interviews. Our explanation of the alpaca value system seeks to depict the main dynamic relationships driving the value of alpaca fibre from its primary stakeholders, rural farmers, to the main manufacturing facilities, which process approximately 80% of all fibre, as it will be subsequently discussed.

WHAT IS OUR SCOPE OF APPLICABILITY?

The profound intricacy of our planet's natural systems requires a multidisciplinary approach to understand the extensive and complex ramifications of sustainability. This paper touches on links between a number

of knowledge sectors to develop a clear and easy to understand interpretation of sustainability as a concept. Employing a multidisciplinary approach to understand sustainability affords the development of

comprehensive arguments that draw from complementary knowledge sectors to present a clear and buttressing rationale for our deductions about this concept. By delving into numerous frameworks addressing the concept of sustainability, we are able to obtain a well-rounded understanding of the different lenses and underlying paradigms informing its most relevant explanations. This approach provides integrative benefits, as we were able to complement and corroborate knowledge through different research sources.

Additionally, a multidisciplinary approach allows us to sanity check conclusions we deem apprehensive through alternative sources, and make sure our insights are taking into account relevant and encompassing points of view. Ultimately, we want to depict the concept of sustainability as simply as possible, so a generalist audience could easily understand the root causes affecting our planet's sustainability. To achieve this, we have to strike a balance between scholarly scientific based and quotidian language to distill the key takeaways.

NATURAL CHARACTERISTICS OF THE RESOURCE

The focus of this paper is on a subset of natural resources innate to our planet's biosphere, which is known as biotic resources. Furthermore, our interest lies in biotic resources that exist and grow on the earth's surface, whether plant or animal based. This includes natural resources from bodies of water and the various climates among our planet's diverse geographies. It is important to note this assessment is not applicable towards mineral resources that require mining extraction processes for their supply.

This paper is relevant to natural resources including animals, plants, and other life forms that provide food, fiber, medicine,

The scope of this paper has three mutually complementary dimensions: Natural characteristics of resource, Maturity of sector, and Socio-economic context. These dimensions delineate the extent of applicability of our findings and their implications. As it has been stated, our intended audience is Change Leaders, including entrepreneurs looking to develop sustainable business models from the ground up. Therefore, a discussion of business development context is pertinent to the interests of those who want to establish sustainable enterprises in nonresident rural locations. However, it is important to mention that our discussion on the socioeconomic context are mere suggestions of signals worth considering when looking to identify where to develop an enterprise. These suggestions are based on economic development knowledge from business literature. The following paragraphs describe each dimension's characteristics, and discusses the rationale for their choice.

and life-sustaining or life-enhancing goods. Thus, the findings of this paper are applicable to the following agricultural sectors: Aqua-farming, farming of livestock and produce, apiculture, fishing, forestry, and ranching. A wide variety of animals, plants, and other organisms are fall under the previously mentioned sectors.

Part of the assessment and synthesis of our research comes from the examination of enterprises leveraging native natural resources. We look at specific business initiatives that leverage autochthon natural resources native to a location. The importance of a resource's inherent tradition and heritage within the community it resides

in, proved to be critical. The findings of this paper are relevant to autochthon natural resources native to a location, where the resource has history of socioeconomic activity from past generations.

Finally, this paper aims to shed light onto agricultural resources that may not be massively consumed at a global scale, but nonetheless, have proven value in terms of quality, benefits, and competitive characteristics. In the last decade, a number of overlooked natural goods have gained popularity in developed countries, and achieved global-scale consumption demands such as quinoa, chia and noni among others. These new entrants to the global market have gained acceptance because of their beneficial features over other incumbents, and the overall value they provide to consumers. Furthermore, we call for the diversification

MATURITY OF SECTOR

When referring to maturity of sector, we specifically allude to the commercial maturity and scale of trading activity of a natural resource. Our investigation focuses on natural resources in which the supply chain and operational activity is non-existent, underdeveloped or at the early-stage of development representing an opportunity for entrepreneurs and change leaders. It is important to acknowledge that quantifying the commercial maturity of trading activity is difficult and varies depending on the natural resource and area in which it is found. For the purpose of our investigation, our research identifies underdeveloped commercial maturity as a scale of trading activity characterized by limited competition and local supply and distribution. Our research is not targeted to large-scale operations that have extensive distribution channels and operational infrastructure characterized by dominant players like WalMart. In addition, early stage maturity

of natural resources to enhance the resiliency and flexibility of our food systems and other related systems. In summary, the natural dimension of our scope has the following characteristics:

- Biotic resource: A resource that originates and develops in the biosphere.
- Actual resource: A resource that has been surveyed, its quality determined, and is currently under use. Its value stems from its benefits over incumbents.

Indigenous resource: A local resource that has historically supported communities as a native asset to the region. Consequently, there is ancestral knowledge (tradition and heritage) associated with the cultivation of these resources.

of the sector may be characterized by natural resources that generate predominantly local or provincial level demand illustrating an opportunity to scale. Finally, the natural resource of interest is one that has been integral to the survival of local communities for generations through the traditional use of the given natural resource. This can be determined through verbal or written historical records of indigenous communities working, growing and surviving off a valued natural resource.

Our research team intentionally decided to not restrict the applicability of our insights to specific countries or regions of the world. Although the pertinence of our research is relevant to a significant portion of the developing world, we are also cognizant our findings may be applicable to particular locations within developed countries. There are a number of local-scale economic activities driven by the use of craft-like methods

and processes for the production of natural goods around the world. An example that stands out is the cheese sector within different developed countries like France, Italy, Germany, and Canada. Therefore, the synthesis and development of our insights takes into account a global applicability and audience embodied by change leaders previously described.

The importance of natural resources in the twenty-first century has taken on new

dimensions. Not only does agriculture represent an economic opportunity, but it has global implications in terms of food security as we face several challenges that will test the ingenuity and adaptability of our species. Once we understand the sustainability gaps in our topic of interest, we aim to offer a solution to develop sustainable value systems that will remediate the negative effects of conventional industrial practices that continue to cause negative social and environmental consequences.

SOCIO-ECONOMIC CONTEXT OF HOST COUNTRY

The political and economic contexts of a host country play an important role in the development of an enterprise that can compete under equal terms and fair conditions. When deciding to establish a new enterprise, it is in a firm's interest to take into account socio-economic characteristics of the location. We suggest bearing in mind three socio-economic considerations as signals of a context with a fair and healthy business development prospects.

These socio-economic indicators serve as signals that support the identification of locations where business development does not have barriers, impediments, or complications for entering entrepreneurs who want to establish new enterprises. Considering the character of our audience and their attentiveness to business development, we thought fitting to discuss general economic characteristics of a host location that signal a favourable context for business development. By no means we are suggesting the socioeconomic indicators discussed are

mandatory requirements for sustainable enterprises. However, we do see these indicators as cues of a market that is open to business development, and that safeguards a fair competitive landscape for all players

equivalently. The following indicators serve as evidence of markets where enterprises can be built from the ground up, and compete under fair conditions.

Two indicators are the economic openness and stability of the host country. Economic openness can be understood as the ability, flexibility, and straightforwardness to develop business ventures that can compete in a level playing field. The concept of economic openness comprises adequate infrastructure for the production, and distribution of goods; swift and uncomplicated procedures to find a business, grow it, and integrate it into the global market; and a healthy financing environment with access to funding options (Dobson, 2014). In terms of economic stability, a market-friendly structure for businesses to operate is a desired characteristic. Policies in place should provide a setting for businesses to evolve based on their own capabilities, as well as foster transparency and minimize unnecessary red tape. Other economic stability traits are a level playing field for competition, and stable economic indicators like inflation and currency exchange.

The last socio-economic indicator is related to a host country's governance and rule of law. The rules of the game and the institu-

tions that frame and enforce those rules, are key components of a favourable business environment (Dobson, 2014). Also, just as important is a fair judicial system buttressing the rules of the game. Policies should provide adequate checks and balances to oversee a fair competitive environment for all players. Furthermore, the transparency and honesty of regulatory institutions is fundamental to prevent corruption.

We do not aim to determine whether integration into the global market is sustainable or not. This will depend on a several factors like the type of resource and scale of operation among others. The variables, contexts, and considerations pertinent to a specific resource are too diverse in order to make a broad-level generalization whether global integration is a requisite for a sustainable enterprise.



SUSTAINABILITY

WHY IS SUSTAINABILITY A FOCAL POINT IN TODAY'S SOCIETY?

By the end of the seventies, the United Nations (UN) was well aware of the heavy deterioration of our environment and its natural resources. During that decade, the UN hosted a Conference on the Human Environment. By 1983, the UN General Assembly created an independent organization to address environmental issues: The World Commission on Environment and Development (WCED), also known as the Brundtland Commission. The Commission's mandate was to assess the critical issues of environment to strengthen international cooperation, and to raise awareness, understanding, and commitment, of individuals, organizations, and governments around the concept of sustainable development.

To address the needs of developing countries, the UN identified a need to reconcile economic growth with environmental well-being. This challenge translated into the question of how to continue economic growth without harming the environment. The result was the concept of sustainable development, which was coined in the 1987 Brundtland Report, "Our Common Future." Sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987).

This definition sheds light onto two key sustainability concepts. The most important being that meeting people's basic needs (globally) should be a priority, and should not be compromised for any other purpose. The second concept is around the thresholds of natural resources, and their ability to provide for future generations, which is directly linked to the technologies and social paradigms that humanity as a society embraces. The main insight of the Brundtland Report's definition of sustainability is the notion of intergenerational equity, which surfaces the social and temporal dimensions of sustainability. After the publication of the Brundtland Report, the issue of sustainability has been on the agenda of international institutions from numerous sectors, businesses, and governments.

In comparison to Earth's existence, contemporary human civilization is of recent origin. The first farming communities started to emerge globally approximately 8,000 years ago. Eventually, villages evolved into small cities, and contemporary human civilization commenced roughly 5,000 years ago. Our initial domestication of plants and animals was the basis that enabled the development of civilization as we know it today (Gilding, 2012).

For the last 250 years, humankind has gone through significant socioeconomic transformations as a result of milestone

episodes like the Industrial Revolutions of the nineteenth and twentieth centuries and the fairly recent Information (digital) Revolution. On the one hand, economic wealth and growth has spread across many countries and their populations, who have been fortunate with socioeconomic prosperity and improved living standards. On the other hand, the planet's natural assets and their environments have been undergoing degradation and depletion mainly due to intense industrial activity and use of fossil fuels.

The world has lost a third of its arable land due to erosion and pollution in the past forty years, with potentially disastrous consequences as global demand for food soars, scientists have warned (Hillel et. al., 1991). The University of Sheffield's Grantham Centre for Sustainable Futures, which undertook the study by analysing various pieces of research published over the past decade, stated that the continual ploughing of fields, combined with heavy use of fertilizers, has degraded soils across the world, with erosion occurring at a pace of up to 100 times greater than the rate of soil formation (Horton, Koh, Guang, 2016). As more soil quantity and quality are lost, farm output in the U.S., for instance, has dropped by about 8 percent in the short term and projected to fall 20 percent over the next 20 years (Eisenberg et. al., 1998).

Most ancient civilizations collapsed because they destroyed their topsoil but few policymakers seem mindful of that history. The degradation of the natural capital that is the foundation for agriculture and farming has been found to be decreasing overall productivity in almost all systems studied worldwide. *Natural Capital* is defined as "the world's stocks of natural assets which include geology, soil, air, water and all living things. It is from this Natural Capital that humans derive a wide range of services, often called *Ecosystem Services*,

which make human life possible. The most obvious Ecosystem Services include the food we eat, the water we drink and the plant materials we use for fuel, building materials and medicines" (World Forum on Natural Capital, 2015). The term Ecosystem Services will be subsequently discussed in detail.

Technological advancements throughout the Industrial Revolution caused generalist factory workers to be redundant, and demanded few skilled machinists and operators. Furthermore, our planet's natural resources were perceived as unbounded and costless. Thus, the main focus of the time was to achieve economies of scale through development of large-scale manufacturing and intensification of efficiencies to achieve as much savings and profits as possible. Several innovations such as steam power, machine tools, metallurgy, fossil fuel mining, chemical factories, and many others accomplished efficiency, the main objective of the time. Furthermore, these technologies have been extended as much as possible whenever feasible. Each wave of innovation has been an extension of the same theme: From Adam Smith's pin factory and Armor Swift's meat disassembly plant to Henry Ford's automobile assembly line; all as if there was no end in sight (Princen, 2005).

In order to achieve the referred innovations and technological efficiencies, human knowledge has developed processes to transform mineral resources like coal, iron, and oil into energy and infrastructure that have enabled the provision of goods to solve a wide variety of needs. The manufacturing and transportation of goods required for an increasingly growing population spurred the creation of large-scale factories and industrial operations around the world. Most of these operations have been powered by fossil fuel energy for almost a century (Rodrigue et al, 2013). These economic

advances – technologies, capital markets, transportation and communication systems, and convenient devices – represent an ever-increasing throughput of material and energy, which threatens to undermine those very economies (Princen, 2005).

The fishing industry evidences the detrimental effects of inconsiderate technological advancements and disproportionate scaling. Today, industrial fishing vessels are like a floating factory, with onboard processing, packing plants, and preservation systems. (Croswell, 2013). The United Nations Food and Agriculture Organization (FAO) surveyed 600 marine fish stocks, of which 25% were considered depleted or overexploited by fishing activity (FAO, 2004). Aquaculture, the farming of fish, use forage fish as feed. In 2003, salmon farming alone consumed 19% of global fishmeal; it takes approximately five to ten pounds of prey fish to grow one pound of salmon; if current trends continue, researchers predict aquaculture will outgrow the supply of fishmeal as soon as 2020 (OCEANA, 2017).

In addition to mineral resources, other natural resources are also used as raw inputs for diverse industrial purposes, be it the production of goods or food. Whether it is the extraction of wood for furniture manufacturing, or depletion of animals' ecosystems for food provision, all natural resources have boundaries to the benefits they can provide us. The world's urban population has been steadily increasing for several decades, and as a result there has been significant depletion of nature to accommodate for urbanization and provision of goods to a growing urban population (Hinrichsen, 2012).

During the twentieth century, world population has increased from 1.65 billion in 1900 to 7.5 billion in 2016, and experienced both the highest rate of population growth (averaging 2.04 per cent per year)

during the late 1960s, as well as the largest annual increment to world population (86 million persons each year) in the late 1980s (UNPD, 1999). Our global population's growth and its increasing needs have put tremendous stress on our planet's natural resources, which are the fundamental components of natural ecosystems. Our planet's natural ecosystems provide critical and unique favorable services to our populations, which will be subsequently discussed.

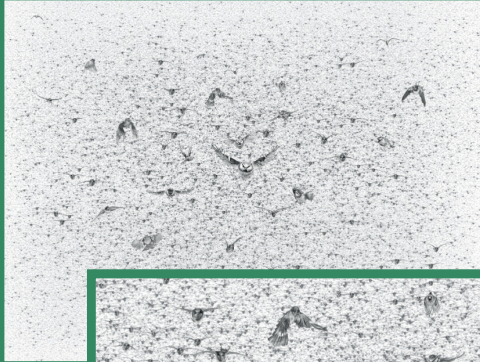


IMAGE 1. CHRIS JORDAN.
SILENT SPRING, 2014.
Depicts 183,000 birds, equal to the
estimated number of birds that die
in the US every day from exposure
to agricultural pesticides. Retrieved
from: [http://chrisjordan.com/
gallery/rtn/#silent-spring](http://chrisjordan.com/gallery/rtn/#silent-spring)

WHAT ARE ECOSYSTEM SERVICES AND HOW DO THEY BENEFIT HUMANS?

Gretchen C. Daily popularized the term Ecosystem Services in her 1997 book, "Nature's Services." Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life (Daily, 1997). Ecosystem Services conserve our planet's biodiversity and support the ongoing provision of natural goods consumed by humans.

In the year 2000, the United Nations (UN) founded the Millennium Ecosystem Assessment Organization, which defined Ecosystem Services as the "benefits that people obtain from our nature's ecosystems (Millennium Ecosystem Assessment, 2005)." The average valuation of earth's Ecosystem Services is of USD\$ 33 trillion dollars per year, with the highest estimates up to USD\$ 54 trillion (Constanza et al. 1997). Although these figures appear steeply prized, the valuation of our natural systems takes into account assumptions, which are not comprehensively accurate. Despite efforts to be precise, we cannot account for all of the value afforded by our natural systems' complex and far-reaching ramifications. Thus, there may be a risk in promoting a value for our nature's worth because the concept lends itself to comparison with capital investing efforts. We suggest there is no monetary justification for the definite depletion of any asset of our natural systems. Nonetheless, the current industrial system in place has been developed in a way that disregards ecosystem services that nature affords us.

The UN has classified four types of Ecosystem Services that afford benefits to humanity. Fundamental Supporting Services

is the most important service because it embeds the others: Provisioning Services, Regulating Services, and Cultural Services (Millennium Ecosystem Assessment, 2005). Supporting Services are related to soil formation, nutrient recycling, and food and water supply. Provisioning Services enable the goods we consume such as food, raw materials, minerals, and others. Regulating Services provide the regulation of natural cycles like disease control and purification of air and water. Finally, Cultural Services are non-material benefits provided from ecosystems like religion, sense of belonging, and heritage (Reid et al, 2005).

Unlike the traditional factors of industrial production, capital and labour, technology has not effectively replaced all critical features of natural resources. In Adam Smith's concept of free market economy, one can exchange machinery for labour. However, nature cannot be exhaustively substituted by any other production factor, and therefore its value is precious and irreplaceable. Water is an example of an irreplaceable resource in that all or most of the water the earth has today may be about all the planet will ever have. Of this supply, 97.5 percent resides in the oceans as salt water and the remaining 2.5 percent represents the planet's entire ration of freshwater (Stevens, 1998). The renewable freshwater supply on land is constantly replenished as part of a perpetual cycle in which water evaporates from the oceans and falls as saltless precipitation. This small and finite supply is the water that actually supports human existence and as such, must be used sustainably.

As it was presented earlier, our planet's Ecosystem Services provide unique and fun-

damental supporting benefits for humanity's subsistence. Ecosystem Services are governed by natural cycles that have been continuously attuned by nature to balance and regulate life conditions in the biosphere (UCAR, n.d.). Currently, our global scale of socioeconomic activity is interfering with our planet's ability to regenerate and self-invigorate its natural cycles, and ultimately diminishing our Ecosystem Services.

It is estimated our current global consumption rate is of 1.5 planets to provide the resources we use, and to absorb that subsequent waste in one year (Global Footprint Network, 2016). This means the planet needs one year and a half to regenerate what our global population consumes in one year, which evidences our overshooting consumption patterns. A bathtub analogy can help understand this concept. If both the drain and the faucet of a bathtub have the same output and input rate respectively, the water level in the tub remains the same. Currently, our planet's population is draining earth's natural resources faster than its faucet, which represents nature's regeneration capacity. This state is described as functioning with an *ecological deficit* which models a scenario where the population consumes more than the planet can regenerate by depleting the existing stocks (Feng, 2003).

The term Carrying Capacity also alludes to this concept; it refers to the permissible number of people the Earth's natural resources could hold at different standards of living and levels of resource consumption (McGinley, 2013). While there is a wide range to the estimates of Earth's carrying capacity, the greatest concentration of estimates falls between 8 and 16 billion people (Pengra, 2012). It is important to highlight the differences in carbon footprint levels resulting from lifestyle consumption habits among different populations. Several countries from what is known as the "Western" or "Developed World" are among the largest carbon footprint contributors. Hence, Carrying Capacity estimates consider projections of current conditions, which are unequitable and below basic living standards for billions of people, mostly in developing countries. As developing countries continue to mature, living standards and carbon footprints may be increasingly shifting towards "Western" consumption levels. Although both mentioned figures are by no means static or absolute, and there is a spread of variation among experts, the underlying deduction is that the sound functioning of our planet's Ecosystem Services are being increasingly compromised as our population grows.

WHAT ARE THE ROOT-CAUSES MAKING

OUR SOCIETY UNSUSTAINABLE

The Natural Step, a non-profit organization with a global network of offices in 11 countries, has been at the forefront of sustainability for more than 25 years. This organization was awarded the Blue Planet

Award in 2000, and has worked with hundreds of companies using their proprietary framework for sustainable development.

The Natural Step pinpoints three scientifically founded root-causes of sustainability, discussed subsequently.

The first root-cause is related to how society extracts resources from underneath the biosphere (minerals, iron, oil, etc.), and has been systematically accumulating them in the biosphere, where they do not belong at such elevated proportions (Magnin, 2014). This systemic accumulation has been occurring at a rate that impedes our planet's natural cycles to self-generate, and consequently it is diminishing the planet's Ecosystem Services. The main issue with this systemic accumulation is that on aggregate, it has been growing at an increasing rate as a result of our global population growth, and its consumption requirements.

An example of this phenomenon is the pollution caused by the use of mercury in the mining industry. Mercury is a heavy and toxic mineral that is extremely rare in earth's crust. Mining and refinement of metals is the third largest man-made source of mercury emissions, as it contributes approximately 18% of man-made mercury emissions (Mining Facts, 2012). Mercury is used in artisanal gold extraction operations in developing countries, often in unsafe and environmentally damaging ways. Over 55 countries have small precarious gold refining facilities, which release approximately 800 metric tons of mercury into the air, soil, and water every year (EPA, 2017)

The second root-cause is related to the abundant synthetic materials that our scientific and technological advances have afforded us. Over the last century, scientific knowledge has enabled humans to develop several materials that do not exist naturally. The diverse range of plastics, chemical compounds, and their derivatives are examples of man-made materials that have also been systematically accumulating in the biosphere without being able to

naturally degrade at fast enough rates. The overall buildup of synthetic materials, and its increasing rate of this accumulation are detrimental to our biosphere's Ecosystem Services as well (Natural Step, 2015). Approximately 140 million tonnes of synthetic polymers are produced worldwide each year. These polymers are extremely stable, and do not readily enter into the degradation cycles of the biosphere. Environmental pollution by synthetic polymers, such as waste plastics and water-soluble synthetic polymers in wastewater, has been recognized as a large problem (Shimao, 2001).

Finally, the spur and growth of urban centres throughout the world has physically displaced and removed nature's biodiversity. Global urbanization and natural resource extraction for the supply of goods to urban clusters have diminished the proportion of nature in our planet. In 2008, for the first time, the world's population was evenly split between urban and rural areas; there were more than 400 cities over 1 million and 19 over 10 million (PRB, 2016). In the coming years, as more people migrate to urban clusters, the current industrial system will overwhelm and inhibit our planet's natural cycles. The industrial system in place has developed in a way that the resources extracted from the earth's lithosphere, and the products created by humans will continue to build up in the biosphere and systematically increase their concentrations (Robert, 2008).

To sum it up, our planet is currently unsustainable due to the systemic rate of accumulation of materials from beneath the biosphere and synthetic man-made materials, as well as the physical extraction of nature due to urbanization and depletion of resources. It is important to note that pollution by natural materials like nitrogen pollution and carbon dioxide from land use changes are being released at a faster rate than the ecosystem can remove them

as well. This represents yet another cause of unsustainability on an overburdened natural system. The accumulation of materials extraneous to the biosphere, in addition to the physical extraction and depletion of nature, are causing our planet to be unsustainable.

The most important and often less discussed aspect of sustainability is its social dimension, and the implications on people's livelihoods and well-being. As it has been referenced, various scientific estimates indicate our planet is having trouble providing life-supporting assistances for its 7.3 billion inhabitants (USCB, 2017). In the current global landscape, not all populations enjoy similar levels of living conditions. Many populations in regions like Africa, Latin America, and South-East Asia reside under substandard living conditions. According to the United Nations, 840 million people living in extreme poverty have less than USD\$ 1 per day to go by (UN, 2017; UNESCO, 2017). Approximately 100 million children under age five are undernourished, and a significant portion of people living in these conditions are in sub-Saharan Africa and Southeast Asia (UN, 2015). The contrasting breach in basic living conditions between

developed and developing countries evidences the far-reaching social implications of our unsustainable systems.

By being unsustainable we are not allowing all humans to meet their basic needs. There are pockets of the world where populations do not have enough resources to meet basic needs like potable water, sanitation services, nutritious meals, or access to education. The systemic effects of sustainability are far-reaching and at different dimensions, scales, and levels. Hence, the negative societal impacts of our unsustainable systems are affecting billions of people around the world. Our cleverness in progressive resource extraction has been largely applied to escaping limits, displacing costs, and distancing negative consequences (Princen, 2005). This mindset has caused unintended systemic impacts on society and the economy. Several companies are employing business models catering to self-serving interests at the expense of people's basic needs and well-being. Consumers provide the revenues for companies to continue growing. Therefore, we should be mindful of what companies we are funding growth to.

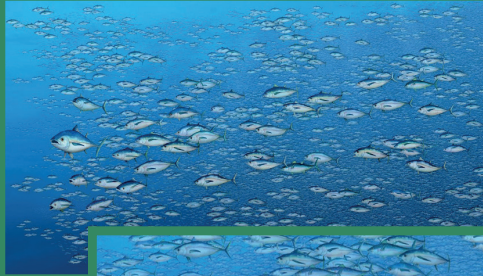


IMAGE 2. CHRIS JORDAN.
TUNA, 2009.
Depicts 20,500 fish, the
average number of tuna
fished from our oceans
every fifteen minutes.
Source: <http://chrisjordan.com/gallery/rtn2/#tuna>

WHAT IS OUR INTERPRETATION OF SUSTAINABILITY?

To understand the environmental implications of a decision, one needs to gain a systemic understanding of the relationships amongst the different components and stakeholders affected by, or affecting the sustainability of our planet. All actions from business and society have direct and indirect impacts on our planet's sustainability. Society, economy, and environment are intimately intertwined with different types of dynamic and emergent relationships. To really assess the environmental impact of a business decision, one needs a grasp on Systems Thinking knowledge to understand the systemic archetypes and key relationships to tackle. Throughout history, our decisions have triggered reactions we did not foresee. Consequently, the solutions of today may become tomorrow's problems. Today's challenges are a result of the systems we have created; the unanticipated side effects created by our inability to understand and act in consonance with our long-term goals and deepest aspirations (Sterman, 2002).

We propose considering The Natural Step framework as a scientifically based foundation for understanding the concept of sustainability. Change leaders must be mindful of the three root causes triggering negative environmental impacts, and be able to understand the systemic impacts of their decisions as it relates to sustainability. To be sustainable is to shift away from the root-causes that inhibit and alter the natural life-supporting structures provided by our planet's Ecosystem Services. Being sustainable is to respect the natural cycles that enable life in the biosphere, which is the only environment where human life as we know it is possible. Therefore, sustainability does not have an ultimate end-point.

It is an on-going process with direction and magnitude, but there is no absolute or static end.

To be sustainable is to be part of an ongoing progression that continually pushes for innovations that emulate nature's processes and underlying principles as much as possible. Our current technologies are still far away from achieving the wonders nature does at normal environmental conditions. Significant portions of our manufacturing technologies are based on heat, beat, and treat processes that require staggering energy inputs, and leave toxic harmful byproducts for our environment (Benyus, 1997). Therefore, we should aim to reduce our sustainability gap with respect to nature in order to develop more sustainable innovations. To build a sustainable society for our children and future generations, we need to fundamentally redesign many of our technologies and social institutions so as to bridge the wide gap between human design and the ecologically sustainable systems of nature (Capra, 2004). Our global level of consumption moving forward will need technological innovations that are mindful of the detrimental implications to our environment, and integrate nature-inspired processes and operations to provide for the largest population levels in history.



STORIES OF SUSTAINABLE ENTERPRISES

WHY DID WE CHOOSE THESE ENTERPRISES?

Sustainability is resoundingly complex, with a scale of depth that is measured not only in a company's carbon footprint, but also in the irreversible devastation that is caused by profit-driven tunnel vision blinding leaders from acknowledging the critical role Ecosystem Services play in the resilience and long-term value of a given enterprise. Sustainability reaches across diverse sectors, and is scrawled into the agendas of numerous tiers of government. It holds real estate across campuses, incubators and hubs in cities across the country, and holds the precious attention of those around tables. However, we have seen fisheries collapse (Myers & Worm, 2003), arable land turned infertile, species go extinct (Baillie, Stuart, 2004) and many other ancillary effects of our mechanistic approach to resource production and manufacturing. Buried under the litany of past environmental devastation lay important lessons that must be researched and published to correct our course for future leaders.

Thus, the complexity of sustainability is so great and dependent on situational variables that it deserved our undivided attention to research, analyze and synthesize instances in which sustainability was successfully integrated into business operations. To do so, our investigation sought to cast a wide net when researching and assessing successful sustainable enterprises. Broadening our effort meant we were able

to diverge in research, and assess at the impact of a number of actors, layers and levers within different value systems at any one time. We acknowledged this encompassing approach as mandatory to explore and understand the nuances and intricacies of value systems stemming from enterprises that have successfully integrated sustainability in their business operations.

After a comprehensive analysis of the enterprises under investigation, and a review of related patterns we found, our team distilled similarities, differences and key points of interest to determine principles that influence the successful development of a sustainable enterprise. Our synthesis approach was inspired by the methodology of renowned 20th century psychologist Abraham Maslow. Maslow studied what he called exemplary people such as Albert Einstein, Jane Addams, and Eleanor Roosevelt rather than mentally ill or neurotic people, writing that "the study of crippled, stunted, immature and unhealthy specimens can yield only a cripple psychology and a cripple philosophy". Maslow studied the healthiest 1% of the college student population to help describe the pattern that human motivations generally move through (Muula, 2009). In this section we aim to showcase examples of successful sustainable enterprises through the narration of sustainable enterprise chronicles.

To select sustainable enterprises of interest, we determined three dimensions that allowed for a comparative analysis of examples while providing a diverse variable set

to consider. The criteria by which our team identified successful sustainable enterprises were as follows: 1) Resource Type, 2) Scale of Operation 3) Origin of Operation

HOW DO THESE STORIES FIT INTO OUR SCOPE?

Our investigation seeks to identify the conditions by which biotic natural resources can be commercialized sustainably through the consideration of Ecosystem Services within a given business model. In the sustainable enterprise chronicles discussed, the natural resources investigated include plants from the Zambian Jungle, lobster from the Atlantic coast of the United States, and a global supply network of natural fibres. Assessing enterprises that span in a number of dimensions like type of resource and geographic locations, allowed us to identify overlapping key variables involved in the development of a sustainable enterprise.

As mentioned above, the core of our investigation focuses on natural biotic resources. In choosing natural resources vital to mankind's survival, our research aims to shed light on a topic of immediate relevance. As our global population places more pressure on agricultural and farming industries to meet growing demand, large-scale technology has been idealized as the solution to the on-going question of global supply. An example of such technological intervention is that of monocultures. Although monocultures have been a productive avenue to rapidly produce crops, serious systemic repercussions have surfaced as a result of this unsustainable practice disregarding Ecosystem Services. Today, the world's farming rests on an extraordinarily narrow genetic base. Biogeographer, Jared Diamond notes

“three fourths of the world's food comes from only seven crop species – wheat, rice, corn potatoes, barley, cassava and sorghum” (Diamond, 2003) . In every one of these key crops, genetic diversity is rapidly diminishing as native habitats are destroyed and monocultures dilute the genetic pool. A loss of genetic biodiversity has catastrophic implications on a given species as genetic differences allow a species to adapt to challenging environmental pressures including bacteria, parasites, viruses and responses to sudden climate changes.

Scale of operation was another consideration taken into account when selecting examples to assess. Therefore, to validate the relevance of the insights derived from the enterprises studied, we aimed to develop conclusions applicable to large, medium and small-scale operations. Acknowledging the varying degree of acceptance to change in a given organization, we aim to make a case that any scale of business operation can apply the insights derived from our investigation when undergoing the implementation of a sustainable enterprise. To quantify “scale of operation”, our team deemed the metric “total annual revenue” as the measurable unit by which we determine scale. The large-scale operation is represented by Patagonia, an apparel company generating approximately 190 million dollars in annual revenue (Hoovers, 2016). Forest Fruits Limited, a Zambian company exporting roughly 1200 metric tones

of honey per year and sales of USD \$2.5 million dollars, represents a medium-scale operation. Lastly, the small-scale operation is illustrated by the Monhegan Cooperative, a lobster fishery in Maine that sells on average USD \$ 1.2 million dollars of lobster per year. Although the revenue magnitudes of the latter two examples may be comparable, the difference in scale of operation is noticeably evidenced in the number of livelihoods involved in the processing of their products. The Monhegan Cooperative is an operation involving 25-30 lobstermen, while the operation of Forest Fruits Limited works with a network of approximately 10,000 beekeepers from local communities. Choosing sustainable enterprises that span varying scales of operation allowed us to consider how our findings overlap in different sized operations facing different challenges in terms of leadership and business objectives.

Finally, origin of operation was another consideration factored into our selection of sustainable enterprises to investigate. As mentioned in the scope section, economic openness and rule of law are critical factors in countries where sustainable enterprises are to be implemented. In order to allow for a business venture to flourish, the host country must enforce ethical governance.

However, there are varying methods of governance as influenced by a country's culture. Therefore, in order to evaluate the applicability to a wide range of geographic locations with varying cultural nuances and methods of governance, our research led us to investigate enterprises originating in different regions of the world, represented by one in Africa, one along the North-Atlantic Coast and one with global operations in different pockets of the world. The representation of varying cultural backgrounds contributed yet another set of potentially influential variables that would provide valuable insights when considering the knowledge derived from the sustainable enterprise chronicles subsequently discussed.

In determining wins, call-outs and risks inherent in the sustainable enterprise chronicles, our research is aimed at demonstrating the wide-range of applicability our findings have across resources, geography and operation scale. It is important to note the takeaways extracted from each chronicle are unique to each context, however the broad-level implications drawn from the common symptoms across all examples act as reinforcing insights that informed the development of our sustainability model discussed in the following sections.

HOW DID THE MONHEGAN FISHERY REMAIN SUSTAINABLE?

Monhegan is a small, 2.5 square-kilometers rocky island located 16 kilometers off the coast of Maine. The island is only accessible by boat, and it does not have any car transit or paved roads. For the last century, Monhegan has been known to be a summer

haven for artists and visitors who appreciate its natural beauty, isolation, and easygoing pace.

The island's year-round population is fairly small, at roughly 50 households, which are home to approximately 75 people (USCB, 2010). Today, Monhegan's two main eco-

conomic activities are fishing and tourism. A large portion of tourism happens during the summer months, when the average population of the island increases up to 250 people. However, the hot tourist season is not enough to provide for the year-round welfare of the community.

The year 2014 marked the Monhegan's 400th anniversary since the arrival of John Smith in the 1600s. Nevertheless, ancient Native Americans have been known to fish Monhegan's coast long before Smith's arrival. Up to this day fishing is a core backbone activity maintaining the economic well-being of Monhegan's community. During the 1800's, fisheries in the North Atlantic coast were richly diverse and plentiful. However, increasing demand from East coast (Boston & New York) markets during the 19th century prompted the definite depletion of several lobster fisheries along the coasts of New Jersey, New York, and New England. During the "bust" period between 1920 and 1940, Maine's department of Sea and Shore Fisheries declared lobster stocks in the North Atlantic coast had collapsed (Phillips, 2006). Currently, only a dozen fishing communities still have year-round residency in Maine, down from approximately 300 a century ago (Princen, 2005).

The Monhegan fishing community is an exception to the depletion pattern that most North Atlantic fisheries underwent over the last century. Three specific initiatives have played an important role in safeguarding the sustainability of the island's fishing waters. These initiatives were eventually backed up by policy supporting the accumulated intergenerational knowledge inherited over several decades of intimate engagement with nature.

Traditionally, Monhegan lobstermen did not extract lobster from their waters year-round. Lobster fishing was done during the winter months in order to let nature

re-establish its biophysical cycles, and to allow for the reproduction and growth of new offspring. This limited time window had been agreed upon and respected by Monhegan lobstermen several decades before official law endorsed it. By 1907, a ratifying policy allowing for six-month fishing periods only during the winter was passed. Therefore, lobster fishing in Monhegan was usually done from December to May. The longstanding origins of closed seasons came as a result of the requirements of lobster fishing: Summer was the best time for lobstermen to repair and maintain their traps, boats, and other fishing gear (Princen, 2005). Until today, Monhegan lobster is not consumed during the summer. Summer visitors eat lobster from other regions because nobody fishes lobster during tourist season.

As it has been previously mentioned, intensive fishing throughout the first half of the 1900s resulted in the depletion of many fisheries along the North Atlantic coast. This was partly a consequence of the systemic pressures of the fishing sector, including the growing number of fishermen, the quantity and technology of their traps, and the spike in demand for lobster. During the 1960s large operators in Maine were employing over 1,000 traps, and by 1964 Maine fishers had set out approximately one million traps, which was quadruple the number in 1952 (Princen, 2005). By 1975, Monhegan lobstermen agreed upon a self-enforced trap limit for all lobstermen of the community at a maximum of 600. The Monhegan lobstermen were the first community in Maine to agree and self-impose such limits. Today, only a few of the Monhegan lobstermen employ more than 500 traps. This quantity of traps has proven to keep the fishery sustainable over time, and allows making enough of a living to get the lobstermen's families through the whole year.

A governance initiative passed in the 1990s had considerable impact in the sustainable management of Monhegan's fishing waters. In 1996, legislation was passed to emulate and encourage self-governance by delegating key decision-making to the community level, and by dividing the Maine fishing region into management zones. Representatives for each management zone would be elected by the fishing community, and have more rule-making authority than state law (Princen, 2005). This policy empowered the Monhegan community to agree upon and self-impose a number of principles that allowed its fishing activity to remain sustainable. In addition to legally ratifying the two initiatives previously discussed, another important parameter was legitimized to safeguard the scale of lobster harvesting. Monhegan established a limit to the number of fishing permits based on traditional apprenticeship standards that had been practiced over several generations.

A fundamental factor in the sustainable welfare of Monhegan's fishing operation

was the exclusive and selective nature of the community's governance structure. The restrictions governing Monhegan's fishing dynamics were rooted in the prioritization of the community's autonomy. The community controlled and defended its own "lobster bottom," a traditional method that proved remarkably effective at conserving the region's lobsters, virtually the only important commercial fish species that has not been fished into near-oblivion (Woodward, 2005). This tradition had been respected for many decades within the Monhegan fishery, and it was legitimized through the community's autonomous governance. Therefore, needs of local stakeholders had preference and clout over external parties with lesser vested interests. Monhegan's protective and exclusionary frame of governance proved fundamental in the sustainable welfare of the community, which suggests smaller scale policy-making may be more adequate to manage small operations.

INSIGHTS

The Monhegan chronicle provided a number of insights that informed the synthesis of our principles for the development of sustainable value systems. The abstract of our observations are the following:

Policy-making at a smaller scale can be more effective when dealing with natural resources that are the socio-economic core of a community.

Research suggests that large-scale state wide policies had not been successful because hundreds of fisheries had suffered definite depletion along the North Atlantic coas (Princen, 2005; Phillips, 2006). The Monhegan fishing waters were considered a sub-region that had needs unique to the community, its context and its stakeholders. Therefore smaller scale policies that

understand and acknowledge these specific needs are paramount to safeguarding the sustainability of a natural resource.

It is crucial to maintain a leveled playing field and flexibility amongst all players to accommodate for any unexpected issues or handicaps that may arise. In Monhegan the fishing season schedule was flexible and open to change, which evidenced the compromise and respect Monhegan lobstermen had amongst them. Although the start of the fishing season was agreed upon every year, if last minute unexpected issues occurred with any of the fishermen, no one started fishing until everyone was ready to sail (Princen, 2005). Furthermore, this initial event had ritualistic significance as Woodward mentions in

The Lobster Coast, “Trap Day has a ritualistic importance that transcends dollars and cents. “It’s like cleaning the slate,” one islander explained to me. ‘We all come together to get the boats ready and any of the crap and hard feelings that have accumulated in the community are wiped away’ (Woodward, 2005). Just as important was the fact that all lobstermen respected the closing date of the season as a reflection of their fair competition attitude. Additional evidence of the fair competition mindset was the fact that all lobstermen had boats and equipment with similar capacities, which reflected their long-term investment in the community and interest in keeping their resource sustainable.

Individuals outside a community understand its natural system differently because their stake in the economic activity is not as invested as the stake of those within that community. The remote and isolated location of Monhegan Island has fostered a prudent sustainable mindset to its community. Without its yearly fishing season the Monhegan community would not be economically feasible, and people would not be able to live there. Having significant reliance on a natural resource enables developing an intimate knowledge and relationship with it (Princen, 2005). This knowledge and relationship are achieved through the dedicated practice of the craft and lifestyle related to that natural resource.

Trust and credibility in rule of law and its representatives is key. Representatives should have the most interest and stake in the wellbeing of their community and its natural resources. A community representative’s main role was to oversee and manage the dynamics of their designated region’s fishing activity. The Monhegan community representative had experience as a lobsterman, and knew the local lobstermen well because of their repeated interactions over the years. Therefore, an important factor in ensuring the stake and commitment of a communi-

ty representative is the fact that they have lived within the region they supervise. A representative’s stake is reflected in how invested they are in a community via their household and family’s livelihood. This is a crucial factor to help avoid the cultivation of a breeding ground for corruption.

Apprenticeship affords selectivity, and functions as a filter to determine the lobstermen candidates with the best fit for the community. Given the fixed number of fishing licenses in Monhegan, the permits can only be obtained when passed on by a retiring lobsterman. This process is accomplished through selection from a pool of apprentices that have been learning and understanding the lobstermen lifestyle for a few years. Those with decades of lobstermen lifestyle experience choose the incoming lobstermen generations. Ultimately only those that embrace the lifestyle and do not have a short-term gold rush mindset are offered a license. It is about having the right fit with the lifestyle and the community, and accepting that one will not become extremely affluent by doing this activity. This process has resemblance with other sectors such as law or consulting, where an individual starts as an employee, and can then gradually become a partner conditional to one’s skills, performance, and overall fit in the organization.

HOW DID AFRICAN BRONZE SCALE SUSTAINABLY?

Forest Fruits Limited is a company founded by Dan Ball, a Zambian-Canadian entrepreneur with a mission to create a business that sells honey found deep within the north western Zambian forest. Recognizing a global shortage of honey bee products, especially those that are raw and fairly traded, Dan decided to capitalize on the opportunity to create a commercially-viable enterprise that significantly improves the well-being of people and planet (Birnbaum, 2016). Leveraging the marketability of its fair-trade, organic, dark, antioxidant, micronutrient rich and full flavour, Forest Fruits positioned their honey as a uniquely differentiated product in expanding market niches within North America.

In remote and under developed areas of the world like rural Zambia, local communities have relied for generations on traditional harvesting techniques to live off their land. Dan had lived in Zambia for many years, which enabled him to gain an intimate understanding for the people and their land. This experience afforded him a greater appreciation for the culture that exists among the Zambian community and the proper harvesting techniques that have been iterated on by past generations. Dan's idea was to leverage tradition and local assets that had been practiced and improved over many generations to create a sustainable business model. Using traditional hives made from bark and hollow logs as practiced by local farmers, and applying Dan Ball's knowledge of the trade, Forest Fruit's was birthed. Until today, the unique transfer of knowledge between critical stakeholders directly linked to the natural resource proves to be critical to the continued success of the company. This knowledge transfer is seen as vital wisdom for the longevity of the business. "By being sensitive to the commu-

nity and culture in which it operates, Forest Fruits is able to make a real difference in the lives of beekeepers," said Renee Bowers, executive director of the Fair Trade Federation (Birnbaum, 2016).

Forest Fruits Limited is built on values dedicated to preserving and promoting culture, social and environmental values. These values have influenced the organization's interactions with diverse stakeholders and actions towards the environment in which they operate. As mentioned above, all harvesting techniques are based on traditional practices to ensure continued sustainability. In using "wild" African bees as opposed to importing European bees, Forest Fruits Limited focuses on the ecological benefit of wild bee cultivation leading to increased resilience and biodiversity over the uniform genetics of high producing European bees. Meetings and discussions are held during harvest season to facilitate an on-going relationship with local communities, and to ensure all business objectives are reached and executed in a sustainable manner. Both parties provide critical information from all nodes of the value system, resulting in a holistic understanding of the environment in which the business operates, and the Ecosystem Services that must be factored into the business model to ensure a continued supply for the company and communities. Working symbiotically with the environment is contrary to the mechanistic approach applied by many foreign companies looking for market-driven profitability, ultimately resulting in environmental collapse and short-term gains. The partnership and unique transfer of knowledge demonstrated by Dan Ball and the local beekeepers exemplifies a crucial paradigm

shift in business practice by corporations looking to monetize natural resources in foreign land.

Over time, as the company grew, so did the beneficiaries of the economic opportunity in a number of communities. The number of beekeepers has grown from roughly 6,000 in 2010 to more than 10,000 in 2016, and the company is practically doubling its annual income allowing the purchase of essential benefits for the community such as bicycles, adequate roofing and schooling for all children (Ball, 2003). In addition, beekeepers are also trained in numeracy and literacy to enhance their prospect for success.

Currently, the honey is sold online by several vendors, and in 125 organic, fair-trade independent retailers across North America including Whole Foods Market. By positioning the brand as sustainable, leveraging the positive attributes of the product, and aligning themselves with partners who share the same values, Forest Fruits Limited has been able to create a strong network of retailer support. In addition, their values-based marketing approach has attracted the interest of adjacent products looking to leverage the benefits of the product in their own marketing as demonstrated by Beau's Brewery who uses the honey in a special B Corp brew presented at the American Craft Brew Association. It is also an ingredient in a Fire Cider beverage that until now used all organic ingredients except one: the honey. These two examples show how Forest Fruits Limited has managed to enter the business-to-business market by leveraging the core features of its product, driven by their underlying values. Critical to their success is maintaining the integrity of their story and sustainability piece that has driven consumer demand and attracted mission-aligned partners that embody the same ethos.

This business model promotes sustainable small-enterprise development, capacity building and poverty relief for local communities, organic agriculture, preserving biodiversity, and creating new niche export markets all the while creating jobs and economic development in rural locations requiring opportunity as well as environment protection. By respecting the traditional knowledge shared by local community members, this company has created a sustainable value system that respects with the ecosystem services that exist in the Zambian jungle (The Embassy of Zambia in Stockholm, 2009). Paul Whitney, co-founder of African Bronze stated, "A major flaw with many aid projects is that the systems created aren't indigenous to the community and thus, often fall apart once completed" (Ball, 2003). However, it is important to note that the approach does have its challenges. Forest Fruits Limited focuses on respecting the social values of communities in which they operate in order to foster positive and bilateral working relationships, and to ensure the ongoing sustainability of the natural resource being leveraged. Indigenous resources have been fundamental to the survival of the local communities and thus, have deep-seated values that make the use of the resource a community-driven process with several relationships at play. Bowers noted. "This may not be the most efficient way of doing business but it is the most effective." (Birnbaum, 2016) Dan Ball's unique experience living in Zambia, gaining an understanding and appreciation for the cultural nuances that exist in the community, and the long-standing knowledge about honey in the area, gave this operation the underlying magic ingredient required to make it a long-term commercial success.

Further validating the successful implementation of their sustainable business model, Forest Fruits Limited was granted membership to the Fair Trade Federation in

2014. To assure customers of their continued commitment to sustainable business

practice, Forest Fruits Limited became certified as a Benefit Corporation upholding the core values that anchor their company.

INSIGHTS

The Zambian honey chronicle provided a number of insights that informed the synthesis of our principles for the development of sustainable enterprises. The abstract of our observations are the following:

Inspired leadership with experience in the emerging country: Dan Ball's unique ability to communicate and gain an understanding for the people and culture that exists in the area was vital to establish the operation in a sustainable manner. Having an intimate understanding of the cultural nuances and the communities' dependence on the resource resulted in Dan acquiring the knowledge about traditional harvesting techniques that respect the Ecosystem Services upholding the health of the environment and thus, the continued supply of the resource.

Mission-aligned distribution partners: The successful scaling of the operation was highly dependent on the addition of Paul Whitney and Liz Connell, two Canadian entrepreneurs. Effectively conveying the core mission of the company combined with the ability to engage and activate mission-aligned distribution partners proved to be a critical piece of the puzzle in allowing the product to surface in North America and eventually acquire shelf space in more than 360 Whole Foods stores.

Leverage intergenerational knowledge: African Bronze's raw honey comes from beekeepers who don't use commercial hives. Instead, they harvest the wild honey twice a year from bark hives made to look like hollowed-out logs. The knowledge passed down from generation to generation through iteration has re-

sulted in an effective harvest of the resource without harming the fragile balance of the ecosystem.

Secure certifications to assure customers: The early acquisition of critical certifications to provide potential customers with quality and safety assurance is paramount to the success of any supply chain. The acquisition of the Global Organic and Food-Safety and B-CORP certifications were critical credentials to have as new product with a value-driven marketing strategy.

Sustainability as a core pillar of the business model: The transfer of knowledge demonstrated by Dan Ball and local beekeepers was fundamental to the success of the business. Sustainability was not considered a charitable or corporate social responsibility play. In fact, it was a critical building block that contributed to the success of the company's business model. A pillar of Forest Fruit Limited's philosophy is that trade is more sustainable than aid. Dan Ball taught the beekeepers to operate as business venture.

HOW DOES PATAGONIA FOSTER TRANSPARENCY THROUGHOUT THEIR ORGANIZATION?

Patagonia is an outdoor retail apparel company pioneering the triple bottom line. However, their responsibilities as business people came slowly and almost involuntarily. Yves Chouinard, the founder of Patagonia was an avid rock climber. On his expeditions, he noticed that his climbing equipment was eroding the rock face preventing future climbers from enjoying the mountain. He set out to create high quality climbing equipment that caused minimal damage to the rock face. The origins of Patagonia built on climbers and surfers dependency on the environment to support their passion influenced the evolution of the company. In the early days of the company, this meant preserving rock faces and producing the highest quality products to ensure safety in life and death situation, however these philosophies evolved into what Patagonia represents today. Patagonia's mission evolved into building the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis (Chouinard, 2013). It is important to note that Patagonia is not completely sustainable and should not be idealized as such. For the purposes of this investigation, we have chosen Patagonia to illustrate how any group of people going about their business can come to realize their environmental and social responsible, then begin to act on them.

Patagonia is an organization focused on its people and their unique interaction with each stakeholder from customer to retailers, to supply chain partners. Integral to the success of Patagonia is their unique supply chain process (Pongtractic, 2007). Committed to working with local farmers directly, they have established a network of farmers globally to supply the raw materials and manufacturing of their products. Pledging fair wages,

safe conditions and minimal environmental impact, Patagonia is a company that is committed to causing no unnecessary harm socially and environmentally. Demonstrating the company's commitment to supply chain transparency, Patagonia launched the Footprint Chronicles, an interactive website tracing Patagonia products geographically from design to fiber, to weaving or knitting, to dye-products (Fletcher, 2012). In addition, the company calculated carbon emissions, energy use and waste as well as the distance traveled from origin to warehouse. This information was publically available to customers on the product's online selling page as well as on the Chronicle's website. To date, Patagonia has been able to calculate and post online the life-cycle analysis for about 150 products, or about 20 percent of the product line representing approximately 80% of sales (Pongtractic, 2007). Patagonia envisions that within five years any customer who owns a smartphone will be able to scan the QR code on any Patagonia product to learn its social and environmental impact (Chouinard, 2013).

The intention behind the Footprint Chronicles was to examine Patagonia's impact beyond employees to every person who worked on Patagonia products. An example of supplier relationship is found in Nicaragua, Managua. Launched in 2006, Patagonia had about 500 people on payroll whereas up to 10,000 people at any given time worked on Patagonia products throughout the supply chain (Patagonia, 2016). Formosa Textil has been a supplier since 2006 specializing in constructing soft-shell and fleece outerwear. As the only outerwear factory in the country, they invest heavily in education and specialized skill development. They also care deeply about the

wellbeing of their workers. After learning that their employees like to sit outside when they eat, they built a new outdoor eating space and garden. In addition, the factory has started an urban reforestation project

and after planting hundreds of native trees, they now have more trees on their factory grounds than the entire rest of their Free Trade Zone combined (Patagonia, 2016).

INSIGHTS

Several lessons can be extracted from our analysis of Patagonia Inc., predominantly focused on the operational dynamic of their supply chain. The following insights

informed the synthesis of our principles for the development of sustainable enterprises. The abstract of our observations are the following:

COMMITMENT TO IMPACT ANALYTICS

To meet the high standards set-out by Patagonia to produce the best products and cause no unnecessary harm, the company has established a clear methodology and code of conduct to maintain the ethical integrity of the sourcing and manufacturing process. These methodologies are driven by Patagonia's company values, local and international regulations, consumers and NGO groups (Chouinard, 2013). The standards are created to ensure all independent and third-party certification audits are completed to the

same principles, scope and methodology. By working closely with their suppliers, Patagonia continuously improves their systems and in turn, suppliers must demonstrate full transparency and commitment to continuous improvement in order to remain a supplier. Through the close working relationships established by Patagonia and their suppliers, Patagonia is able to provide consumers with the most transparent and robust contents claims assurance available in the industry (Petrie, 2016).

TRANSPARENCY

Central to Patagonia's success is their commitment to transparency. As evidenced by the Footprint Chronicles initiative, transparency toward their customers, suppliers and competitors makes it possible to gain the trust and buy-in from all stakeholders involved. A quote from Yves Chouinard's novel entitled, *The Responsible Company* stated, "It is crucial to share knowledge within the company so that social and environmentally responsible behavior can be mandated as part of every job". "For a company to set goals or assess progress toward meeting them it needs freely flowing, transparent information. No transparency equals no accountability" (Chouinard, 2013).

An increase in transparency makes it easier for competitors to work cooperatively to solve problems that range from materials shortages to emissions and effluents to the need for a better grievance process for the workers on the floor. The more you reveal about your environmental and social challenges and successes, the more you help others in your industry who are trying to reduce their social and environmental footprint (Pongtractic, 2007). As evidenced by the Sustainable Apparel Coalition, companies organizing themselves into industry-wide working groups to develop shared methodologies has resulted in increasing the level of trust and communica-

tion among participating companies. Similar-

ly, transparency encourages suppliers to work together to better identify their problems and priorities. (Fletcher, 2012)

MANAGEMENT-STYLE

Patagonia Inc. is built and managed by a leadership team intimately connected to the company ethos. With a vision and mission that is tethered to the strategic decision-making, Patagonia has been able to effectively govern their core principles by empowering their workforce through a bottom-up management approach. This management style mirrors the characteristics of a “living organization” explored by Capra in which he asserts that applying the principles of living systems to traditional business management theory encourages creative autonomy, self-sufficiency and effective feedback between a employees and leadership in a given organization (Capra, 2004). Capra suggests that organizations

managed in machine-like ways, as popularized by Frederick Taylor results in employee animosity and an emotional divide between employees and their leadership team. Consequently, such a divide prevents members from truly identifying with the intent and vision of the organization (Capra, 2004) Patagonia exemplifies a “living organization” as leadership governs through partnership and empowerment instead of siloed direction. As a result, Patagonia is able to maintain the ethical integrity of their supply chain. Partnering with suppliers who follow the strict guidelines set-out by Patagonia, and obtaining third party certification to conduct regular audits allow for continual feedback and improvement.

HOW CAN WE FURTHER REFINE OUR UNDERSTANDING OF SUSTAINABLE ENTERPRISES?

Applying the research methodology inspired by Abraham Maslow, encouraging the study of “best practices” as a means of extracting potent insights from one’s area of research proves to be valuable in many respects. However, this research method has limitations and criticism that need to be acknowledged when considering the information presented throughout the report. The initial weakness in this methodology is well articulated by Max Neev, who argues the dynamic nature that exists between people and their environment creates an ever-changing context. As a result, a previously considered “best practices” can

no longer be deemed as such because we live in a state of continual change whereby, the shifting context alters the conditions by which a practice was deemed “best”. Therefore, it is important to acknowledge that the insights and findings presented in this report are by no means considered uncontested “best practices”. The findings from this report acts as data points upon which our team aims to continue strengthening to advance our understanding about the development of sustainable enterprises.

Once we acknowledge these guiding principles are not instructional in their nature, it is important to note the strategic complexity that is involved in the development of a sustainable enterprise. As stated above, in a chaotic system where conditions are constantly changing, the target is always moving, making the process to establish such an operation very challenging both from a financial and strategic standpoint. Some examples of changing conditions include, topography, cultural nuances and social codes, climate, geopolitics and several others. Managing this diverse set of variables is a challenge that allows for margin of error.

Given the changing nature of today's natural environments, it is important to mention the critical role that traceability and measurement of ecosystem data plays. In order to acknowledge and respect the thresholds governing the on-going replenishment of a natural resource, it is necessary to track and measure relevant information that enables sound decision-making for the harvesting of a resource. This tracking serves as a feedback mechanism that provides information about the overall status of a natural resource's welfare in terms of replenishment rates and scales, stock levels, toxicity levels, and other indicators relevant to the natural cycles governing a resource.

Our research suggests it is necessary to integrate information on ecosystem data into management decisions to make sound judgments that do not compromise the ongoing welfare of a natural resource with short-sighted appetite for gains that disregard detrimental implications. This feedback mechanism is necessary to develop business operations that do not interfere with the resiliency of a natural resource. Ultimately, the gathered information should be translated into rules and guidelines that dictate how a sustainable operation works. This will be further discussed in the explanation of our model.

In the event that a change leader successfully establishes a sustainable value system, it should be understood that the initial time and financial investment required might not result in immediate benefits to the organization. In fact, organizations may experience diminishing profitability in the short-term further delaying the gratification associated with establishing such an initiative. However, it can be rationalized by indicating how the initial investment in sustainable business practice will build a more resilient and profitable organization in the future.

Finally, the last limitation to acknowledge is the concept of scalability. Central to the insights derived from the cases above is the notion that sustainability is governed by the natural constraints of Ecosystem Services that support the natural resource of interest. As a result, the level at which an operation can scale is subject to the natural limitations of the environment in which it operates in. Therefore, when considering the development of a sustainable value system, a change leader must identify the maximum sustainable supply to determine if the venture's profitability is attractive.

The consolidation of our insights derived from the sustainable enterprise assessment, resulted in a visual representation of the intricate system that exists between key stakeholder groups in a sustainable value system called the *Bottom-Up Pyramid Model*. Through data gathering, analysis and representation, our research team aimed to equip change leaders with a pragmatic visual model to help them better understand the social, economic and environmental landscape in their area of interest and identify challenges and gaps that may need to be addressed to develop a sustainable enterprise from the bottom up. In the following section, we will explore the stakeholder groups involved in the Bottom-Up Pyramid Model and the critical role knowledge plays in stability and thus, sustainability.



THE BOTTOM-UP PYRAMID MODEL

WHAT ARE THE COMPONENTS OF THE MODEL?

Inspired by Abraham Maslow's approach, our team investigated enterprises that have been known to successfully implement and maintain sustainability principles. Through the assessment of businesses that defied conventional business practice by looking beyond the bottom line to ensure long-term viability, we could better appreciate the conditions required to foster sustainable enterprises involving natural resources. To have a holistic and comprehensive understanding of each selected enterprise, we resorted to literary reviews from various sources representing different points of view. This allowed us to double check deductions and complement information to build well informed arguments in addition to other benefits mentioned in the methodology section.

The intersection between business and environment sparks a highly complex system with myriad stakeholders involved. To understand the underlying dynamics of such value system, it was important to identify the stakeholder groups involved and the interactions driving the generation of value. To discern the interdependence of stakeholders in a sustainable value system, our team developed two tools to help understand the building blocks required to assemble a sustainable enterprise from the ground up. One of the tools helps visualize the interdependent relationship between three fundamental stakeholder groups, and

highlight the crucial role of equivalent bidirectional transfer of knowledge amongst all of them, the Bottom-Up Pyramid model.

The Bottom-Up Pyramid Model has a unique structure in which an upside down pyramid is balanced on a fulcrum point. Created for its metaphorical pragmatism, The Bottom-Up Pyramid Model is meant to convey the fragile and interdependent relationship between three key stakeholder groups in a value system: Community, a fundamental source of knowledge, Business, and Government, each of which has crucial responsibilities involving the sustainability of a value system.

Our research suggests pre-industrial heritage and traditional knowledge should be seen as the bedrock to a sustainable interaction with a natural resource and the local communities living off its intrinsic value. All natural resources are part of our environment's natural capital, which is the pool of earth's natural wealth and assets, as it was previously introduced. Therefore, every natural resource represents a component playing a role in the provision of nature's Ecosystem Services

Heritage and tradition is paramount to achieving a sustainable value system. When seen as a fulcrum point, heritage and tradition provide vital knowledge that should be integrated into decision-making processes

for the development of sustainable policies and business practices. As mentioned in the section discussing sustainability, most technological interventions to meet the exponentially increasing demand for natural goods have disregarded fundamental Ecosystem Services that support the sustainable viability of natural resources. Evidenced by increased soil erosion due to intensive agriculture, collapsing fisheries, and rapidly growing infertile land, value systems involving natural goods must be re-examined to reverse these detrimental consequences to the environment and people in surrounding areas.

Our research suggests that some inherited traditional knowledge obtained by local indigenous communities dependent on natural goods for survival, has resulted in

a valuable source of knowledge to sustainably maintain the natural stock of a given resource. Throughout our literary review on sustainable enterprises, we found evidence pointing to heritage and tradition as a source of knowledge that proved to be key for the maintenance of a sustainable operation. As demonstrated through the assessment of sustainable enterprises like Monhegan, a fishery that was able to maintain a sustainable source of biomass through the permanency of traditional pre-industrial knowledge and social codes, heritage and tradition is a source of fundamental knowledge for the development of a sustainable enterprise in rural communities from the ground up.

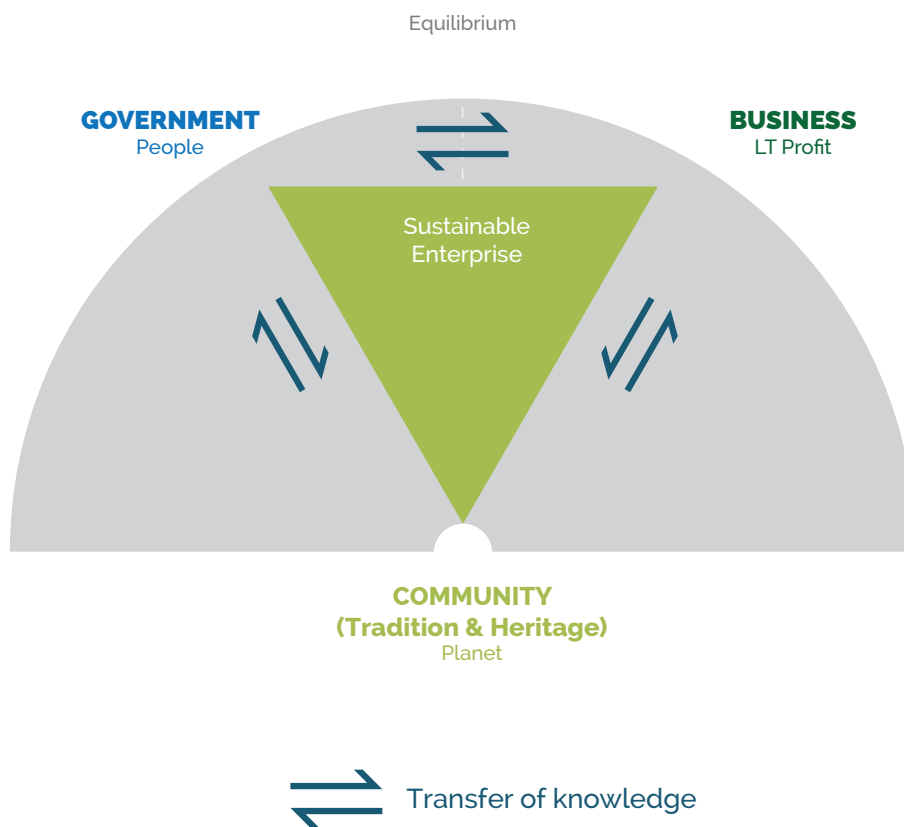


Image 3. Bottom-up model: Sustainable enterprise

WHY DOES LOCAL HERITAGE AND TRADITION MATTER?

Dictionaries describe heritage it as something that can be passed from one generation to the next, something that can be conserved or inherited, and something that has historic or cultural value. However, there are various non-physical manifestations of heritage that are conserved from past generations. Intangible heritage indicators like culture, lifestyle, literature, and popular song play a very important role in helping a social collective understand who they are.

We are interested in the intangible aspect of heritage: How it influences and affects the ways in which communities go about conserving their resources. That is, the choices a community makes about what to conserve from the past and what to discard: Which memories, instruments, and practices to maintain. To this extent, we focus on heritage as the composition of customs and habits that inform how we behave and who we are as a social collective. Ultimately, communities have been using heritage to shape their ideas about the past, present, and future.

In his book, “*Tradition*”, Edward Shils describes the concept as “all that a society of a given time possesses and which already existed when its present possessors came up upon it, and which is not solely the product of physical processes in the external world or exclusively the result of ecological and physiological necessity.” (Shils, 1981). Thus, tradition has both pragmatic and subjective components that determine its significance and relevance.

Our research interest lies in the transmissible components of tradition, which are the patterns of action and beliefs governing the enactment of those traditions. The patterns of actions from the past are the conditions for subsequent actions; they are precedents for future actions. Tradition is the past in the present, but it is as much part of the present as any very recent innovation (Shils, 1981).

RELEVANCE OF HERITAGE AND TRADITION

Heritage and tradition have a reinforcing relationship, in which both are mutually supporting each other to determine the beliefs, practices, and purposes that translate into shared lifestyle standards within a community. As it will be subsequently discussed, heritage and tradition passed over generations serve as a basis to inform the adequate social norms and collective practices of a community whose livelihood depends on a natural resource. However, it is also important to mention that flexibility and iteration are crucial features of a resilient community that seeks to adapt

to the changing landscape of social and biophysical contexts, which will be further discussed subsequently.

Our interpretation of heritage and tradition can be described as the intimate understanding of a lifestyle that permits the ongoing provision of a natural resource without compromising its quality and availability for future generations. Correspondingly, lifestyle is an accumulated knowledge-set inherited from past generations of labourers who have been interacting with a resource’s natural cycles to deter-

mine a sound balance between its harvest and self-regeneration. This lifestyle translates into specific social customs, norms, and habits stemming from a mindset that

genuinely integrates the dependence of a community's livelihood into the sustainable welfare of a natural resource.

IMPORTANCE OF HERITAGE AND TRADITION IN LIFESTYLE

The underlying mindset supporting the inherited lifestyle comes from an accumulated intergenerational understanding and acknowledgement of the sound intersection between biophysical and social systems. Heritage and tradition are fundamental pillars of this lifestyle inheritance within a community. In the Monhegan fishery example, lobstermen interacted with the natural systems linked to the ongoing provision of lobster on a daily basis, season after season. This interaction characterizes the crossing of the biophysical systems governing the ongoing provision of a natural resource and social systems, embodied by the lobstermen, their community, and their collective lifestyle.

Through their activities, dictated by the social norms of the community, Monhegan lobstermen were able to identify the thresholds of their operations in order to not interfere with the natural cycles supporting the natural resource they relied upon. Our research deductions suggest the inherited lifestyle of a community dependent on a natural resource functions like a dual feedback mechanism that enables the identification of congruent equilibriums between natural and social systems.

The knowledge and feedback afforded by an inherited lifestyle should be leveraged

for the consideration of a natural resource's thresholds in terms of scale and rate of operations. By recognizing the boundaries of a resource's permissible harvesting capacity, change leaders can then establish adequate restraints, in terms of technology and processes, to achieve a sustainable operation. Therefore, we suggest the inherited lifestyle discussed represents an interface at the crossing of social and natural systems; it affords an understanding of practices that are sustainable for a natural resource.

We postulate there should not be a tension between inherited traditional knowledge and technology. When integrated fittingly, this valuable knowledge can be embedded in the development of technologies that recognize the thresholds of the natural systems governing the natural resources a business relies upon. To aim for a sustainable operation, it is important a business integrates this knowledge as a fundamental pillar of the mindset underpinning its culture and vision. In doing so, a business will be able to flourish and have long-term continuance without compromising depletion of natural resources. Additionally, we underscore the importance of a flexible iterative frame of mind to regularly gauge and attempt new improvements in the processes and operations of a business.

IMPORTANCE OF ITERATIVE PROCESSES IN EXPERIENTIAL KNOWLEDGE

Our assessment revealed that a fundamental aspect of heritage and tradition, as it has

been defined, is experiential knowledge. Communities that have relied on natural

resources for centuries have experiential knowledge, in terms of physical processes and methods, which has evolved and been refined over time. This experiential knowledge is passed along generations, and overtime it upgrades and adapts to the present conditions of the environment. We see experiential knowledge as an iterative process because there is a continuous testing of the inherited physical processes and methods to determine if they are still suitable to the current conditions of natural systems. Consequently, this continuous iteration of inherited practices fosters a test-lab mindset, in which the community is always looking to fine-tune their practices to the present environmental conditions and overall context.

As it is commonly known, the environmental conditions of climates in various regions around the world have been morphing over the last two decades. Our environment will continue to change, so the ability to be flex-

ible and adapt is key for rural communities to continue relying on natural resources. In the examples and literature assessed we observed that overtime, newer generations of labourers are able to validate and account for inherited knowledge that continues to work today. Eventually, only those principles and processes that continue to be in-tune with the limits' of natural systems will remain as the heritage and tradition of a community.

Our research deductions suggest that an iterative mindset and a culture of experimentation are a fundamental aspect of heritage and tradition, and the dissemination of experiential knowledge fosters this mindset.. Inherited experiential knowledge of ancestral practices involving human labour allows for the continuous testing of traditional methods, to adapt or discard them based on their congruence with current natural conditions

APPRENTICESHIP AFFORDS INHERITANCE OF INTER-GENERATIONAL KNOWLEDGE

An important take away from the enterprises assessed is the role of *apprenticeship* and its relevance in the knowledge transfer between generations of labourers. Apprenticeship affords the inheritance of accumulated inter-generational knowledge that has proven to be sustainable over time. We understand apprenticeship as the process in which individuals are selected to join a collective of people with particular skillset and knowledge related to a craft. In the enterprises we assessed, apprenticeship played a fundamental role in the maintenance of the livelihoods of people harvesting a resource. Our research findings point to apprenticeship as a process providing two beneficial mechanisms:

1. Filtered selection based on an individual's fit with the collective and its community, and
2. Permissible scale of operation to ensure natural cycles are able to self-generate.

Apprenticeship allows the more experienced individuals of a collective, the selection of new waves of incoming labourers. Leaders and influencers act gatekeepers to select those individuals who best fit with the mindset and lifestyle of the group. Through our assessment we found length of apprenticeship to be a factor linked to the successful selection of individuals with an optimal fit for a collective.

The longer the apprenticeship, the more evidence and corroboration for both incumbent and incoming parties to determine whether they are aligned and committed to an underlying worldview that is mindful of the resident community's envelopment in its surrounding natural systems.

An additional benefit of the apprenticeship process is the implications on the collective scale of operations within a community. Throughout our research we observed that a community's mindfulness for the natural systems governing its resources were enacted in a number of ways. First and most importantly, there was a cap to the number of people directly involved in the harvesting of a resource. In the examples analyzed, we found that only fixed number of individuals were allowed to harvest a natural resource. Apprenticeship processes provide a pool of potential candidates to join a collective once someone retires. For the Monhegan community, the limit to the amount of active fishermen was crucial in protecting its lobster population from depletion like the hundreds of neighbouring fisheries in the region.

In addition to the amount of people involved in the harvesting of a natural resource, the technologies being employed may also pose a significant risk to its depletion. Throughout our research, we found evidence suggesting the harvesting rate and scale of some technologies can be detrimental to the sustainable welfare of natural resources. As discussed earlier, large-scale industrial technologies may not be suitable for the harvesting of natural resources managed by circumscribed complex natural systems with intertwined relationships. Natural systems are inherently complex, as they are characterized by the diversity of components, the relationships among those components, and the autonomous process-

es that employ the outcomes of interactions to select a subset of components to enhance (Levin, 1999).

Our insight was corroborated by our research evidence supporting an inclination towards more traditional and elementary harvesting instruments. In the examples assessed, we found technologies and instruments that had been employed for several generations because they did not interfere with the resiliency of its embedding natural systems. Most of these instruments and their capabilities did not require advanced technology or large equipment, as they were from local natural materials ingeniously designed to accommodate for the harvesting requirements without compromising the resilience of natural resources.

It is important to understand and acknowledge the thresholds delimiting the wellbeing of the natural system governing a natural resource. Hence, as it has been stated, the importance of tracking and measuring ecosystem data, which serves as a feedback mechanism. This knowledge can partly be found in the inherited traditions of communities whose craft directly interacts with a natural resource. By understanding the processes and methods inherent in the craft of a community, one can discern the relevant variables that merit monitoring. Furthermore, it is important for business stakeholders to understand the critical role those variables play, and find means to track those variable and integrate them into the decision-making for harvesting operations.

The application of large-scale technologies to harvest a resource without considering the implications on the thresholds regulating its replenishment, may have irreversible detrimental effects to the long-term provision of that asset. Therefore it is key that all stakeholder groups share the same knowledge, and are aligned in the underlying

rationale that aims for a sustainable operation. To achieve this, transfer of knowledge and transparency from the community

HOW DOES TRANSFER OF KNOWLEDGE

UNITE ALL STAKEHOLDER GROUPS?

Transfer of knowledge is defined as the explicit exchange of information between stakeholders in a given system. In the system being explored, a sustainable value system, our research has identified transfer of knowledge between each stakeholder to be a crucial element required to achieve sustainability. Transfer of knowledge acts as a stabilizing force between stakeholders, establishing a level playing field to determine the mutually-beneficial course of action. The three crucial groups of stakeholders are identified as “policy makers”, “business owners” and “local communities”. To develop sustainable enterprises, the integration and application of a diverse set of knowledge areas into the business model and policy ensures that all needs are met for each stakeholder. Leveraging a diverse set of knowledge areas provides a more comprehensive and holistic plan that considers all variables that would impact the long-term success of a given business operation including people, planet and profit. Therefore, it is important to identify these knowledge sectors, and determine their systemic influences as fundamental building blocks required to shape a sustainable value system involving natural goods. To facilitate the successful transfer of knowledge, members of each stakeholder group must be present and involved in a productive dialogue that informs the development of policy and business.

Policy makers represent the stakeholders that establish laws that protect and govern. These stakeholders enforce the limits and regulations required to ensure a business operation is run sustainably. Without informed policy makers, natural resources are at risk of depletion. For example, during resource harvesting, the value of the resource can be squandered by extracting and/or selling it at the wrong times or by extracting it with excessive losses. This can be seen in the forestry sector where most governments have underpriced timber on public lands, ignoring the dictum that governments must “devise administrable instruments that enable the government-as-owner to appropriate as large a rent share as is practical” (Ascher, 1999). The result has been reckless and excessive timber harvesting in Brazil, Cameroon, Costa Rica, Honduras, Indonesia and Malaysia (Ascher, 1999). To shape fair and comprehensive regulations that adhere to the natural limits of a given ecosystem, policy makers must communicate with local community members and farmers who have been living off the land for generations. Working with local communities provides insight into the cultural nuances and intergenerational knowledge that is central to the establishment of policy, governing a given natural resource.

Local farmers hold invaluable knowledge about sustainable farming techniques that

should be integrated into the policy making process. Intimate knowledge about the environment and its natural limits comes from generations of dependency on a given resource. Tradition established by past generations comes from the iterative process of farming techniques that have been refined to the point of sustainability. Given that local communities rely on indigenous natural resources to survive, sustainability is prioritized above all to ensure the continued survival of their people. Thus, a unique social self-restraint is ingrained in local communities where respect for the ecosystem services that support the continued abundance of natural resources, leads to an innate understanding and appreciation for sustainability.

Business owners represent a third and final stakeholder in the sustainable value ecosystem triage. As with most business owners, profits are central to their objectives. To ensure that people and the environment are integrated as a line item in the balance sheet, transfer of knowledge in the form of a productive dialogue between business owners and local community members must be involved in the development of business operations. Leveraging the unique knowledge set possessed by local communities, business owners will be able to integrate the natural limits of ecosystem services into their business model. As illustrated by the Flourishing Business Model Canvas, a resilient business strategy must consider the natural ecosystem that supports the business operation and the unique social dynamics that exist between the economics and the environment (Upward, Jones, 2016). In other words, to generate profit, there are key ecosystem actors and resources that drive profitability. Once these resources are depleted, profitability disappears. Therefore, to build a resilient business model, we must integrate

the natural limits of the environment into the economics of the business operation to ensure long-term profitability.

As with sustainability, transfer of knowledge is an ongoing process. Transfer of knowledge, described above as a stabilizing force between all stakeholder groups, is required to build and maintain a sustainable business model by leveraging heritage and tradition to inform the needs of people, planet and ultimately profits. In attempts to further clarify the powerful driving force behind transfer of knowledge, our team identifies a reinforcing loop between new and old generations that builds tradition, which is ultimately passed down to next generations as heritage (insert diagram). This iterative process of tradition through the intimate relationship between people and their environment resulting in a sustainable relationship is at the heart of this wicked problem. Our research team has found that the intersection between past knowledge in form of traditional pre-industrial practice and present knowledge in the form of technological innovation is critical to building solutions surrounding sustainability. In the examples investigated above, we have learned that the modernization of the agricultural industry has largely ignored the fragile ecosystem services that protect the continued sustainability of a given natural resource. Through the noise made from population growth, overconsumption and fixation on artificial solutions, we have ignored the natural limits of our ecosystem.

HOW DOES POLICY FACILITATE THE DEVELOPMENT OF SUSTAINABLE ENTERPRISES?

The third and final component in the Bottom-Up Pyramid Model is identified as “Government” representing a group of stakeholders involved in the process of policy making and rule of law. Acting as a reinforcing weight, governance through policy maintains and regulates policies aimed to realize organizational and societal goals. Given the complexity of governance, it is difficult to capture in a simple definition. For the purposes of this investigation, our analysis is based on the five principles of

good governance as outlined by the United Nations Development Program (UNDP). The following excerpt outlines the five dimensions that characterize good governance as defined by the UNDP. Although this list is not exhaustive, it functions as a globally recognized standard to which “change leaders” can follow when sculpting the conditions necessary to allow for the development of sustainable of value systems in a given area.

1. LEGITIMACY AND VOICE

A. Participation – all men and women should have a voice in decision-making, either directly or through legitimate intermediate institutions that represent their intention. Such broad participation is built on freedom of association and speech, as well as capacities to participate constructively.

B. Consensus orientation – good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures.

2. DIRECTION

A. Strategic vision – leaders and the public have a broad and long-term perspective on good governance and human development, along with a sense of what is needed for such development. There is also an understanding of the historical, cultural and social complexities in which that perspective is grounded.

3. PERFORMANCE

A. Responsiveness – institutions and processes try to serve all stakeholders.

B. Effectiveness and efficiency – processes and institutions produce results that meet needs while making the best use of resources.

4. ACCOUNTABILITY

A. Accountability – decision-makers in government, the private sector and civil society organizations are accountable to the public, as well as to institutional stakeholders. This accountability differs depending on the organizations and whether the decision is internal or external.

B. Transparency – transparency is built on the free flow of information. Processes, institutions and information are directly accessible to those concerned with them, and enough information is provided to understand and monitor them.

5. FAIRNESS

A. Equity – all men and women have opportunities to improve or maintain their well-being.

B. Rule of Law – legal frameworks should be fair and enforced impartially, particularly the laws on human rights.

Capra asserted that when working with living systems, continuous feedback and adjustments are necessary to maintain fair and effective involvement of all components and stakeholders (Capra, 2002). This concept can be applied directly to the relationships involving the stakeholder groups represented in our model. To achieve the principles discussed, a symbiotic relationship must exist amongst all three stakeholder-groups, in which active feedback is

received and integrated into the output. To derive key principles directly related to our subject matter, biotic resources, we applied the conditions for good governance as defined above by the UNDP to the dynamics that exist in each case being explored. In doing so, our research team determined three dimensions that allow for good governance specific to the agriculture and farming industry.

FREE MARKET DYNAMICS?

A key observation made during our investigation was that free market dynamics might not be an ideal model for natural resources. Given the finite character of natural resources, an open market in which the prices of goods and services inadequately reflect their true costs due to self-serving interests of stakeholders allows for exploitation. In addition, a free market without laws protecting the limitations of the natural systems linked to a resource further enhances the probability for unsustainable business practices. Critics of free markets

claim this type of system may lead to monopolies resulting in sluggish production methods, questionable quality, unethical social values, and overall weak competitiveness in the global market. In the Monhegan fishery example, it was observed that business owners entered the market to reap short-term gains from the available stock of lobster in the area. Disregarding the natural limits of the ecosystem services, business owners entered the market with a “gold-rush mentality”. Ultimately, over-fishing diminished the biomass of lobster in the

area, risking collapse of the fishery. Characterizing the dynamics of a free market, this case exemplifies the need for regulation to

protect the natural limits of a given natural resources to mitigate the risk of overexploitation that may lead to breakdown.

ACKNOWLEDGEMENT OF LOCAL SOCIAL DYNAMICS

Social equity is required to ensure good governance of natural resources. Establishing positive social relations in the area in which a business owner aims to operate is paramount to achieving a sustainable value system. Respecting the land and resources that local community members have lived on for generations allows for a productive and meaningful conversation between key stakeholders involved in the sustainable value system. The prioritization of natural resources to the stakeholders with most at stake establishes that relationship from the early-onset of development. Recent evidence of this tension between stakeholders was the North Dakota Pipeline protests during the last quarter of 2016. As demonstrated by the North Dakota Pipeline in the United States, indigenous communities have stated their opposition to the project on the grounds that the pipeline and its construction threatens the tribe's "way of life, their water, people and land" (Archambault, 2016). According to the statement by Alvaro Pop Ac, Chair of the United Nations Permanent Forum on Indigenous Issues, "the project was proposed and planned without any consultation with the Standing Rock Sioux or others that will be affected by this major project. According to the U.S. Army Corps data, there had been 389 meetings with more than 55 tribes, including nine meetings with The Standing Rock Sioux Tribe (Medina, 2016). While both sides contradict each other, the fact remains that both sides have yet to reach an amicable solution that integrates the needs of all stakeholders involved. This situation exemplifies the conditions in which an unsustainable value system may surface, one that prioritizes the needs of specific stakeholders while

marginalizing other stakeholders with the most at stake, in some cases even the question of survival itself.

The concept of social equity also refers to the social codes that exist among local communities living off their land's natural resources. Through the dependency on a given resource, communities form self-management systems fostering a community-driven mentality that contrasts with a market-driven mentality. As illustrated in the African Bronze example above, the honey is harvested once a year, and profits are equally distributed among local beekeepers involved in the harvesting process. The preservationist mindset that exists in these communities acknowledges the fragility of their own ecosystem and thus, informs their every action including harvest and consumption. Policy should be developed at the intersection of social and biophysical systems. Outsiders including business owners and policy makers understand the system differently and hold different perspectives that are far removed from the intimate knowledge that exists in these insular communities. Therefore, policy must be informed by the social codes that exist in their insular communities to achieve the good governance of natural resources.

LOCAL KNOWLEDGE TO INFORM POLICY

The third and final dimension of good governance identifies that policies should be tailored to the community hosting the natural resource of interest. Acknowledging the differences in types of natural resources, cultural practices, and geographic characteristics, our investigation led us to the realization that good governance is composed of tailored policies specific to the region and type of resource. Contrary to traditional management theory popularized by Taylor, which advocates for top-down approach to management, our research suggests that the inverse is crucial to the successful implementation of a sustainable value system. A bottom-up approach allows for the intimate knowledge possessed by local communities to be successfully integrated in the policy and business operations that aim to leverage a natural resource in a given area. This insight was supported by a study assessing the impact of participatory processes on sustainability indicator identification and environmental management (Fraser, Reed, 2006). The research team concluded that “Multi-stakeholder processes must formally feed into decision-making forums or they risk being viewed as irrelevant by policy-makers and stakeholders”. To support this conclusion, the research identified that “since ecological boundaries rarely meet up

with political jurisdictions, it is necessary to be flexible when choosing the scale at which monitoring and decision-making occurs. This requires an awareness of major environmental pathways that run through landscapes to understand how seemingly remote areas may be connected in ways that are not immediately apparent” (Fraser, Reed, 2006). The study illustrates that policy must leverage and reinforce heritage to allow for the sustainable management of the environment and social dynamics in a location with desirable natural resources.

However, it is important to note that the process of tailored policy-making should be flexible and iterative, as it needs to be adaptable to an ever-changing context. Acknowledging the dynamic nature of ecosystem services and social networks in a given location, the policies that govern a natural resource must be adaptive to the changing conditions that occur. Like the equal and reciprocal relationship that must exist between all stakeholders in a sustainable value system to allow for the successful transfer of knowledge, governance and policy-makers must acknowledge the social and biophysical systems that exist and drive the continued sustainability of a given natural resource.

WHAT DOES A SCENARIO LOOK LIKE FOR

A SUSTAINABLE ENTERPRISE?

The Bottom-Up Pyramid Model illustrates the interdependent relationship between key stakeholder groups involved in the establishment of a sustainable enterprise. De-

picting an upside-down pyramid balancing on a single fulcrum, this model intends to convey the fragile balancing act that must exist between local native communities,

government, and business to reach a sustainability point where enhanced benefits for people, planet and profits are realized. The connective tissue fundamental to the structural integrity of the model, is the relevant equivalent and reciprocal transfer of knowledge that must exist between each

group of stakeholders. Ultimately the goal is to draw from culture, specifically heritage and tradition, to shape business models aimed at monetizing untapped natural resource, and policy acting as regulatory brakes to ensure sustainable practices are understood, respected, and enacted.

WHAT DOES A SCENARIO LOOK LIKE FOR A UNSUSTAINABLE ENTERPRISE?

In understanding the optimal scenario to strive for, as previously discussed, it is also important to consider the dynamics of a scenario in which there is not an equal and reciprocal feedback between all stakeholder groups, and thus, is considered an unsustainable value system. In the following section, we employ our model to present examples depicting scenarios of unsustainable value systems. The scenarios discussed are illustrations of unregulated profiteering and over-regulation.

In the scenario described as “unregulated profiteering”, the below iteration of The Bottom-Up Pyramid Model depicts a scenario in which the underlying mindset of business owners has shifted away from heritage and tradition to a profit-driven mindset. Thus, heritage and tradition is largely ignored by policy makers and business owners, who are mainly focused on growth and establishing a competitive advantage in the market at all costs. In a parallel way, government stakeholders are lured by the influence of business stakeholders and their promises of more economic activity. As a result, the government provides business stakeholders with aid and support to facilitate their inequitable operations with the justification of increasing economic pros-

perity. This behavior is representative of a reinforcing loop with detrimental effects. However, in most occasions, the systemic effects on a location’s natural resource and its people are not foreseen and accounted due to lack of information.

In this type of scenario monopolies and oligopolies may form, mitigating the ability for smaller operations to compete on a leveled playing field. Business stakeholders are driven by a short-term mentality in attempts to satisfy investors. Policy-makers and business owners working with a foundation built on unregulated profiteering enables a short-term mentality resulting in rapid resource depletion, overexploitation and ultimately, value system collapse. As illustrated by The Bottom-Up Pyramid Model, the foundation built on a cultural shift toward profiteering leads to an unbalanced pyramid in which business owner’s intentions and knowledge base was prioritized above all other components in the framework. This unequal prioritization of business interest leads to people and planet falling out of the sustainability triage, eloquently suggesting the subtraction of their interests from the scenario. Although this scenario is built on characteristics identified in the examples above, it is important

to acknowledge that these descriptions are largely assumptions used to illustrate the possible future of sustainability as culture shifts on The Bottom-Up Pyramid Model. The effects of exploitation of natural resources are exhibited in the impacts from the Ok Tedi Mine. After BHP Billiton entered into Papua New Guinea to exploit copper and gold, mining pollution including toxic contamination of natural water supply for communities along the Ok tedi River, caused widespread killing of aquatic life.

In the scenario described as “over-regulation”, the below iteration of The Bottom-Up Pyramid Model depicts a scenario in which the cultural landscape has shifted away from heritage and tradition to a fulcrum point of over-regulation of markets by the

government in the form of subsidization and economic policy. In this scenario, government interest is prioritized above all other components in attempts to control the price, volume and demand of a valued resource. Over-regulation may lead to a non-competitive, sluggish economy as local and foreign business interest are limited due to the high risk of regulatory costs and local tariffs making entering the market, profitably undesirable. In addition, over-regulated countries may be indicative of political instability and corruption contributing to a reduced attraction to entering the market from local and foreign business, ultimately stunting economic activity.

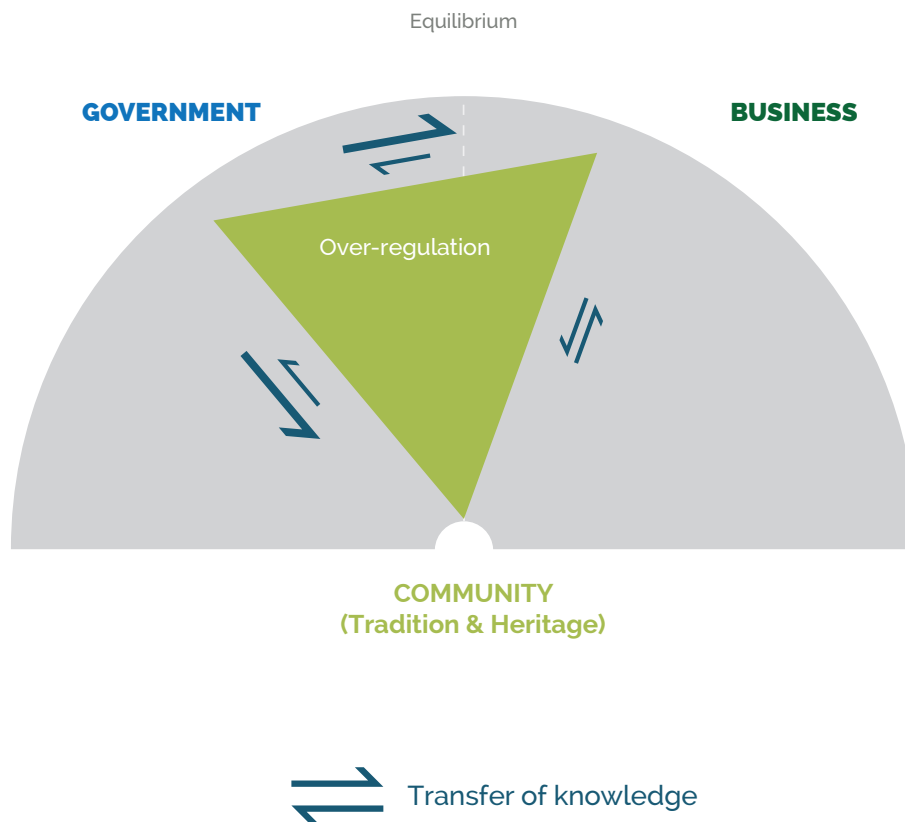
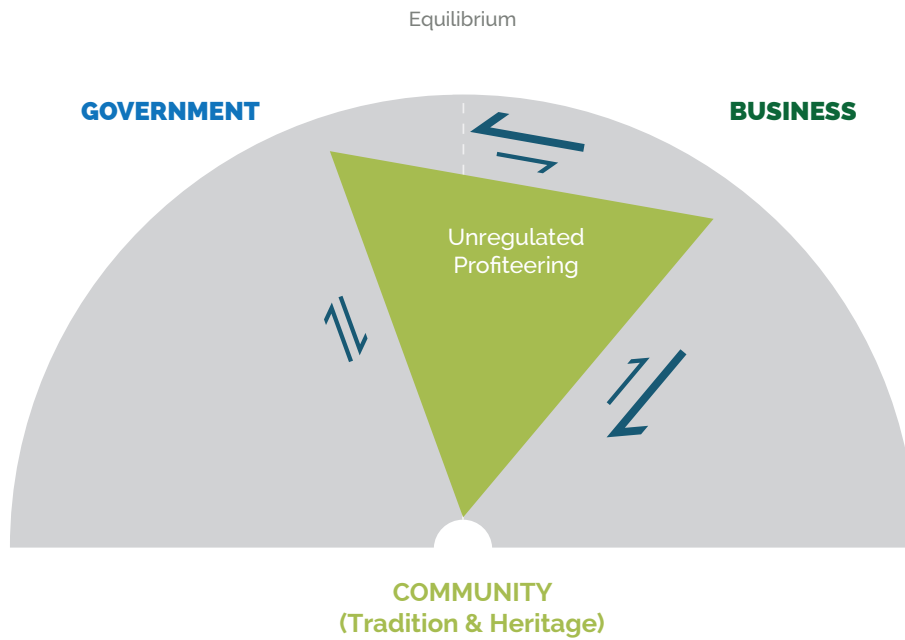


Image 4. Bottom-up mode: Over-regulation scenario



 Transfer of knowledge

Image 5. Bottom-up model: Unregulated profiteering

OUR GUIDING PRINCIPLES FOR SUSTAINABLE ENTERPRISES

After extensive research involving literature reviews, case study analysis, primary stakeholder interviews and data distillation in the form of categorizing and sensemaking, our research team synthesized the findings into a set of principles aimed at empowering change leaders with actionable insights to drive their sustainability initiatives. The following list of principles and the corresponding visual representation, entitled “Bottom-Up Pyramid Model Principles” is the summation of our findings that may be applied to changing contexts involving the implementation of a sustainable value system seeking to extract untapped natural resources. It is important to note that these principles are by no means definitive in their meaning and should not be treated as such. These principles aim to shed light on the core values and philosophies required by change leaders to effectively establish and maintain a sustainable enterprise.

All Stakeholders

- Operate with as much transparency as possible to foster ethical integrity among partners
- Cultivate and facilitate feedback culture to ensure effective transfer of knowledge among all stakeholders

Community

- Leverage intergenerational knowledge to inform policy and business operations

Business

- Strive to instill and augment the most added value to your offering

Government

- Institute market policy that acknowledges the limits of the natural cycles governing a natural resource and the players involved in its harvesting

Business - Government

- Ensure all stakeholders are well-aligned and committed to social and environmental responsibilities
- Maintain transparency and ethical integrity through third party scrutiny and certification

Community - Business

- Business leaders require an intimate understanding of the people and land they wish to operate in
- Develop apprenticeship programs to safeguard community knowledge and foster professional development
- Provide an opportunity for employee ownership to foster accountability with most at stake

Government - Community

- Integrate community representation with a vested interest into all stakeholder groups
- Develop a bottom-up approach to enable transfer of knowledge from primary stakeholders



Image 6. Ceperiano, an interviewee, herding his alpacas. His rope and poncho were made from the fibre of his animals.



THE ALPACA INDUSTRY IN PERU

WHAT IS THE CONTEXT OF RURAL ALPACA FARMERS IN THE PERUVIAN HIGHLANDS?

The last portion of our research project entailed performing an assessment of a natural resource that fell within the scope characteristics initially defined. The purpose of this assessment was twofold. Primarily, it would allow us to probe the principles and model we have developed against a contemporary real-world situation. Furthermore, it would allow us to explore and propose the building blocks a change leader would need in order to establish a sustainable enterprise involving rural communities.

In a similar manner, our research revealed a number of coinciding hurdles for the development of sustainable enterprises in rural areas globally. The nature of these hurdles can be better understood by looking at a current example representative of the overlapping difficulties that arise when developing a sustainable enterprise with rural communities. Thus, we decided to examine the alpaca wool sector in Peru, which leverages a promising natural resource within our intended scope, and encompasses the

livelihoods of hundreds of rural communities. Moreover, this sector is also reflective of the ecological problem archetypes change leaders may face when developing an enterprise from the ground up. Therefore, we think that by testing our findings with a representative contemporary problem, we will be able to further enhance and refine our tools.

By assessing the Peruvian alpaca sector, we seek to probe the principles and model we have developed through the synthesis of our research's insights. The following paragraphs will give context to the contemporary alpaca sector in Peru to depict the issues and opportunities inherent in its value system. Additionally, a brief discussion of the history of alpacas is provided to understand the intrinsic value of alpaca farming heritage. This legacy is represented in the lifestyle and traditions accumulated over generations, and is validated as appropriate through its continued embracement over time.

LOCATION - PERU

Peru has a population of 31.3 million people, and it is the third largest Latin American country in terms of surface area. Peru's diverse geography can be segmented

into three territories: The coast (costa), the highlands (sierra), and the jungle (selva). Various microclimates contrasting in natural, biological, and geographical charac-

teristics exist within these three territories. This segmentation also serves useful to understand the tiers of socioeconomic prosperity and overall scale of economic activity in the country. The Peruvian coast and the provinces lying within its territory are the most socioeconomically prosperous in the country. At the other end of the spectrum is the eastern jungle territory, which has the least economic activity and socioeconomic prosperity.

This tiered socioeconomic landscape is partly a result of each territory's accessibility, in terms of transportation infrastructure, towards the Peruvian coast and Lima, cap-

ital city and home to major sear port of Callao. The Peruvian coast's advantage lies in its three strategically located ports and its major economic hubs. Consequently, the coast is home to approximately 60% of Peru's population (INEI, 2008). Provinces located in the coast such as Trujillo, Tumbes, and coastal Arequipa are the country's economic backbones, as they are well interconnected to the capital. Given the sierra territory is adjacent to the coast, it is the second most socioeconomically prosperous territory, significantly surpassing the jungle. The focus of this paper is on the alpaca sector situated in the highland territory, also known as the Peruvian sierra.

LOCATION – PERUVIAN SIERRA

The Peruvian sierra is located within the Andes Mountains, a colossal mountain range expanding through the highlands of many countries including Peru, Bolivia, Chile, and Argentina. The Andes contains several geographies and microclimates that range from sub-tropical valleys to snowy mountain peaks. Consequently, the Peruvian sierra hosts a gradient of plateaus and depressions, the majority of which are located higher than 3,800 meters above sea level. The Peruvian sierra geography is difficult and irregular, making the overall development of communication and transport infrastructure problematic. The layout of how rural communities are arranged is challenging; it would require an intricate and complex road network to provide all communities with access to the main road systems (Rojas et al, 2008).

Over the last century, scattered pockets of populations have been settling based on natural and geographic assets of particular areas in the highlands. Therefore, the Peruvian sierra has few locations with large urban populations. The city of Arequipa is the largest city with approximately

870,000 residents; Cusco and Huancayo, the second and third largest urban centres, have roughly 420,000 and 360,000 residents respectively; the succeeding urban hubs are much smaller (INEI, 2008). Several small populations are scattered throughout the Peruvian sierra, and they have little or no accessibility to the country's main transportation systems.

Approximately 60% of agricultural production in the Peruvian sierra is not integrated into the larger trading systems that supply the Lima or global export markets; most of the output is for internal consumption (Rojas et al, 2008). Consequently, the further away a location is from Lima, the more agricultural self-provision it possesses. This tendency reinforces itself as one move further east towards the more remote highland and jungle territories. The takeaway is that transportation systems in the Peruvian sierra have not been developed with the intent of intra-departmental connectivity; making only a few rural locations well integrated with external economic hubs, mostly in the coast.



Image 8. Typical landscape of Peruvian highlands resulting from the tricky topography of Andes mountain range

Consequently, the overall interconnectivity within the Peruvian sierra is at a disadvantage. As it is subsequently discussed, infrastructure in the sierra has prioritized mineral transportation to external economic hubs in the coast over intra-provincial and inter-provincial road development to integrate remote communities scattered throughout the region. The symptoms described above result in a transportation system that lacks direct access to several productive areas offering an attractive supply of agricultural goods.

The aforementioned depiction sets the context in which the alpaca sector has evolved since its beginnings. Small alpaca farmers are scattered throughout remote rural locations, which access to adequate transportation and communication infrastructure. More than two thirds of alpaca fibre comes from these pockets of small farmer populations vastly dispersed throughout the tricky sierra geography. Consequently there is an opportunity to support and advance the livelihoods of these vulnerable populations by increasing the quality and added-value of alpaca fibre at the initial link/component of the value system, rural farmers.

DEFINITION OF ALPACA

Alpacas, scientifically known as *Vicugna Pacos*, are South American camelids domesticated for the qualities and excellence of their fibre. Alpacas have been traditionally farmed for centuries in the Andes mountain range, specifically in altitudes higher than 3,500 meters above sea level. However, alpaca herds can be found in countries with lower altitudes such as Australia, Canada, and the US today.

Alpaca fibre has a few salient features over comparable natural fibres like cashmere, mohair, and angora. The unique thermal properties of alpaca fibre come from its internal microscopic air bubbles. Alpaca wool can be up to three times stronger and six times warmer than generic sheep wool (MINCE-



Image 9. Huancavelica city (population 50,000) is one of the few urban hubs scattered throughout the Peruvian highlands. Interviews were done in Sacccamarca, approximately 17km away.

TUR, 2003). Although lighter in weight, the fiber's durability and strength surpasses that of sheep wool's (CONACS, n.d.)

There are two alpaca breeds: The Huacaya represents approximately 80% of the Peruvian population, and the Suri breed about 12%; the rest are hybrid crossbreeds (MIN-

AGRI, 2014). More specific characteristics in terms of appearance and fibre qualities of both breeds can be found on appendix 1. Given its significant proportion, the Huacaya breed is omnipresent amongst small rural farmers, who are the focus of this paper.

THE ALPACA SECTOR TODAY

Peru has the largest population of alpacas, with close to four million animals representing approximately 86% of the total global population (INEI, 2010; MINAGRI, 2014). The largest alpaca populations live within the Andes regions of Peru (86%) and Bolivia (11%), two locations distressed with extreme poverty and lack of government support to meet basic needs like potable water, electricity, and education (CONACS, 2005). Furthermore, the majority of livelihoods in the alpaca sector fall within this disadvantaged demographic in need of socioeconomic advancement.

Small alpaca farmer operations in rural communities account for approximately 80% of Peruvian alpacas. This is a longstanding household-supporting activity that provides for the livelihoods of more than one million people in the sierra highlands (Gestion, 2014). Small alpaca farmers own on average 50 to 60 alpacas, and are the most vulnerable populations as alpaca farming provides for a significant portion of their sustenance. Although many rural farmers grow food like potatoes and quinoa, they still rely on alpaca trade to support other needs such as health and education of children (Pacheco, 2009). Furthermore, their remote rural locations and lack of integration to main transportation



Image 10. Homes are makeshift structures made from rudimentary local materials like stone, mudcap and wood.

networks is a hindrance resulting in undervalued remuneration and limited opportunities for farmers to integrate added value to their fibre.

The provinces with largest alpaca populations in descending order are Arequipa, Cusco, Puno, and Huancavelica; altogether they account for approximately 80% of the Peruvian population (MINAGRI, 2014). Arequipa and Cusco have the most successful alpaca operations partly because of their favoured

dealings with the Peruvian government, and a well-integrated access to the transportation systems routed to Lima, the capital.

Given the provenance of our research 's groundwork, the pertinence of our findings are more applicable to remote rural communities that have little support from private or public institutions. Large portions of these communities are located within the provinces of Puno and Huancavelica, where there is a lack of an adequate economic integration with alpaca processing hubs



Image 11. Farmers are living under substandard living conditions. Most do not have access to potable water or electricity

in Arequipa and Lima. The characteristics and context of these rural populations are aligned with the applicability our research aims to deliver. There is an opportunity to develop a value system that can provide rural alpaca farmers with the means to live sustainably by leveraging inherited traditional knowledge from their ances-

tor's lifestyle. Less than 20% of the alpaca population falls under medium to big sized operations, which are funded by private institutions (Arestegui, 2011). Consequently, our focus is on the more than one million livelihoods afflicted by severe poverty, and who depend on small alpaca farming operations for their basic sustenance.

ALPACA HISTORY

Given the significance of heritage and tradition in the development of our insights, it is imperative to understand this cultural component as it relates to the legacy of alpaca farming knowledge. Within the history of alpacas and their progression with Peruvian culture, there is evidence of knowledge and practices, which have proven to remain relevant and sound in terms of their sustainability implications. We interpret this evidence as signals of the opportunities to leverage heritage and tradition for envisioning more sustainable processes and operations in a given business model. A brief discussion of alpaca history provides context to understand the relevance of traditional alpaca farming heritage from the Inca period.

The earliest signals of alpaca domestication come from the pre-Inca Moche civilization, which existed in what is now the northern region of Peru from 100 to 800 AD (Berrin, 1997). The Moche people were skillful weavers of alpaca fiber textiles; evidence of their expertise in tapestry can be seen in museums exhibiting their artistry. Subsequently, the Inca civilization, which began in Cusco around 1100 AD, fully embraced their autochthon camelids, incorporating them in many aspects of their lives and cosmology. Alpacas were integral to Inca society, as they afforded several usages like clothing, fertilizer, energy source, transportation, and nutrition (Yates, 2015)

Agriculture and textiles were fundamental socioeconomic activities for the Inca civilization. Wool from the camelids was mixed with cotton to make cloaks, rugs, hangings, and tapestries. Textiles had a religious and social connotations (Mosley, 2001). Soldiers, religious guides, mentors, and distinguished citizens who served the Inca Empire were given clothing as the uttermost gesture of appreciation. The finest fiber from alpacas and vicunas was reserved for use of Inca royalty exclusively, as they were considered godly garments. (Mosley, 2001)

The processing of the alpaca wool involved stakeholders from all tiers of Inca society. After shepherds sheared alpacas, the fleece was taken to royal warehouses where it was processed into wool, and distributed according to the specific needs of households. Mostly Inca men were involved in the wool processing, while the women performed spinning and weaving tasks.

Imperial administrators, elected by the Inca governing body, oversaw the distribution of work over a designated population. These supervisors managed and assigned the type of task and the time allocation for all individuals involved in textile production. All citizens directly or indirectly involved the processing of alpaca wool, and were expected to abide by the working program they were assigned.

Within Inca society there were a special group of people, considered special expert advisors, and revered by Incan royalty for their wisdom and expertise; they were known as kamayoqs. These experts were tasked with advising Inca royalty in a variety of matters that ranged from warfare, politics, astrology, agriculture, and other fields. Agricultural kamayoqs were special advisors on agriculture and climate. They were trained to anticipate weather patterns and were responsible for advising on key agricultural practices such as optimal sowing dates (Hellin & Rodriguez, 2006).

Currently, there is evidence of private and public initiatives leveraging Kamayoq knowledge to teach rural communities farming and veterinary methods to take care of their alpacas (Hurtado, 2010)

Image 12. Winter freezes have increasingly become harsher over the last few years. This picture was taken in early December, the beginning of winter season.





Image 13. As one reaches higher altitudes, climate conditions gets harsher, and pastures become ruined and scarcer.

WHAT ARE THE MAIN ENVIRONMENTAL ISSUES AFFECTING RURAL FARMERS?

Today, three underlying issues are affecting rural alpaca farmers as a result of climate change, and its alteration of standard weather temperatures over the last decades. These problems have negative implications on the quality and overall value of alpaca fibre produced by rural farmers in the Andes. Ultimately this situation underpins a vicious cycle, in which the low income from bulk sales of fibre is not enough to invest in farming resources to increase the fibre quality.

Over the last few years, winter freezes have become colder and more frequent than the last decades (El Comercio, 2016). Alpaca farmers are the hardest hit because most live 3,500 meters above sea level, where weather conditions are extreme, and special gear is needed to protect cattle, especially babies, from freezing temperatures at night.

Extreme cold temperatures down to negative 20 degrees Celsius have been killing thousands of baby alpacas over the last winters. (El Comercio, 2016).

The cold weather also has negative implications on grasslands in the Andes. Given the high altitude and adverse topography of the region, there are not many grass species that can thrive in that environment; areas of vast available grassland are not ubiquitous (Hurtado, 2010). When extended ice storms hit the Andes, some grassland areas are covered with ice for several days, making food unavailable to alpacas. Overtime, this continued degradation leads to depletion of grasslands, which has been known to be a problem of increasing concern over the last years (CONACS, 2005).



Image 14. Pasture is not abundant in the highlands, there are not many grass species that can grow under such harsh conditions

Another significant environmental issue inflicting small rural farmers relates to the bodies of water they rely on to feed their alpacas. Bodies of water such as lakes, basins, creeks, and small rivers have been becoming scarcer as a result of climate change and mining operations. Climate change has caused bodies of water to change characteristics and dry up over time. Alpaca farmers in the province of Puno claim a decrease in the availability of water for their alpacas in the last five years (Pacheco, 2009).

The three components previously discussed: Water, grasslands, and climate temperature, are fundamental factors that need to be addressed in order to maintain a sustainable operation in rural farming communities in Peru. As the climate landscape in the highlands continues to shift, it is important to put efforts towards tracking this type of ecosystem information to mitigate detrimental implications that can be foreseen with this data.

WHAT DOES THE ALPACA VALUE SYSTEM CURRENTLY LOOK LIKE?

The value system generated by the alpaca sector in Peru involves several stakeholders, each with particular roles and varied influences over other participants in the system. The following paragraphs will describe the alpaca value system to provide a holistic understanding of the dynamics influencing how it functions. The emphasis of this description is on those stakeholders our research focuses on, rural alpaca farmers and their corresponding traders,

who engage in relationships that influence the livelihood of these rural communities. Furthermore, we want to illustrate how relationships among different stakeholders shape the gestalt of the alpaca value system and its encompassing behaviour. To achieve this, we examined the value system to understand how added-value is generated and distributed among different stakeholders.

The initial link of the alpaca value system begins with the farmers who raise, breed, shear, and look for the wellbeing of their alpacas. The scale of farming operations can be segmented into three levels: Small farming operations account for 80% of Peru's alpaca population and ranch on average 50 alpacas; mid-sized operations represent 10% of the alpaca population and ranch on average 150 alpacas; the remaining 10% of alpacas belong to large scale operations that manage more than 500 animals (MIN-AGRI, 2014)

Rural farmers, our focus, sell the majority of their fiber to three stakeholders: Reachers, Small Intermediaries, and Large Intermediaries; together these participants accumulate approximately 65% of all Peruvian alpaca production (Aréstegui, 2011). Reachers are the smallest aggregators of all three, and their advantage lies in their proximity to rural farming locations. Reachers usually live in communal hubs nearly located to rural communities, so they have a first-mover advantage in terms of proximity to fibre supply. Furthermore, Reachers leverage their convivial and

amiable relationships with Rural Farmers to pact self-serving beneficial transactions. This is achieved through up-front payments and word of mouth agreements, which may not be thoroughly respected or have formal repercussions as it would be the case for business-to-business transactions (Felipe, 2009). The informal nature of transactions between Reachers and Rural Farmers is shaped and reinforced through the relationships these stakeholders develop.

The inequitable dealings of Reachers with Rural Farmers are evidenced in their portrayal of information asymmetry and bulk purchases realized through their transactions (Pacheco, 2009). Reachers convey a perception of supply surplus to drive prices down as much as possible. The detrimental effects of this action are dual. Given their remote location, Rural Farmers are disconnected from communication channels to corroborate the transparency of prices agreed upon with Reachers. Secondly, the bulk value of fibre is the lowest price point, which puts Rural Farmers at a disadvantage because remuneration value is not determined by the fibre's finesse and quality, but



Image 16. Store front of intermediary stand, where bulk fibre is traded between Reachers and Farmers



Image 17. Husband and wife couple. Males usually handle commercial transactions, while females take care of agricultural tasks

rather by its weight. The bulk unit of purchase for alpaca fibre has been established at 450 grams (1 pound) for several decades (Felipe, 2009). The result of this undervalued transaction is a minimized and inequitable remuneration for Rural Farmers, the most vulnerable stakeholders in the system.

Small Intermediaries purchase fibre from Reachers, but they may also directly purchase from Rural Farmers. Small Intermediaries represent a bridge between rural alpaca communities and the large purchasers of fibre located closer to or in urban hubs: Large Intermediaries and Commercial Agents who are employed by Manufacturers. The trade volume between Small Intermediaries and Large Intermediaries is approximately twice as much as that traded by Commercial Agents (Aréstegui, 2011). Large Intermediary trade accounts for approximately 60% of alpaca production; therefore this circumstance intensifies their purchasing power to influence market prices for the succeeding subordinate transactions in the value system (Pacheco, 2009).

Our research suggests the purchasing power of Large Intermediaries derives from their high procurement volumes and manipulative payment methods. Their negotiation tactic is to execute large wholesale purchases with upfront payments, which

enables them to drive down prices as much as possible. These upfront payments are correspondingly used by Small Intermediaries to accumulate fibre from Reachers and Small Farmers. Therefore, Small Intermediaries settle on transaction prices with Reachers, and occasionally Rural Farmers, based on preset figures dictated by Large Intermediaries, who provide the upfront funding for accumulative fibre purchase. A similar occurrence develops between Reachers and Rural Farmers as well. Thus, the implications of Large Intermediaries' negotiation tactics are evidenced in the underrated value of alpaca fibre and underestimated remuneration of Rural Farmers.

Commercial Agents are wholesale buyers of fibre working directly for a Manufacturer. These agents are analogous to Large Intermediaries in the sense that they both directly transact with Manufacturers. However, Commercial Agents are more formal and principled than Intermediaries because they legally represent Manufacturing companies held responsible for operating under fair and equitable conditions with their suppliers. Consequently, Commercial Agents have two major fibre providers, Large Intermediaries and Accumulation Centres. The former is characterized for its large volume and informal nature, as it has been previously discussed. Commercial

Agents purchase fibre from Large Intermediaries and Accumulation Centres in decreasing order. Occasionally, these agents may trade with Small Intermediaries or Reachers. More than a third of fibre purchased by Commercial Agents comes from the informal network of intermediaries due to its vast scope and ubiquity throughout the Andes (MINCETUR, 2003).

Ultimately, the consequent ramifications of the alpaca value system in the livelihoods of Rural Farmers have a number of implications. Rural Farmers have a limited exposure to ethical and equitable transaction options that could provide them with fair remuneration, and opportunities to instill added value to their fibre supply. The vast network of informal intermediaries is ubiquitous, and arguably the only alternative for a significant populations of Rural Farm-

ers to support their family's sustenance through alpaca farming. As it has been described, this network of various intermediaries, informal by nature, is an underlying driving force shaping how the alpaca value system functions, and inducing detrimental implications for Rural Farmers.

The value system generated by the alpaca wool sector in Peru is more complex and interwoven than the previous description, which is a condensed synthesis of the fundamental dynamics and relationships shaping the value system, and driving the remuneration of its stakeholders. There are unfavorable implications resulting from the way this system has been arranged, which was not planned accordingly with a long-term vision into the development of the multitudinous rural communities involved in the trade of this valuable fibre.

WHAT ARE THE FUNDAMENTAL INHERENT ISSUES

BURDENING HOW THE ALPACA SECTOR FUNCTIONS?

The alpaca sector is impaired by two pivotal mutually reinforcing issues, of which one of them ensues the other to generate a proliferating phenomenon detrimental to rural farming populations and their longevity. These populations account for more than two thirds of alpaca production, hence it their socio-economic wellbeing is vital for the alpaca sector to thrive. Moreover, there is an opportunity to advance the socio-economic prosperity of these people and elevate the aggregate level of fibre quality in Peru as a consequence. The underlying issue is related to implications of prioritizing the development of a communication network for the mining industry.

Mineral extraction has been a core backbone of the Peruvian economy for several decades. The contemporary mining industry in Peru flourished in the 1950s, when policy was passed to facilitate and encourage mining investments through tax breaks, subsidies, and other incentives; Peru positioned itself among the world leaders in silver, copper, lead, and zinc production (Chirif, 2008). Since the year 1990, after a decade of political and economic turmoil, the Peruvian mining industry has been a driver for economic growth and development in the country. Peru's mining activity accounts for approximately 6% of the national GDP and over 60%

of exports (Martines, 2012). Today, Peru is considered a world leader in copper, silver, lead, and tin production.

The term 'neo-extractivism' refers to the contradictory development trajectory of continued dependency on the extractive industries for economic growth, while attempting to use the revenues accrued via the extractive sector to fund social investment programmes or other socially-oriented development schemes (Yates, 2015). This approach has been criticized for its failure to provide an equitable and sustainable development path for rural communities in the Andes, and instead entrenching post-colonial development as usual (Damonte, 2012).

Rural communities engaged in sustainably scaled operations and communal trade are being displaced by a broader political agenda prioritizing the large-scale mechanized industrial mineral extraction that lays the ground for capitalist value systems. As a result, rudimentary trails that connect numerous remote communities are being destroyed to favour the construction of roads benefitting mining operations. Consequently, younger generations of farmer populations are migrating to large urban hubs like the cities of Arequipa, Cusco, and Lima in search of improvements in income and living standards. This shift represents a strain on the communal non-market forms of exchange and mutual assistance that characterize Andean communities; the result is an exodus from a pastoral way of life and even from the alpaca industry altogether (Yates, 2015). This trend denotes a risk for the Peruvian alpaca sector, and the social DNA carried by the traditional activities and lifestyles inherent in the Peruvian highlands' peoples

Over the last decades, the central government in Lima has been benefitting two regions with substantial inflows of resources to expand and strengthen socio-economic ties with them: Cusco for its importance as a major

tourism destination, and Arequipa for its significant industrial sector and proximity to large mining operations. Consequently, the most successful alpaca operations are located in provinces within these two economically active regions

The patterns of poverty among the contrasting spatial differences in the Peruvian highlands reveal an uneven topography of socio-economic prosperity for rural communities in the Andes. Socio-economic advancement and opportunities are mostly restricted to locations with accessibility to major highways and neighbouring urban hubs. This data reveals complex patterns that emanate from the intertwining of diverse livelihoods, power relations, public/private institutions, and poverty. Ultimately, communities located in areas favoured by the government stand to benefit from public and private investments.

WHAT ARE THE ISSUES AND OPPORTUNITIES

IDENTIFIED BY THE TOOLS WE DEVELOPED?

To hone in, it is worth focusing on some of the barriers inherent in the current alpaca system, and how they relate to the Bottom-up model. To reiterate, a sustainable value system is one that integrates people, planet and profits into a given practice, and in doing so, the organization meets the needs of the community, and respects natural limits of the environment to achieve profits sustainably. However, it is important to acknowledge the dynamic and changing contexts in which Change Leaders seek to establish sustainable enterprises. With different geographic areas, cultural practices and social codes, come different challenges that should be analyzed on a case by case basis.

In the case of the Peruvian Alpaca sector, we identified three underlying barriers that need to be addressed in order to develop fruitful and sustainable business models. Each barrier pertains to one of the stakeholder groups depicted in the Bottom-up model: Government, Business, and Community. By understanding these challenges, one can better gauge the myriad of issues rural farmers are against, and begin to think about how to tackle them. The first challenge is most pertinent to government stakeholders due to their competency to set rules and guidelines on how a market can function, and their regulating role in the sound and ethical performance of markets.

Our assessments points to a disconnect, underpinned by the difficult topography of the highlands, between small rural farmers and manufacturing facilities. This divide comes in gradients, based on the accessibility of a community's location, and its proximity to major transportation chan-

nels. Nevertheless, the majority of rural alpaca farmers do not have adequate access to platforms for direct transaction with manufacturers. Consequently, as it was mentioned, tiers of informal intermediaries take on a bridging role, which they leverage to reap accrued value for themselves, disregarding an equitable remuneration for alpaca farmers. This evidence points to a lack of transfer of information between manufacturers and farmers. Furthermore, the information available it is not thoroughly transparent for all stakeholders involved.

This wrongdoing is carried out through deceitful means like price asymmetry, misleading information, and unethical negotiation tactics previously mentioned. As a result of this disconnect, a persuasive informal platform, conducted by and for intermediaries looking for self-benefitting interest, has developed over time. This platform needs checks and balances from government stakeholders through policy, and sound governance of a commerce framework that enables fair and equitable trade for all transacting stakeholders.

Our research suggests, there is a need for regulatory market policies that foster equitable transactions for rural farmers, and provide the mechanisms to shift away from the prevailing reliance on an informal network of intermediaries. We call for government stakeholders to prioritize the communities directly involved with the fibre's supply, and to assume a bridging role with the manufacturing sector to pass the accrued value captured by intermediaries towards alpaca farmers for their equitable remuneration..

Moreover, government stakeholders should foster transparency of information in terms of prices, demand and supply, and overall market sentiment to safeguard fair transactions in all trading stages. We suggest looking into establishing mechanisms that advance information transfer for all stakeholder groups, as well as implementing checks and balances to minimize fraudulent transactions or related activities. To this end, it is important to be aware of the detrimental effects corruption.

In summary, we see an opportunity to turn around the ample trade volume from an informal network of intermediaries towards a formal network of accumulation centres that provide alpaca farmers with opportunities to receive added value by classifying the fibre. In doing this, alpaca farmers will reduce the existent gap with manufacturers, and break a dependency on informal intermediaries. Overtime analogous initiatives have surfaced, but there needs to be a more cohesive and congruous effort to realize a scale that can impact the greater portion of rural communities throughout the Peruvian highlands.

It is worth noting existing partnerships between the private and public sectors to develop networks that trade fibre ethically and equitably. An example is the Pacamarca facility, a 12 year-old initiative located in the Arequipa region, and privately funded by Grupo Inca, a dominant player in the alpaca sector (Grupo Inca, 2017). This well-funded initiative breeds and farms high quality alpacas with aims to improve the fibre's quality, and partners with local municipalities to share their knowledge with nearby communities in order to elevate the overall fibre quality of contiguous areas (Pacomarca, 2016). Additionally, through this initiative, rural farmers can directly transact with commercial agents representing factories owned by Grupo Inca. This example shows how bridging the

gap between rural farmers and factories can benefit both stakeholder groups by providing fair sourcing and equitable pay for the fibre, which is a social responsibility asset for any business.

There is evidence of fair and equitable sourcing initiatives through accumulation centres as mentioned in the description of the alpaca value system. However, accumulation centres are limited, and do not achieve an extensive reach throughout the highlands. There is a need for development of an accumulation centre network that has adequate scale and reach for the vast scattered rural populations throughout the highlands. The lack of access to accumulation centres equates into less options for rural farmers to trade their fibre equitably, and with added-value through fibre classification. This symptom is more notable in regions that have less accessibility to major transportation networks. Looking into the possibility of developing a network of accumulation centres can be a pivotal step into shifting away from a reliance of an informal network of intermediaries.

The following challenge is relevant to business stakeholders. Due to the early stage development of the alpaca sector, there seems to be a lack of investment from factories in branding and sales to improve the profit margin on alpaca exports. Currently, approximately 92% of alpaca products exported from Peru are tops, which are fibres that have been washed, combed, and classified according to their quality; less than 5% of alpaca fibre exports are garments or fabric (Rojas et al, 2008). As a result, significant profit margins are lost. Through investments in branding and sales, alpaca fibre has the potential to generate significant demand in foreign markets as it has attributes that supercede wools like merino, cashmere, and angora, commonly used comparables. Approximately 10% of exports are textiles including

yarn, garments and fabrics, so there is an opportunity to shift focus into boosting textile production and considering a stronger brand strategy to elevate the material in the eyes of global consumers. A comparable industry to mimic would be the Italian garment industry that has established themselves as the leader in high quality fashion through brand recognition and high quality material. Peruvian alpaca factories have the resources to emulate this strategy. Ideally, garments and fabrics should represent the majority of exports, which is opposite of the current context.

The final challenge is related to the loss of traditional farming knowledge and the social capital of the alpaca farming way of life. As it has been discussed, younger generations of farmers are moving out of their rural communities to pursue other endeavours in urban hubs. Many of them are apprehensive about the economic advancement alpaca farming can provide, and are choosing to be trained in other occupations, usually more consistent with urban life. Ultimately, if this trend continues, the knowledge, tradition, and way of life pertinent to alpaca farming will be lost, and with it, the opportunity to champion a natural resource with the potential to advance the socio-economic prosperity of more than a million rural inhabitants.

Throughout our literary review we came across a few examples of initiatives addressing this issue by strengthening and disseminating inter-generational knowledge that continues to be relevant in today's context. This knowledge is related to breeding, veterinary care, and farming practices that, in some cases, traces back to ancestral Inca traditions. An example worth noting is the Kamayoq program led by Practical Action, an English, privately funded NGO with subsidiaries in Latin America. This program's focus is to train individuals with affordable farming practices rooted

in ancestral knowledge, and that leverage local resources instead of relying on costly technologies. As of 2010, more than 300 people have successfully completed training and certification by attending theoretical and practical lessons over the course of eight months in a training facility (Practical Action, 2017).

Research suggests several rural communities lack resources and knowledge of adequate veterinary and farming practices for the wellbeing of their alpacas. This is partly due to an episode of terrorism throughout the eighties, which severely afflicted many rural towns in the highlands causing exodus and death (Yates, 2015). Consequently, alpaca farming knowledge has been washing away and vanishing as rural alpaca communities were broken and abandoned. However, initiatives like the Kamayoq program are reversing this gloomy episode, and rescuing pockets of knowledge from a few communities that have managed to preserve this valuable asset.

We suggest developing initiatives analogous to the ones previously described to shift away from the momentous informal network of intermediaries that exists today. There are two fundamental modifications to consider. One is related to the physical and communicational disconnect between rural farmers and the ultimate purchasers of the fibre, manufacturers. The second pertains to the output quality and overall remuneration of alpaca farmers, which needs to be supported by adequate farming knowledge and equitable pay for an improved fibre. As it was discussed, there are signals of positive initiatives happening, but there is a need for a more cohesive and concerted effort in order to encompass the widely-scattered communities of alpaca farmers.

To conclude, this assessment is an initial glimpse at the overall status of the Peru-

vian alpaca sector, and it seeks to depict how one can begin to think about tackling the fundamental problems afflicting rural communities. Our viewpoint does not seek to be conclusive or definitive, it is more an illustration of the opportunities available in natural resources like the alpaca.

As demonstrated in our analysis, the barriers are complex and intertwined. In order to achieve the goal of establishing a sustainable enterprise in the Alpaca industry that is equipped to meet the demand of foreign markets, business leaders must address the disconnectivity among rural farmers, breeding and care education, classification techniques and the need for a revitalization of the alpaca brand internationally. While people or material support can address some of this, it can and should be further enabled by a methodical approach that empowers business owners to generate the greatest impact. In a nutshell, this means planning for a sustainable tomorrow by making deliberate choices today. With the path before business leaders filled with barriers and uncertainty, what is ultimately required is a roadmap that will provide navigational support and empower change leaders to continue the movement toward a more sustainable tomorrow.



Final Thoughts & Next Steps

For purposes of this section, we are purely examining the implications of this research for future research efforts, whereas implications for our stakeholders (i.e. initial recommendations) are explored in greater detail elsewhere in this report.

In reflection, our research team would like to acknowledge that this process was an iterative one that saw our research question evolve and develop based on various findings. Illuminated by these findings, we delved into the complexities of sustainability and its application to the harvesting of natural resources. While this phase of the research is officially over, we recognize that these findings by their nature require further research to uncover additional layers of evidence to support our initial findings.

Moving forward, we envision this future research will likely involve an examination of industry-specific dynamics in Peru, such as the advances being made in manufacturing technology. These sectoral insights might inform other opportunities to implement sustainability principles in their operation. On a similar tone, a Porter analysis would provide a more contextualized understanding into the unique challenges and opportunities that may exist across Peru's regions. Along these lines, a more penetrating analysis of the opportunity and risks that may exist when deciding whether to embark on a venture as change leader might be beneficial to make informed strategic direction. Further, working with and alongside various government officials that operate within the country of interest, may provide a unique point of entry into the system and permit a more rigorous approach to materialize.

It is important to note that our research was highly iterative and dynamic. The evolution of our methodology and research started with identifying an interest in determining what it would take to set-up a sustainable value system focused on untapped natural resources. This led our research team to identify Alpaca as a resource of interest, which developed into in-depth discussions with our advisors suggesting the exploration of successful enterprises as a criterion by which we measure success.

On a final note, we acknowledge that should this research to continue, we should employ more elemental data to inform our approach, along with other models and simulations that might shed new light on the findings we had previously identified. At this point, it may also benefit the study to deploy other research methods (such as additional statistical and quantitative tools) and to expand our sample size to inform a more robust set of findings.



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IMAGES

Alpaca Suri

http://www.arvi.fr/Nos_voyages/Perou/2012/3-Pisac/images/4711-Centre_lamas_ALPAGA_SURI.JPG

Alpaca Huacaya

<http://www.melfordgreenalpacos.co.uk/alpacas/breeding>
http://www.melfordgreenalpacos.co.uk/userfiles/product_images/123/160/Ascendent%20EV.jpg

Chris Jordan

Silent Spring (Owls)

<http://chrisjordan.com/gallery/rtn/#silent-spring>

Blue (water bottles)

<http://chrisjordan.com/gallery/rtn2/#water-bottles>

Roundup (bees)

<http://chrisjordan.com/gallery/rtn2/#bees>

Monsanto seeds in India & deaths

<http://chrisjordan.com/gallery/rtn2/#seeds>

Tuna fishing

<http://chrisjordan.com/gallery/rtn2/#tuna>

APPENDIX

CHARACTERISTICS	HUACAYA BREED	SURI BREED
Approximate population	3'200,000	600,000
Description	Its fibers grow perpendicular to its body, giving it a puffy pompous appearance. Also, its head is noticeably smaller and elliptical than the Suri. Its broad colour diversity, give it more than twenty natural tones.	Its fibers grow parallel to its body, giving it a slenderer and more finessed appearance. Its fiber is known for its length and shininess. However, it has a smaller range of natural colours.
Hair width (tiers)	Royal: Less than 20 microns Baby: 20 to 23 microns Fleece: 23 to 26.5 microns Medium fleece: 26.5 to 29 microns Huarizo: Thicker than 29 microns	
Average weight	Newborn: 7.5 kilograms Adult: 67 kilograms	
Average height	90 centimeters	
Hair length	9 to 12 centimeters	10.5 to 20 centimeters

Appendix A. Characteristics of alpaca breeds

NAME	STAKEHOLDER AFFILIATION	ENGAGEMENT	HERD SIZE	MEMBERS PER HOUSEHOLD	OTHER ANIMALS FARMED	UNIT OF TRANSACTION
Augustina	Rural farmer	Semi-structured interv.	80 alpacas	six	Llamas, cows, guinea pigs	Bulk sale
Benancio	Rural farmer	Semi-structured interv.	60 alpacas	five	Llamas, guinea pigs	Bulk sale
Ceperiano	Rural farmer	Semi-structured interv.	120 alpacas	six	Llamas	Bulk sale
Victor	Intermediary	Observation	N/A	N/A	N/A	Bulk sale
Julio	Retail vendor	Open-ended interv.	N/A	N/A	N/A	Clothes & fabric
Cesar	Community rep	Open-ended interv.	N/A	N/A	N/A	N/A

Appendix B. Summary of interviews



Appendix C. Interviews were done with farmers from the Tambo Saccsamarca community



Appendix D. Augustina, an interviewee, takes a rest while herding her alpacas